Marine Plan for Northern Ireland - Sustainability Appraisal Scoping Report

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1 Introduction

1.1 Introduction

This Scoping Report has been prepared as part of a Sustainability Appraisal (SA) of the Plan to facilitate marine spatial planning around Northern Ireland. The Northern Ireland marine area comprises the Northern Ireland Inshore Region (Territorial Waters within 12nm), Offshore Region (Contiguous Zone within 24nm) and Shared Waters (Figure 1). The plan for the marine spatial planning of this area will be the Marine Plan for Northern Ireland ("the Plan").

The Northern Ireland Department of Environment (DOE), Marine Division is currently developing the Plan and has appointed AECOM and APBmer to undertake a SA. The SA will be used to inform the development of the Plan and to assess the environmental, social and economic effects arising from the Plan's implementation.

1.2 Need for the Plan and Key Facts

In 2008, the Northern Ireland Executive agreed to introduce marine legislation to Northern Ireland. Due to the nature of the devolution settlement for Northern Ireland, and the complex mix of devolved and non-devolved functions, this framework has been achieved in Northern Ireland through three interlocking pieces of legislation:

- the Marine and Coastal Access Act 2009 (herein referred to as the MCA Act 2009) (c.23), which received Royal Assent on 12 November 2009;
- United Kingdom-wide Marine Strategy Regulations 2010 (No.1627), which came into operation on 15 July 2010, and which transpose the Marine Strategy Framework Directive (2008/56/EC); and
- the Marine Act (Northern Ireland) 2013.

The Plan is being prepared to enable DOE to advance towards an integrated spatial planning approach to Northern Ireland's inshore and offshore areas, its resources, and the activities and interactions that take place within the areas. Table 1 provides a summary of the key facts regarding the Plan.

Table 1: Marine Plan for Northern Ireland - Key Facts

Responsible Authority	Department of the Environment
Title	Marine Plan for Northern Ireland
Purpose	To provide a pro-active, forward looking planning approach to the management of Northern Ireland's marine area, its resources and the activities and interactions that take place within it.
What prompted the plan?	The MCA Act 2009 and the Marine Act (Northern Ireland) 2013 enabled the Department as the Marine Plan Authority to commence a new marine planning system for Northern Ireland's marine area.
Subject	Marine Spatial Planning
Period covered	From 2016
Frequency of updates	A report will be published within 3 years after the first marine plan for Northern Ireland is adopted. Reports within 6 years from the passing of the MCA Act 2009 and the Marine Act (Northern Ireland) 2013 on marine plans prepared, intentions to amend existing plans or preparation of additional plans.
Geographical Area covered	Northern Ireland marine area. The Northern Ireland Inshore Region (Territorial Waters within 12nm), Offshore Region (Contiguous Zone within 24nm) and Shared Waters.
Summary of nature/content	The Marine Plan for Northern Ireland aims to contribute to the effective management of marine activities and the sustainable use of marine resources.
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1.3 The Need for the Sustainability Appraisal

Under Schedule 1, section 10 of the Marine Act (Northern Ireland) 2013:

> *10 (1) The Department must carry out an appraisal of the sustainability of its proposals for inclusion in any marine plan..*
>
> *(2) The Department may proceed with those proposals only if it considers that the results of the appraisal indicate that it is appropriate to do so.*
>
> *(3) The Department must publish a report of the results of the appraisal.*
>
> *(4) The report is to be published when the Department publishes the consultation draft under paragraph 11.*

Though not referred to in the Marine Act (Northern Ireland) 2013, the MCA Act 2009 requires that all SAs incorporate Strategic Environmental Assessment (SEA). The process of SEA was introduced under the European Directive 2001/42/EC 'the assessment of certain plans and programmes on the environment', commonly referred to as the SEA Directive. The Directive was transposed into domestic law in Northern Ireland through the Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (S.R. 280/2004). SA therefore assesses the environmental, economic and social impacts of the Plan.

1.4 Spatial Coverage of the SA

The spatial coverage of the SA will match the spatial coverage of the Plan i.e. the Northern Ireland marine area compromising the Northern Ireland Inshore Region (Territorial Waters within 12nm), Offshore Region (Contiguous Zone within 24nm) and Shared Waters (see Figure 1). In relation to the spatial coverage of terrestrial areas, the baseline description focuses on the marine environment but takes account of the inter-relationship between terrestrial and marine activities and resources in coastal areas. The SA will therefore primarily focus on the Plan's effects on marine resources and activities. Effects on terrestrial activities and resources will only be assessed in so far as these are affected by the policies and actions contained in the Plan.

1.5 How the SA will influence the Plan

Ultimately the focus of this SA is to identify how a marine spatial planning regime could affect the social, economic, biological and physical environment of Northern Ireland. The results of the SA will then be used to help DOE understand the environmental, social and economic implications of the Plan and to influence its implementation.

The Plan is being developed in parallel to the SA (see indicative timescales in Section 1.9 below). Following the selection of preferred policies, the draft Plan will be subject to an SA, which will include the development of mitigation measures to avoid, reduce and offset environmental, social and economic effects where appropriate. These measures will be incorporated within the Plan itself.

When a draft of the Plan has been prepared, it will be published for a period of consultation with the public and all other stakeholders. The Sustainability Appraisal Report, which sets out the findings of the SA process, will be published with the Draft Plan. This will allow consultees to comment on the Draft Plan, in the knowledge of its predicted environmental, social and economic effects. All comments on the Draft Plan and SA will be taken into account in the development of the final adopted Plan.

1.6 Relationship between SA and SEA

As stated above the SA encompasses the requirements of the SEA Directive as well as the need to consider other social and economic issues. Our proposed approach to undertaking the SA is therefore based on the methods widely used to undertake assessments under the SEA Directive but with the addition of further social and economic elements.

To aid understanding of what would be encompassed under the SA topics, the standard SEA topic headings have been adapted to give a more appropriate description of the information which has been collected as part of the baseline for the SA report, the adaptations are shown in Table 2.

Table 2 : SA headings proposed in line with the SEA Directive and Plan SA.

SA Topics identified	Topic Headings used is this SA
Biodiversity, flora and fauna*	Biodiversity, flora and fauna
Climate Factors*	Climate Factors
Air*	Air
Water*	Water and Soils
Soil*	Water and Soils
Landscape*	Landscape and Seascape
Cultural Heritage*	Cultural Heritage
Material Assets*	Material Assets / Uses and Activities
Human Health*	Socio-Demographics
Population*	Socio-Demographics
Economic Interests	Uses and Activities

*SEA Directive Topic

As shown in Table 2, there are overlaps between the topics and how the information is presented in the SA scoping report. In Chapter 5 of this Report further information is provided for each SA topics identified, including a summary of existing conditions, key issues, problems and future trends.

1.7 Key Stages in the SA Process

The relationship between the SA and SEA has been stated in section 1.6 above. In terms of methodology for undertaking the SA, we propose to follow the five stage approach typically used for SEA. These stages are set out in the UK guidance note on SEA 'A Practical Guide to the Strategic Environmental Assessment Directive' (ODPM 2005), which was prepared jointly by the former Office of the Deputy Prime Minister (now Department of Communities and Local Government), the former Scottish Executive (now Scottish Government), the Welsh Assembly Government and DOE in Northern Ireland. These stages have been adapted to include the social and economic topics which are required to be assessed as part of the SA and to address specific opportunities within the project timetable to consolidate approach.

The requirements for each stage are summarised in Table 3.

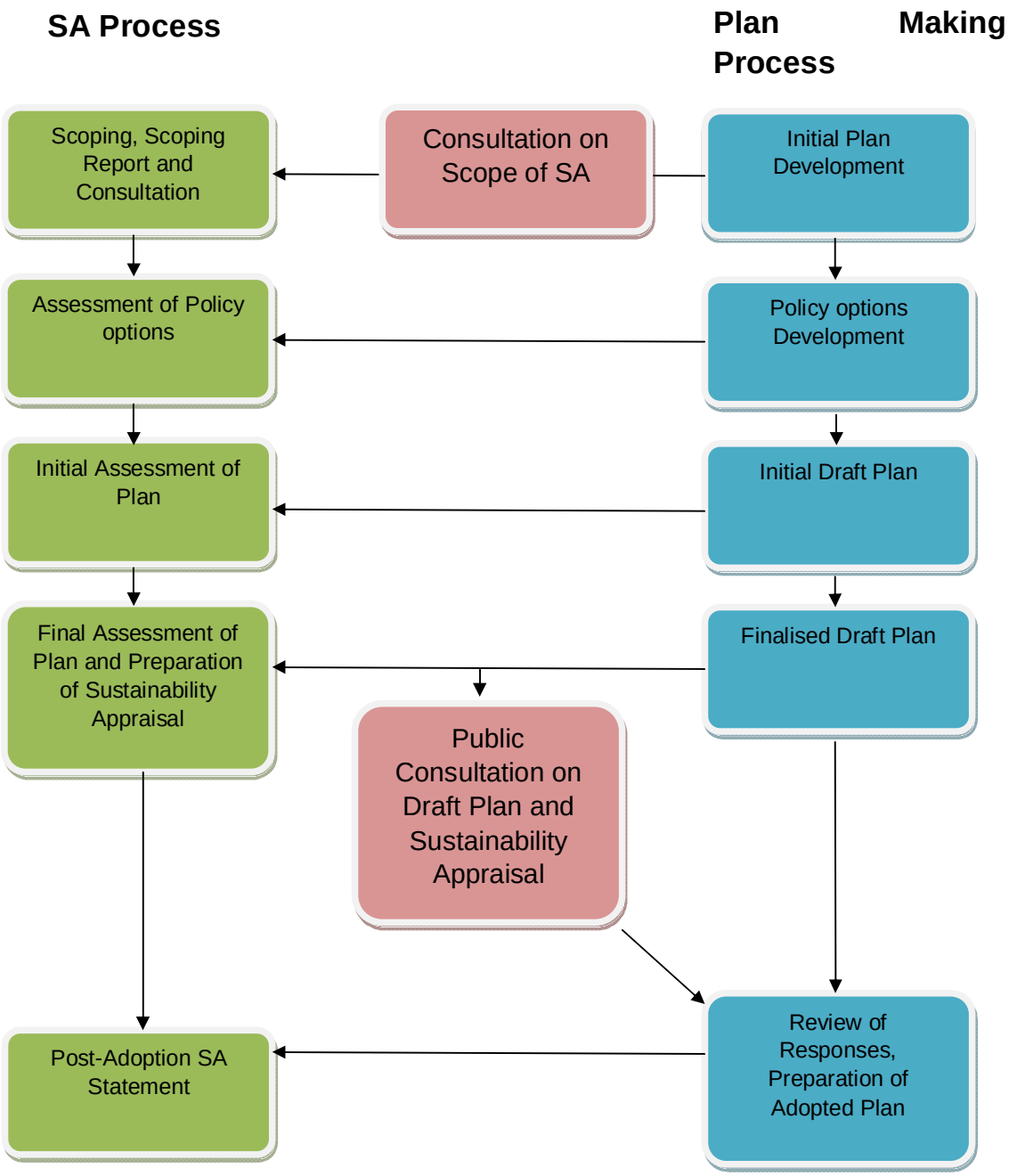
Table 3 : SA Process Stages

SA Stage	Description
Stage A : Deciding the Scope of the SA and Identifying Strategic Alternatives.	Identification of spatial and temporal scope of assessment. Identification/collection of baseline data. Identification of key environmental, social and economic issues/problems. Identification of relevant plans, programmes and their associated environmental, social and economic protection objectives to characterise the existing legislative and policy environment (see section 3 for result of identification). Development of a method for assessing potential environmental, social and economic effects (see section 4.4 for description of method). Consultation with statutory authorities with environmental, social and economic responsibilities on scope of SA (i.e. Northern Ireland Environment Agency, DOE for Northern Ireland) and transboundary consultations with bordering countries and devolved administrations. (Outside the SA process, DOE Marine Plan team have assessed the strategic alternatives which are available at this stage of the plan development process).
Stage B :Assessing Effects	Identification of the likely environmental, social and economic effects of the Plan. Use significance criteria to evaluate the predicted effects. Outlining the potential measures to mitigate environmental, social and economic effects. Proposal of measures to monitor the environmental, social and economic effects throughout the implementation of the Plan.
Stage C : Preparing the Sustainability Appraisal Report	Presentation of the findings of the SA process in a Sustainability Appraisal Report.

SA Stage	Description
Stage D : Consulting and Decision Making	Consultation with the public, community groups, authorities with environmental, social and economic responsibilities (e.g. Northern Ireland Environment Agency (NIEA), Department of Culture, Arts and Leisure (DCAL), Department for Regional Development (DRD), Department of Agriculture and Rural Development (DARD), Department of Enterprise, Trade and Investment (DETI) plus other key stakeholders, industry and academics. Consultation with the Environmental Protection Agency (EPA) in the Republic of Ireland and the governmental departments within the other devolved administrations. Incorporation of comments received from consultation and findings of the Sustainability Appraisal Report into the Plan. Assessment of any significant changes to the Plan. Issuing a 'statement' of how the findings of the SA and responses from consultation were incorporated into the Plan.
Stage E : Monitoring Implementation of the Plan	Monitoring of the environmental, social and economic effects of the Plan throughout the period if its implementation. Responding to adverse effects.

This iterative process is summarised in Image 1, which highlights the key stages where the SA process interacts with the development of the Plan.

Image 1: SA and Plan Development Process



1.8 Transboundary Considerations

The policies within the Plan will be limited to Northern Ireland territorial waters; however given the nature of the marine environment, there is potential for transboundary effects.

SEA legislation required that where the plan under development has the potential to result in significant adverse effects on a neighbouring Member State, the affected country must be consulted. Therefore in addition to assessing transboundary effects, the statutory consultees for SA in the Republic of Ireland will be consulted on the draft Plan and SA report. In addition to the Republic of Ireland, the bounded UK administrations (MMO, Marine Scotland, Welsh Government and Department for Environment, Food and Rural Affairs (Defra)) will also be consulted on the draft Plan and SA report.

1.9 Indicative Timescales for the Plan and SA

It is intended that the Draft Plan and Sustainability Appraisal will be issued in 2015 for public consultation. The DOE propose a consultation period of 12 weeks.

During this time consultees will have an opportunity to comment on the content of the Plan. The consultation will be followed by a period of review prior to adoption of the final Plan.

A Post Adoption Statement will be published following the adoption of the Plan. This will set out how the findings from the SA and comments from consultation have been integrated into the final adopted Plan.

1.10 Habitat Regulations Assessment (HRA)

Prior to the formal screening exercise, a HRA pre-screening will be undertaken to identify sites of conservation interest within the marine environment prior to the formal screening exercise. The formal screening exercise will be undertaken to determine whether the Plan should be subject to an Appropriate Assessment (AA). An AA will be required if it is identified that the Plan is likely to have a significant adverse effect on any European sites (Special Protection Areas (SPA), Special Areas of Conservation (SAC) or Ramsar Site as designated under the European and International legislation. This screening exercise will be undertaken when more information is known about the forthcoming Plan, enabling a judgement to be taken regarding its likely effect on these sites.

1.11 Note on Socio-Economic Impact Assessment

A separate and detailed socio-economic impact assessment is not being undertaken as part of this assessment. The social and economic parts of this assessment will follow the same method and level of detail as that for the environmental aspects. The assessment for environmental, social and economic topics will be qualitative and not quantitative; this is in line with assessments which have been undertaken for other marine SAs. Further information on assessment methods is provided in Chapter 4 below.

2 Overview of Marine Plan for Northern Ireland

2.1 Introduction

Northern Ireland's seas are a major environmental and economic asset. They provide an important social and cultural function and sustain coastal communities and industries. However, the sea is not a limitless resource and as a result, regulation has been developed to sustainably manage and develop these activities. Marine planning is a tool which will facilitate the sustainable development of the marine area. The Plan aims to guide decision-makers to take a balanced consideration of economic, social and environmental factors while taking account of the costs and benefits of key marine activities.

2.2 Background to Northern Ireland's Marine Programme

Sustainable development is at the heart of Northern Ireland's Marine Programme which is designed to achieve the shared UK vision of clean, healthy, safe, productive and biologically diverse oceans and seas.

The Marine Programme which is led by DOE is putting in place mechanisms to enhance the long-term viability and potential growth of marine activities and to improve the stewardship of the marine area. It is part of a suite of interlocking legislation which is being introduced by the UK administrations.

2.2.1 Marine and Coastal Access Act 2009 (MCA Act 2009)

The MCA Act 2009 established DOE as the Marine Plan Authority for the development of Marine Plans in the offshore region – that is, from the 12 nautical mile mark to the boundary of the Northern Ireland zone.

2.2.2 Marine Act (Northern Ireland) 2013

The Marine Act (Northern Ireland) establishes DOE as the Marine Plan Authority for the inshore region. This, together with the MCA Act 2009 gives DOE the power to prepare and adopt a Marine Plan for Northern Ireland thereby enhancing the long-term viability of the marine area. The legislation requires DOE to work in conjunction with other relevant Northern Ireland Departments with responsibilities in the marine area (DARD, DETI, DRD and DCAL). This legislation also enables DOE to designate Marine Conservation Zones (MCZs) in Northern Ireland's inshore region following approval from the Secretary of State thereby helping to deliver the UK's aim of establishing an "ecologically coherent network of Marine Protected Areas". The network will ensure that biodiversity is protected and international and European commitments are met. Following enactment of this legislation Strangford Lough was designated as a Marine Conservation Zone.

2.2.3 Marine Policy Statement

In addition, the MCA Act 2009 made provision for the introduction of the Marine Policy Statement (MPS). The MPS, agreed by all UK Administrations, provides the high-level policy context within which the Marine Plan for Northern Ireland will be developed, implemented, monitored, amended and/or withdrawn. The Statement also ensures that there is appropriate consistency in marine planning across the UK marine area.

At a UK level, the MPS is the first step in marine planning. It outlines the national policies for various activities and issues which need to be considered when developing a marine plan. It provides transparency to users, guides the development of marine plans, sets out the importance of encouraging co-existence of uses and how impacts should be considered.

The MPS does not provide specific guidance on, or attempt to prioritise, every activity which will take place in, or otherwise affect, Northern Ireland's marine area. In addition, until a Marine Plan for Northern Ireland is in place all decisions capable of affecting the marine area are subject to the requirements of the MPS unless relevant considerations indicate otherwise.

2.2.4 Marine Licensing Reforms

The MCA Act 2009 also made provision for certain marine licensing reforms, primarily replacement of Part II of the Food and Environment Protection Act 1985 (Deposits in the Sea) with a more streamlined system for

managing the marine area. DOE, as the marine licensing authority for the inshore region, introduced a suite of subordinate legislation which became effective on 6 April 2011 to implement the new marine licensing system.

2.2.5 Marine Strategy Framework Directive

The Marine Strategy Framework Directive (MSFD) requires Member States to determine Good Environmental Status (GES) for their marine waters, and to design and implement programmes of measures aimed at achieving GES by 2020, using an ecosystem approach to marine management.

DOE is responsible for leading the implementation of the Directive in the inshore region. However, the legislation recognises that other public bodies in Northern Ireland have an important role to play in realising the objectives of the Directive and a general duty is placed on DARD, DCAL, DETI, DRD and the Loughs Agency to exercise their relevant functions so as to secure compliance with the requirements of the Directive.

2.3 The Marine Plan for Northern Ireland

2.3.1 Role of the Marine Plan for Northern Ireland

The Marine Plan will enable DOE to advance towards a new Plan-led system that will provide the framework within which decisions on the management of Northern Ireland's marine area will be taken. In this way, marine users and prospective developers / investors will have greater certainty about Northern Ireland's marine priorities and should experience less regulatory burden thereby attracting more confidence to proceed with individual proposals.

The Marine Plan will also seek to support and complement existing plans wherever appropriate, signposting to any relevant information and policies.

2.3.2 Objectives of the draft Marine Plan for Northern Ireland

The draft vision for the Marine Plan for Northern Ireland is "A healthy marine area which is managed sustainably for the economic, environmental and social prosperity of present and future generations".

The draft Objectives are:

- To promote the sustainable development of productive activities, which support employment at all skill levels, while fully considering the requirements of other marine interests;
- To help realise the potential of energy resources and energy storage within the marine area while fully considering the requirements of other marine interests;
- To promote the development of vibrant, accessible and sustainable coastal communities;
- To promote the marine resource, its recreational value and the wider social, economic and environmental benefits to all;
- To promote the preservation and enjoyment of marine related heritage assets;
- To promote a healthy, resilient and adaptable marine ecosystem and an ecologically coherent network of Marine Protected Areas;
- To contribute towards climate change mitigation and adaptation;
- To encourage compatibility with other plans (including those in adjacent administrations) relevant to the regulation and management of key activities and issues; and,
- To continue to develop a sound marine evidence base in a coordinated manner to increase understanding and to support the development, monitoring and review of marine plans.

2.3.3 Direction of the draft Marine Plan

The Department set out its consideration of alternative approaches to the direction of the Marine Plan in its March 2014 paper which was circulated to stakeholders. In order to meet its objectives, DOE aims to "develop a strategic plan with spatial elements included, where appropriate, and to take a balanced

approach to guide the users of the Marine Plan to consider the relative weight of any economic, environmental and social considerations in the exercise of their functions".

Data is fundamental to supporting decisions that affect the Northern Ireland marine area. DOE is working collaboratively with other Northern Ireland Government Departments and Agencies, the UK Government Departments, and other organisations to fill strategic data and knowledge gaps that will underpin marine planning and future management of the marine area.

2.3.4 Outcomes of the Marine Plan for Northern Ireland

The Plan will consider as far as possible, all of the relevant marine activities, the natural and cultural resources within the Plan area and the impacts they may have on each other. It will address both the current situation, and also emerging and future marine uses and technologies, while also anticipating changing economic and social trends and the impact of climate change. It will indicate where appropriate development would be supported. It will also identify both existing and proposed development as well as new designations and allocations. The Plan will not designate new areas for economic, environmental and socio-economic and/or social protection/generation. The Plan will incorporate areas identified and designated through separate processes within the relevant Department's responsibilities. The Plan in part, also aims to clarify the application and intent of the MPS as it applies to the Northern Ireland marine area.

In Northern Ireland, responsibility for the marine area is spread across a number of NI Government Departments and Agencies, and UK Government Departments, including Department of Energy and Climate Change (DECC), Ministry of Defence (MOD), Department for Transport (DfT) and Defra. Consultation with the relevant Departments is recognised in the marine legislation and, therefore, is an integral part of the marine plan process. Whilst the MPS and the Marine Plan, when adopted, will inform and guide decision making the responsibility for the activities including policy development is retained by the relevant Departments and Agencies.

The Marine Plan will be subject to ongoing review and monitoring to ensure it remains relevant and effective. In particular, DOE is required to report within 6 years on its planning activity, including details of any new Plans it has prepared, any amendments it expects to make to those Plans and any new Plans it intends to prepare. In addition, the effectiveness of marine plans are required to be reviewed within three years.

2.4 Other Related Initiatives – how will the Plan interact with other plans and policies

The Marine Plan recognises that there are other related initiatives that will support the objectives of the Marine Plan.

Of particular note is the interaction between the terrestrial planning and marine planning systems. The Marine Plan area boundary extends up to the level of the mean high water spring tides while terrestrial planning generally extends to the mean low water spring tides. Consequently, the Marine Plan area will physically overlap with that of terrestrial plans.

The UK MPS sets out that the integration of marine and terrestrial Planning will be achieved through:

- Consistency between marine and terrestrial policy documents and guidance;
- Liaison between respective authorities for terrestrial and marine planning, including plan development, implementation and review stages; and,
- Sharing the evidence base and data where relevant and appropriate.

The MSFD sets out the framework for the achievement of good environmental status in our marine and coastal waters. The aim of the Directive is to put in place management measures designed to achieve good environmental status by 2020. In estuaries and coastal waters there are similar requirements under the Water Framework Directive, which requires the achievement of good ecological status by 2015.

The Department also aims to have in place an ecologically coherent network of well-managed Marine Protected Areas (MPA) in the Northern Ireland inshore region by 2016. This will contribute to the wider UK MPA network, to meet International (e.g. OSPAR) and EU (e.g. Marine Strategy Framework Directive) obligations. The MPA network will include Special Areas of Conservation (SAC), Special Protection Areas (SPA), Areas of Special Scientific Interest (ASSI), Ramsar sites and Marine Conservation Zones (MCZ).

The Executive's priorities for the period 2011-2015 are set out in the Programme for Government (PfG) 2011-2015. Economic development to provide "the wealth and resources required to build the peaceful, prosperous, fair and healthy society" is a top priority. It is recognised that this must be undertaken in a way

which protects and enhances the physical and natural environment while balancing the imperative for economic development.

The Executive's objectives are currently being delivered through a number of strategies such as the Regional Development Strategy (RDS) and via the policy priorities of the Northern Ireland Departments.

Strategic Objective 4.3 in the Sustainable Development Strategy "Everyone's Involved" promotes sustainable marine management. The Implementation Plan for the Sustainable Development Strategy sets out the actions being taken by Departments, Local Government Districts (LGDs) and others in support of the achievement of this strategic objective.

The Sustainable Development Strategy is underpinned by a statutory duty on all Departments and LGDs to, "act in the exercise of their functions, in the manner they consider best calculated to promote the achievement of sustainable development".

3 Relationship with other Relevant Plans, Programmes and Strategies

3.1 Introduction

Preparation of the Marine Plan for Northern Ireland cannot be undertaken in isolation. It is guided and influenced by a number of existing plans, programmes and strategies produced in Northern Ireland, the other UK devolved administrations, the Republic of Ireland and the Isle of Man. These have been developed at the national, regional and local level seeking to enhance and promote the environmental, economic and social development of the Northern Ireland Marine Area and its bordering nations. These are discussed below. A full summary of all legislation, plans and relevant programmes can be found in Appendix A.

3.2 International Context

At the international level, the United Nations Convention of the Law of the Sea establishes the right of coastal nations to set laws and regulate the use of the marine area out to 12 nautical miles. This Convention also establishes exclusive economic zones from 12 to 200 nautical miles from the coast. There are also a number of international commitments which are relevant to the Marine Plan area, including the International Convention for the Prevention of Pollution from Ships (MARPOL Convention) and the Aichi targets which were agreed at the Nagoya conference of the Parties to the Convention on Biological Diversity.

3.2.1 The Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR" Convention)

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention') was open for signature at the Ministerial Meeting of the Oslo and Paris Commissions in Paris on 22 September 1992. It was adopted together with a Final declaration and an Action Plan.

The Convention has been signed and ratified by all of the Contracting Parties to the original Oslo or Paris Conventions (Belgium, Denmark, the European Union, Finland, France, Germany, Iceland, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland) and by Luxembourg and Switzerland.

Contained within the OSPAR Convention are a series of Annexes which deal with the following specific areas:

- Annex I: Prevention and elimination of pollution from land-based sources;
- Annex II: Prevention and elimination of pollution by dumping or incineration;
- Annex III: Prevention and elimination of pollution from offshore sources; and,
- Annex IV: Assessment of the quality of the marine environment.

The first Ministerial Meeting of the OSPAR Commission at Sintra, Portugal in 1998 adopted Annex V to the Convention, to extend the cooperation of the Contracting Parties to cover all human activities that might adversely affect the marine environment of the North-East Atlantic. Nevertheless, programmes and measures cannot be adopted under the Convention on questions relating to fisheries management and there is a preference for issues related to shipping to be dealt with by the International Maritime Organisation.

In 2000, to fulfil obligations under Annex IV of the OSPAR Convention the OSPAR Commission published the first comprehensive Quality Status Report on the quality of the marine environment of the OSPAR maritime area.

This was followed by the Quality Status Report in 2010 which examined all aspects of human influence on the sea, including contaminants, nutrient pollution and radioactive substances and the effects of human activities such as the offshore oil and gas industry, offshore wind farms, maritime transport, and fisheries. It will guide OSPAR's work and strategies in the period to 2020.

3.3 European Context

The European Commission recognises that maritime spatial planning is a tool which will contribute to the sustainable development of marine and coastal areas and adopted the "Road Map for Maritime Spatial Planning: Achieving Common Principles in the EU" in 2008.

The advent of the Marine Strategy Framework Directive (MSFD) has provided the impetus for coordinated marine spatial planning across Europe.

The MSFD aims to more effectively protect the marine environment across Europe though the application of an ecosystem approach to marine management. It requires Member States to put measures in place to achieve or maintain Good Environmental Status (GES) by 2020. The most basic description of GES is to protect the marine environment, prevent its deterioration and restore it where practicable while still using the marine resource sustainably. The Directive sets out 11 high level Descriptors of Good Environmental Status, these are:

- Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.
- Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.
- Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.
- All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.
- Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.
- Sea floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.
- Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.
- Concentrations of contaminants are at levels not giving rise to pollution effects.
- Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.
- Properties and quantities of marine litter do not cause harm to the coastal and marine environment.
- Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.

The Directive came into force on 15 July 2008, where it was transposed into national legislation through the Marine Strategy Regulations 2010 and the Marine Act 2013. Member States were required to report on their initial assessment of their seas and to determine GES and associated targets and indicators by 2012.

In addition to the MSFD, the Water Framework Directive, the Habitats and Birds Directives and the Common Fisheries Policy contain provisions for the use and protection of the marine environment.

The European Union's Integrated Maritime Policy recognises that the seas are Europe's lifeblood and are central to its wellbeing and prosperity. The Integrated Maritime Policy, launched in October 2007, covers marine transport, the competitiveness of marine businesses, marine employment, scientific research and protection of the marine environment. The objectives of the policy include enhancing Europe's capacity to face the challenges of globalisation and competitiveness, degradation of the marine environment, maritime safety and security and energy security and sustainability.

3.4 National, Regional and Local Level

At the UK level, the MCA Act 2009 requires that Marine Plans are prepared for the UK marine area (0 to 200 nautical miles). The devolved administrations have jurisdiction over marine planning matters from 0 to 12 nautical miles. The following sections provide an overview of the marine planning mechanisms in Northern Ireland and within each of the bordering devolved administration.

The UK Administrations are committed to the coordination of marine planning across administrative boundaries and have made it a requirement of their respective legislation. Coordination will include planning for activities which extend across national or marine plan area boundaries, the sharing of data between plan authorities and the timing of development of the marine plans for any area.

3.4.1 Marine Planning in Northern Ireland

As described in chapter 2, this scoping report is part of the process to inform a Marine Plan for Northern Ireland. Chapter 2 also describes how national and local marine legislation will influenced the Plan. In addition to marine legislation, a full list of relevant legislation and a summary of their objectives are found in Appendix A.

3.4.2 Marine Planning in Scotland

In 2013, Marine Scotland prepared a draft National Marine Plan for Scotland, in accordance with the requirements of the Marine (Scotland) Act 2010 and the MCA Act 2009. It is expected that the plan will be adopted in 2014. The Plan covers both Scottish inshore waters (0-12 nautical miles) and offshore waters (12-200 nautical miles). The Scottish and United Kingdom Governments have agreed that the national marine plan for Scottish inshore waters and a marine plan covering Scottish offshore waters will be published in one document and will be collectively referred to as the "National Marine Plan". However, it is recognised that the 'National Marine Plan' still comprises two plans made under two separate pieces of legislation.

3.4.3 Marine Planning in England

The Marine Management Organisation (MMO) was established under the MCA Act 2009 and one of its delegated responsibilities is preparing marine plans for the English inshore and offshore waters. As part of this responsibility, the English coastline has been divided into ten marine plan areas, which are as follows:

1. North East Inshore;
2. North East Offshore;
3. East Inshore;
4. East Offshore;
5. South East Inshore;
6. South Inshore;
7. South Offshore;
8. South West Inshore;
9. South West Offshore; and,
10. North West.

Work has been completed on the East Marine Plans (for areas 3 and 4) which were published in April 2014 and work has begun on the South Marine Plans (areas 6 and 7).

3.5 Linkages to Regional Strategic and Terrestrial Planning

The Marine Plan for Northern Ireland will not operate in isolation and will become part of the wider policy regime in Northern Ireland.

3.5.1 Regional Development Strategy 2035

The Regional Development Strategy 2035 – Building a Better Future (RDS 2035), is the overarching strategic planning framework which facilitates and guides the public and private sectors, to inform and guide the whole community in the drive to create a dynamic, prosperous and progressive Northern Ireland. Within marine planning, its influence extends into the marine area.

The RDS 2035 identified the need to "protect, enhance and manage the coast" it states "The quality of coastal waters needs to be raised. Coastal areas need to be protected from coastal squeeze, to safeguard against loss of distinctive habitats and to help adaptation to climate change. The landscape setting of features should be conserved". The RDS 2035 identifies that the MPS and subsequent Marine Plan will

provide spatial guidance and detailed policy where appropriate for the terrestrial/marine interface and the marine environment, which will be complemented by work to advance integrated coastal zone management. In addition RDS 2035 policy SFG15: Strengthen the Gateways for Regional competitiveness identifies the importance of providing "high quality connections to and from the air and sea ports", where development must be appropriate and "in accordance with future marine plans when adopted".

In addition to the policies and strategic needs identified within RDS 2035, it also identified administrative hubs and associated clusters. One of the many benefits of the review of public administration is the identified hubs and clusters will become part of the same LGDs after April 1st 2015. Within the area of the Plan, the following hubs and associated clusters have been identified, they are:

- Londonderry / Strabane/ Letterkenny (transboundary linkage);
- Coleraine / Limavady / Ballycastle / Ballymoney;
- Larne / Ballymena / Antrim;
- Belfast / Newtownards;
- Downpatrick / Newcastle; and,
- Newry / Warrenpoint / Dundalk (transboundary linkage).

The boundaries of the LGDs mimic the proposed clusters.

3.5.2 Changes to public administration in Northern Ireland

The reform of local government will result in a reduction in the current number of LGDs from 26 to 11. This process is set to be completed in April 2015. As a result of the reform, the following LGDs will have coastal areas:

- Derry and Strabane;
- Causeway Coast and Glens;
- Mid and East Antrim;
- Belfast;
- Antrim and Newtownabbey;
- North Down and Ards; and,
- Newry, Mourne and Down.

Each of the new LGDs will be responsible for producing their own Development Plans which will replace the existing Area Plans. As a result of these changes to the public administration structure in Northern Ireland, there will be associated changes to the planning regime. To harmonise the production of the Development Plans and provide a "new set of overarching core planning principles to underpin delivery of the planning reforms set out in the Planning Act (Northern Ireland) 2011", the Strategic Planning Policy for Northern Ireland (SPPS) was published for consultation in February 2014.

The SPPS contains policies pertaining to the formulation of the local development plans, development management within the LGDs, subject policies and implementation and transitional arrangements. In relation to the subject policies, for coastal development, the SPPS recognises the following policy objectives:

- To conserve the natural character and landscape of the underdeveloped coast and to protect it from excessive, inappropriate or obtrusive development and from the actual or potential effects of pollution; and,
- To facilitate development in coastal locations within coastal settlements that contribute to a sustainable economy and which is sensitive to its location.

In addition to the policy objective, the consultation documents for the SPPS also states that "of particular relevance to LGDs, particularly those with an interface with the marine environment, will be the current legislative requirement that all public authorities taking authorisation or enforcement decisions that affect or

might affect the UK marine area must do so in accordance with the MPS unless relevant considerations indicate otherwise".

3.5.3 Focus on the Future – Sustainable Development Strategy Implementation

The implementation strategy for the Sustainable Development Strategy for Northern Ireland, assigns objectives to each of the Government Departments which make up the Northern Ireland government administrative structure. In relation to marine planning, objective 4.3 for DOE states "promote sustainable marine management'.

4 Sustainability Appraisal: Approach and Method

4.1 Introduction

This Chapter sets out the approach to undertaking the SA including: the main stages in the process, the environmental, economic and social topics that will be included within the scope of the SA, and the methods that will be used to assess effects and identify mitigation measures.

As stated in the introduction to this report, the approach to the SA is based on the widely used methods for undertaking SEA but adapted to meet the requirements for an SA including extended coverage of social and economic issues. The methods therefore generally follow the UK guidance on SEA 'A Practical Guide to the Strategic Environmental Assessment Directive' (ODPM 2005). Using this recognised approach, the main stages (as presented above in Table 2) of SA will be as follows

- Stage A: Deciding the Scope of the SA and Identifying Strategic Alternatives;
- Stage B: Assessing Effects;
- Stage C: Preparing the Sustainability Appraisal Report;
- Stage D: Consulting and Decision Making; and,
- Stage E: Monitoring Implementation of the Plan.

The proposed approach to Stages A to D is explained below. Further information on Stage E Monitoring will be provided in the Sustainability Appraisal Report.

4.2 Establishing the Scope of the SA (Stage A)

Scoping is the process used to set the context of the SA, define the study area, identify key environmental, economic and social baseline information within the study area and agree on the method that will be used to assess the Plan. The main output from this stage is the Scoping Report (this report) which has been issued to statutory consultees for comment.

The scoping of this SA has included a workshop where key stakeholders were invited to discuss the content of the Scoping Report, including its coverage of environmental, economic and social topics and the associated assessment method. In addition to the scoping workshop, formal comment on the scope of the SA is required from other transboundary statutory authorities. These are the other devolved administrations and other bordering countries (the Republic of Ireland). The responses from the scoping workshop have informed this report and statutory consultees will be further integrated into the next stages of the SA process where appropriate.

4.2.1 Approach to Scoping

Table 4 below describes the main tasks in the scoping stage of this SA.

Table 4 : Stage A Scoping

SA Stage	Description
Stage A : Deciding the Scope of the SA and Identifying Strategic Alternatives	Identification of spatial and temporal scope of assessment
	Identification/collection of baseline data
	Identification of key environmental, social and economic issues/problems
	Identification of relevant plans, programmes and their associated environmental, social and economic protection objectives to characterise the existing legislative and policy environment (see section 3 for result of identification).
	Development of a method for assessing potential environmental, social and economic effects (see section 4.4 for description of method).

SA Stage	Description
	Consultation with statutory authorities with environmental, social and economic responsibilities on scope of SA (i.e. Northern Ireland Environment Agency, DOE for Northern Ireland) and transboundary consultations with bordering countries and devolved administrations.
	(Outside the SA process, DOE Marine Plan team have assessed the strategic alternatives which are available at this stage of the plan development process).

4.2.2 SA Topics

It is proposed that the SA covers the topics shown in Table 5 below, and is further sub-divided by the important factors/sub-topics listed. Baseline information for each of these topics is provided in Chapter 5 below.

Table 5 : SA Topics and Subtopics

SA Topics	Important Factors/Sub-topics
Biodiversity, Flora and Fauna	Protected Sites (International, European and National Conservation Sites). Benthic and Intertidal Ecology Plankton Fish and Shellfish Marine Mammals Marine Reptiles Birds Marine Noise
Water and Soils	Bathymetry and hydrography (including circulation and tides) Geology, geomorphology and sediment processes (including coastal and marine processes) Sediment and Water Quality
Air	Air, including, Air Quality Management Areas (AQMAs) and Registered Pollutant Releases
Climate Factors	Climate Factors, including, greenhouse gas releases and vessel fuel emissions.
Socio-Demographics	General Demography Deprivation Life Expectancy and Median Age at Death Neighbourhood Renewal Education Housing Northern Ireland Economy Coastal Communities Fund

SA Topics	Important Factors/Sub-topics
Uses and Activities	Commercial Fisheries Aquaculture Ports, Shipping, Navigation, Dredging and Disposal Recreation and Tourism Aviation Military Activity Coastal Defences Noise Lighting Marine Litter
Material Assets	Cables and Pipelines Terrestrial Transport Network Aggregates Underground Offshore Energy Storage Petroleum Exploration Licensing Offshore Renewable Energy Carbon Capture and Storage Compressed Air Energy Storage Waste Water Treatment and Industrial Discharges
Cultural Heritage	Cultural Heritage Wrecks Submerged Prehistory Coastal and Intertidal Archaeology Terrestrial Cultural Heritage
Landscape and Seascape	Landscape and Seascape

4.3 Approach to the Consideration of Alternatives

The DOE Marine Plan team approach to alternatives has been explained in Appendix B. This alternatives approach has been cited as a response to section 14 of the SEA Directive, which requires account be taken of reasonable alternatives in the context of the objectives and the geographical scope of the plan or programme.

The Plan is proposed to be broadly strategic in nature with spatial elements, where appropriate, and will follow an ethos of sustainable development. The Plan objectives have been broadly agreed with stakeholders and the approach to alternatives has been designed to primarily meet these objective requirements.

4.4 Assessing Effects (SA Stage B)

4.4.1 Assessment of the Plan

The focus of this stage is to assess how the Plan will affect the social, economic and environmental receptors within the study area and the wider environment, and to then identify mitigation measures to avoid, reduce or offset adverse effects. The results of the assessment will be documented in a Sustainability Appraisal Report (Stage C).

Table 6 summarises the tasks that will be carried out to deliver Stage B of this SA. The method that will be used to assess the effects of the Plan on the social, economic and natural environment is presented at the end of this chapter.

Table 6 : SA Stage B: Assessing Effects

SA Stage	Description
Stage B :Assessing Effects	Identification of the likely environmental, social and economic effects of the Plan
	Use significance criteria to evaluate the predicted effects
	Outlining the potential measures to mitigate environmental, social and economic effects
	Proposal of measures to monitor the environmental, social and economic effects throughout the implementation of the Plan

4.5 Approach to the Assessment of Effects

The approach to be used for the assessment of effects has been informed by the proposed content and coverage of the Plan as described in Chapter 2 of this Scoping Report. Table 7 below provides an overview of the coverage of the Plan and what this means for the SA.

Table 7 : The Plan Overview available during Scoping and how it informs the SA

The Plan	The SA
Will provide a strategic framework with spatial elements. The Plan will consist of a series of policy statements covering cross-cutting marine planning issues that apply to all decision making in the marine area and to relevant sectors.	The approach to the SA, level of detail, methods will match the strategic nature of the Plan. The highly strategic nature of the proposed Plan and its policies means that the level of detail for baseline information and assessment will be at a similar level of detail.
Will not zone new areas for development/ particular uses or drive forward new designations	The SA will therefore not compare or assess specific developments or locations for different uses. The assessment will use an approach which matches the strategic nature of the Plan, where zoning or designations are not undertaken.
Will not bring forward new policies governed by other departments but will align with and contribute to the policy objectives for key marine activities as set out in the UK MPS. It will support and complement existing plans and policies.	The SA will not replicate previous SEAs (e.g. Offshore Renewables) but use the results of these studies in assessing the effects resulting from the Plan and ensure consistency.
The Marine Plan team has determined that there are no reasonable alternatives to the Plan.	The SA will therefore not include an assessment of alternatives, with the exception of the no Plan alternative.

Based on the above, the proposed assessment of environmental, social and economic effects will comprise two parts:

- Part 1: Individual Policy Assessment
- Part 2: Cumulative assessment

Part 1: Individual Policy Assessment

Part 1 of the assessment will assess the likely effects on all SA topics of each policy or action contained in the Draft Plan. It is proposed that each of the policies/actions be assessed to determine its likely significant effects on the relevant receptors identified under each of the SA topics. The assessment results will presented in the form of a matrix using the assessment approach described below.

Part 2: Cumulative Assessment

Part 2 of the assessment will assess the cumulative effects of the draft Plan (all policies/actions) across the entire study area on each SA topic e.g. assess the total effect on water quality that is likely to result from the implementation of the Plan. In addition, the potential cumulative effects with other plans, programmes and strategies will also be assessed.

As part of the cumulative impact assessment, an ecosystems services assessment will be undertaken following the approach outlined below.

Part 1 and Part 2 assessments will inform the identification of mitigation measures designed to avoid, reduce or offset impacts. Following an initial assessment of potential effects, an assessment of 'residual effects' will be undertaken i.e. taking into account the implementation of mitigation measures. The two part assessment with an integration of ecosystems services is designed to produce a rigorous assessment. It is accepted that parts of marine and coastal processes and their associated interactions cannot be fully assessed because they are not fully understood. The proposed assessment will address this uncertainty by using the most recently available information to inform decision making and where necessary highlight how uncertainty can be addressed for later plans.

4.5.1 Coverage of Ecosystem Services

Ecosystem services qualify the benefits that ecosystems provide to contribute to human existence. These consist of all the natural products and processes that contribute to human well-being, along with the personal and social enjoyment derived from nature. Ecosystem services are commonly grouped into four categories, these are:

- Provisioning – the products obtained from ecosystems such as food, timber, medicines, fiber and freshwater;
- Regulating – the benefits obtained from ecosystem processes such as pollination and control of the climate and water;
- Cultural – the non-material benefits obtained from ecosystems, such as recreation, spiritual values and aesthetic enjoyment; and,
- Supporting – ecosystem functions that are necessary for the production of all other ecosystem services, such as nutrient cycling and primary production.

As part of the cumulative assessment associated with the SA, it is proposed to undertaken an assessment of the impact of the policies resulting from the plan within an ecosystems services context. A matrix approach will be used to undertake an ecosystems analysis of the Marine Plan for Northern Ireland. This will identify the relationships between issues and the potential effects on ecosystem services (both positive and negative) resulting from the Plan.

4.6 Assessment Criteria

It is proposed that the impact assessment uses the criteria set out in Table 8 below. The proposed assessment criteria reflect the strategic nature of this SA. Given the high level nature of this Plan and its national scope, the assessment will not attempt to qualify 'significance' in any great detail. For example identifying any differentiation between 'high' or 'medium' significance is unlikely to be possible when assessing effects on protected species.

The assessment undertaken in Part 1 will therefore be based on the criteria outlined in Table 8 as follows:

Table 8 : Assessment Criteria

Effect	Assessment Criteria
Significant Adverse	The precise measure for significant adverse effect will vary across the different SA topics. However, in general, the key factors influencing the potential for a significant adverse effect to occur are likely to include: • Permanent, long term or irreversible change in baseline conditions e.g. reduction in quality of baseline environment or effect on baseline features (receptors). • Direct and indirect effects on baseline features of international or European importance. • Direct effect on baseline features of national importance. It should be noted that each SA topic, and the baseline features (receptors) associated with that topic, will need to be considered on a case by case basis. There is the potential that the criteria listed above will be subject to modification during the assessment to reflect specific characteristics of the baseline environment within Northern Ireland. However, any modifications will be reflective of the main principles of an assessment of significant adverse effect.
Adverse (Not Significant)	As above, the measure for adverse effect will vary across the different SA topics. However, in general, the key factors influencing the potential for a negative (not significant) effect to occur are likely to include: • Temporary, short term or reversible change in baseline conditions e.g. reduction in quality of baseline environment or effect on baseline features (receptors). • Indirect effect on baseline features of national importance. • Direct effect on baseline features that are not designated under international, European or national legislation but which are known to be sensitive to certain types of marine, coastal or intertidal development.
Negligible	Negligible effects will be identified where there is likely to be change in baseline, or effect on a baseline feature (receptor), but the level of change/effect will be indiscernible/very slight. Negligible effects may be positive or negative.
Neutral	There will be no change in baseline environment/features as a result of the Plan.
Positive	Proposals within the Plan will have a positive effect on the baseline environment/features.
Unknown	Unknown effects will be recorded where there is insufficient information available to accurately determine the level and type of potential effect. This could be due to: • A lack of baseline data. • Limited knowledge on how the Plan would interact with particular baseline features/ characteristics. • A lack of knowledge as to whether certain baseline features (receptors) are sensitive to development interactions in the marine, coastal or intertidal area.

It is proposed that the following system of symbol coding will be used in the presentation of the results from the assessment (Table 9). These symbols reflect the criteria described in the previous Table 8.

Table 9 : Assessment Criteria Symbol Codes

Assessment Result	Symbol Coding
Significant Adverse	XX
Adverse	X
Negligible	<>
Neutral	0
Positive	✓
Unknown	?

4.7 Note on Assessment 'Objectives'

This SA will use the main SA topics and related features/components as the basis of the assessment rather than developing specific SA objectives.

The use of SA objectives is not a statutory requirement of the SEA Directive or SEA Regulations (Northern Ireland) 2004, or referenced within the Marine and Coastal Access Act 2009, however it has become recognised method in the SEA process. SEA objectives can be a useful assessment technique, however, they do not always offer the flexibility required when assessing complex plans or environments, and in some cases can lead to the over assessment of issues which may not be appropriate and can be misleading.

It is proposed that objectives will therefore not be used for this SA and instead effects on the SA 'topics' as defined in section 4.2.2 and refined for this plan that will be assessed.

4.8 Sustainability Appraisal Report (Stage C)

The results from the assessment (Stage B) will be presented in a Sustainability Appraisal Report which will be issued along with the draft Plan for an agreed period of public consultation. The main aim therefore of the Sustainability Appraisal Report is to provide consultees with the necessary environmental, social and economic information to inform their views on the proposals within the Plan (once it is published in draft form).

The consultation process helps to ensure that the findings from the SA are accurate and correct and that all potential social, economic and environmental issues have been dealt with appropriately. All formal responses to the consultation on the Sustainability Appraisal Report will be taken into account in the preparation of the final Plan.

4.8.1 Proposed Content of the Sustainability Appraisal Report

The following is a summary of the proposed contents of the Sustainability Appraisal Report:

- Non -Technical Summary (published as a standalone document)
- Introduction to the SA
- Outline of the Plan
- SA baseline information and context
- Assessment Methods
- Assessment Results
- Monitoring
- Appendices

4.9 Consultation (Stage D)

All comments received during consultation on the SA and draft Plan will be made available on the DOE Marine Division website. Following consultation (a minimum of 12 week period is proposed) there will be a period of review where all comments received on the SA and draft Plan are reviewed, and changes integrated into the final Plan as necessary. Following adoption of the final Plan, an SA Statement will be prepared. This will document how the findings from the SA and relevant comments received from public consultation were taken into account in the preparation of the final Plan. This document will also be made available on the DOE Marine Division website.

5 Baseline Data

5.1 Introduction

Baseline information has been gathered to identify the social, economic and environmental issues associated with the Plan area, to inform the SA. Consequently, the baseline data requirements for the SA differ from those of the Plan. The approach to baseline information and data collection (in particular the level of detail) is consistent with the strategic nature and sustainable approach of the Plan as described in Chapter 2. The assessment methods proposed, including the approach to scoping and SA topics covered are described in Chapter 4. If additional baseline information is identified, it will be considered to inform the assessment.

5.2 SA Topic Relationships

It is recognised that relationships between topics need to be described in order to accurately present the status of the existing environment. To aid this description, an illustration of the relationships identified in Chapter 5, as part of the key issues, problems and future trends has been provided in Appendix C of this report.

5.3 Baseline Data Collection Methodology

Baseline information gathering has to inform the assessment methodology of the SA and based on the information which is already known about the Plan, a number of considerations have been identified, these include:

- Strategic nature of baseline data – resolution to match the Plan
- Desk based approach to data and information gathering
- Transboundary information included as appropriate
- Inclusion of appropriate terrestrial data

It is accepted practice for strategic assessments, that all baseline information gathering has used sources which are primarily available within the public domain. As a result, no consultation for data has been undertaken in addition to the scoping workshop which was undertaken prior to the publication of the scoping report.

Data gathering from the public domain has the advantage of data presented being instantly available to any reader for external scrutiny, but has the limitation that it is not always available for the year of plan or programme publication.

This is particularly pertinent to the different timescales in which environmental, social and economic data is collected. For example, environmental data relating to water quality is collected yearly but published lagging a year (data for 2012 is available in 2013), social data relating to deprivation is collected in a five year cycle and economic data relating to agricultural businesses is collected on a yearly basis and published lagging a year, like water quality data. All of this data is used to describe the marine area and its environs but the reader must be cognisant of the different timescales in which the data is collected and equally the different time scales in which trends and issues will present themselves.

The function of the baseline data collection for the SA is to characterise the marine area of the Plan. While there is a requirement to collect data which is as accurate and up to date as possible, all the data collected provides a “snapshot” of the marine area and its environs during that point in time and it is subject to revision during the SA period. The Northern Ireland marine area compromises the Northern Ireland Inshore Region (Territorial Waters within 12nm), Offshore Region (Contiguous Zone within 24nm) and Shared Waters.

The data collection extent has been set at approximately 30km landward from the coastline in the first instance, then within the LGDs which are encompassed by this area and finally where there is no other alternative information for all of Northern Ireland has been collected. This reflects the strategic nature of the Plan and acknowledges the wider interaction between the land and the marine area of Northern Ireland.

The use of the 30km buffer from the coastline is to identify data sources which inform the cumulative impacts assessments for the Plan and identify ecosystem linkages. This is to mimic the scales at which the policies within the Plan will interact with their receiving environment. For the purpose of this scoping report, it is proposed that the policies within the Plan will be strategic in nature, and the baseline data for the SA will reflect this.

5.4 The Baseline Data

Baseline information has been provided in respect of each of the SA topics and sub topics (or related subjects) and has been structured as follows:

- Sources of baseline data;
- Baseline description providing a summary of any trends identified for available/existing data sets e.g. changing population sizes or distributions; and,
- Indicative key issues, problems and future trends.

Where possible, the baseline data collected has been illustrated in map format (see Appendix D). Due to the strategic nature of the Plan and therefore this SA, the baseline data presented for the SA is of a similar strategic nature i.e. the baseline data review focuses therefore on site or features which are designated at a national or international level. Some of the social and economic information is at the LGD or county level, depending on the data source. More detailed baseline information, for example locally protected sites, should be considered through project level environmental assessments as schemes are developed for individual planning applications.

It should be clarified at this point that for the entire SA process, all data gathering has been undertaken using a desk based approach. Due to the previously mentioned strategic nature of the Plan and the SA, field based information gathering is not considered appropriate or necessary for this process.

5.5 Marine Plan for Northern Ireland Plan Area

The Marine Plan for the Northern Ireland Plan Area will cover an area of approximately 12,350km^2 and include 650km of coastline. The area of coastline bounds the LGDs of:

- Newry and Mourne;
- Down;
- Ards;
- North Down;
- Belfast;
- Newtownabbey;
- Carrickfergus;
- Larne;
- Moyle;
- Coleraine;
- Limavady;
- Derry; and,
- Strabane.

In 2011, the total population of these LGDs was 1,020,994. This is approximately 56% of the total Northern Ireland population for 2011. These figures do give an indication of how much of the population live within proximity to the coast and how many existing administrative regimes exist along the coastal area of Northern Ireland.

5.6 Reform of local government

The reform of local government will result in a reduction in the current number of Northern Ireland LGDs from 26 to 11. This process is set to be completed in April 2015. As a result of the reform, the following LGDs will have an area of coastline:

- Derry and Strabane;
- Causeway Coast and Glens;
- Mid and East Antrim;
- Antrim and Newtonabbey;
- Belfast;
- North Down and Ards; and,
- Newry, Mourne and Down.

While the land use plans extend to the coast of Northern Ireland, there is currently no planning regime for how the marine environment is managed, it is anticipated that the Plan will provide the framework to address this. The Plan area will comprise an "inshore" and "offshore" region. The inshore region covers all Northern Ireland marine waters including tidal rivers and sea loughs, out to the 12 nautical mile limit. The offshore region is the area from the 12 nautical mile mark to the boundary of the Northern Ireland zone (Illustrated on Figure 1).

5.7 Introduction

The baseline section has been split into each of the SA topic headings, which are:

- Biodiversity, Flora and Fauna;
- Water and Soils;
- Air;
- Climate Factors;
- Socio-Demographics
- Uses and Activities;
- Material Assets;
- Cultural Heritage; and
- Landscape and Seascape

Table 10 shows the general layout of the baseline section, with the environmental issues based on the SA topics and the sub-topics presented in the document.

Table 10 : SA Topics and Sub-topics

SA Topics	Important Factors/Sub-topics
Biodiversity, Flora and Fauna	Protected Sites (International, European and National Conservation Sites) Benthic and Intertidal Ecology Plankton Fish and Shellfish Marine Mammals Marine Reptiles Birds Marine Noise

SA Topics	Important Factors/Sub-topics
Water and Soils	Bathymetry and hydrography (including circulation and tides) Geology, geomorphology and sediment processes (including coastal and marine processes) Sediment and Water Quality
Air	Air, including, Air Quality Management Areas (AQMAs) and Registered Pollutant Releases
Climate Factors	Climate Factors, including, greenhouse gas releases and vessel fuel emissions.
Socio-Demographics	General Demography Deprivation Life Expectancy and Median Age at Death Neighbourhood Renewal Education Housing Northern Ireland Economy Coastal Communities Fund
Uses and Activities	Commercial Fisheries Aquaculture Ports, Shipping, Navigation, Dredging and Disposal Recreation and Tourism Aviation Military Activity Coastal Defences Noise Lighting Marine Litter
Material Assets	Cables and Pipelines Terrestrial Transport Network Aggregates Underground Offshore Energy Storage Petroleum Exploration Licensing Offshore Renewable Energy Carbon Capture and Storage Compressed Air Energy Storage Waste Water Treatment and Industrial Discharges
Cultural Heritage	Cultural Heritage Wrecks Submerged Prehistory Coastal and Intertidal Archaeology Terrestrial Cultural Heritage
Landscape and Seascape	Landscape and Seascape

In addition to data gathering relating to the SA topics, data gathering was also undertaken to inform the ecosystem services assessment. While it has been included as part of Chapter 5, it is not part of the SA topics and sub-topics.

Transboundary information has been included where it is appropriate, however the study area for transboundary assessments will ultimately depend on the nature of the assessments being undertaken and may vary depending on the particular SA topic.

5.7.1 Terrestrial Data

While the Plan area is known, the extent of how the Plan will impact on the terrestrial environment is unknown. Terrestrial information has been collected approximately 30km from the coastline. This is to capture the extent of tidal rivers and provide a context for the information being presented. In relation to social and economic baseline information, information was collected based on the LGDs adjacent to the coast.

5.8 Biodiversity, Flora and Fauna

5.8.1 Introduction

This section contains an overview and summary of the data collected in relation to biodiversity, flora and fauna. This topic has been split into six main sub-headings which are:

- Protected sites;
- Benthic and intertidal ecology;
- Plankton;
- Fish and shellfish;
- Marine mammals;
- Marine reptiles;
- Birds; and,
- Marine Noise

5.8.2 Protected Sites

The following data sources have been used to characterise the protected sites within the Plan area:

- World Heritage Sites (WHS) (United National Educational Scientific and Cultural Organisation, (UNESCO));
- Giant's Causeway and Causeway Coast World Heritage Site (Environmental and Heritage Service, 2005);
- Existing and proposed protected sites (Special Areas of Conservation (SACs), Sites of Community Importance (SCI) Special Protected Areas (SPAs), Ramsar Sites, Marine Nature Reserves (MNRs), National Nature Reserves (NNRs) and Areas of Outstanding Natural Beauty (AONB);
- Northern Ireland Environment Agency (NIEA) Protected areas and NIEA biodiversity pages;
- Joint Nature Conservation Committee (JNCC) website;
- Marine Reserves in Northern Ireland: The way forward. World Wildlife Fund (WWF) and Ulster Wildlife Trust (UWT) (Thurstan et al., 2008);
- Northern Ireland Coastal Zone - Indicators of Sustainable Development (DOE, 2011); and,
- Marine Conservation Zone (MCZ) Areas of Search.
- Draft guidance on selection and designation of Marine Conservation Zones (MCZs) in the Northern Ireland Inshore Region. A consultation Document. October 2013. Department of the Environment Northern Ireland. (DOE, 2013);

- Defra, 2014. Department for Environment, Food and Rural Affairs Marine Conservation Zones: Update February 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/285304/pb14141-mcz-update-201402.pdf; and
- Irish Sea Conservation Zones website http://www.irishseaconservation.org.uk/MCZ-recommendations.

Baseline Description

The coastal and marine environment of Northern Ireland supports a diverse range of flora and fauna. As a result, a large percentage of the area is designated or proposed for designation for nature conservation interest under national, European and international legislation. The existing and proposed protected sites within the Plan area are listed in Table 11 and shown in Figure 2. These have been reviewed in more detail in the following sections.

Table 11 : Summary of Protected Sites within the Plan area

Site name	Designation										
	International		European			National					
	Ramsar	WHS	SAC	SCI	SPA	MNR	NNR	AONB	ASSI	rMCZ	MCZ Area of Search
Belfast Lough	X				X						
Killough Bay	X				X						
Larne Lough	X				X				X		
Lough Foyle	X				X						
Outer Ards	X				X				X		
Strangford Lough	X		X		X	X					
Giant's Causeway and Causeway Coast		X									
Murlough			X				X		X		
Magilligan			X						X		
Rathlin Island			X		X						
Bann Estuary			X						X		
North Antrim Coast			X								
Red Bay			X								
Pisces Reef Complex				X							
Skerries and Causeway				X							
The Maidens				X							
Sheep Island					X				X		
Belfast Lough Open Water					X						
Copeland Islands					X				X		
Portrush							X				
Swan Island							X				
Granagh Bay							X				
Dorn							X				
Cloghy Rocks							X				
Kebble							X				
Ballymaclary							X				
Magilligan Point							X				
Killard							X				

Site name	Designation										
	International		European			National					
	Ramsar	WHS	SAC	SCI	SPA	MNR	NNR	AONB	ASSI	rMCZ	MCZ Area of Search
Ballyquintin Point							X		X		
Giant's Causeway							X				
North Strangford Lough							X				
Mourne								X			
Strangford and Lecale								X			
Causeway Coast								X			
Antrim Coast and Glens								X			
Binevenagh								X			
Rathlin Island - Ballycarry									X		
Rathlin Island - Ballygill North									X		
Rathlin Island - Kinramer South									X		
Rathlin Island - Coast									X		
Carrickarade									X		
White Park Bay									X		
Giant's Causeway and Dunseverick									X		
Runkerry									X		
Portballintrae									X		
Ramore Head and The Skerries									X		
Straidkilly Wood									X		
Waterloo									X		
Portmuck									X		
Ballymacormick Point									X		
Outer Belfast Lough									X		
Inner Belfast Lough									X		
Strangford Lough Part 1									X		
Strangford Lough Part 3									X		
Quoile									X		
Strangford Lough Part 2									X		
Killough Bay and Strand Lough									X		
Ballycastle Coalfield									X		
Torr Head									X		
Carlingford Lough									X		
Sheepland Coast									X		

Site name	Designation										
	International		European			National					
	Ramsar	WHS	SAC	SCI	SPA	MNR	NNR	AONB	ASSI	rMCZ	MCZ Area of Search
The Gobbins									X		
Castle Point									X		
Cloghfin Port									X		
Little Deer Park									X		
Minnis									X		
Cloghastucan									X		
Fair Head and Murlough Bay									X		
Church Bay									X		
Galboly									X		
Rathlin Island - Kebble									X		
Tyrella & Minerstown									X		
Slieve Na Griddle										X	
South Rigg										X	
Maidens-Larne											X
Belfast Lough											X
Dundrum Bay											X
Rathlin Deeps											X
Lough Foyle											X
Outer Ards											X
Carlingford Lough											X
Rathlin Church Bay											X
Total	**6**	**1**	**6**	**3**	**10**	**1**	**13**	**5**	**46**	**2**	**8**

International Overview

The two distinct types of internationally protected sites occurring within the Plan area are as follows:

- Ramsar Sites – wetlands of international importance designated under the Ramsar Convention on Wetlands (1971); and,
- World Heritage Sites - designated under the United Nations Educational, Scientific and Cultural Organisation (UNESCO).

The Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Ramsar convention is the only global environmental treaty that deals with a particular ecosystem. Ramsar sites are designated to protect wetland conservation due to their importance to biodiversity conservation and anthropogenic well-being. Within the Plan area, there are six Ramsar sites (Table 11).

There is one World Heritage Site in Northern Ireland, The Giant's Causeway and Causeway Coast, which was designated in 1986 because of its geological and geomorphological value[1]. The site is situated on the north coast of County Antrim and extends for 6km between Causeway Head and Benbane Head (Figure 2). The site is made up of some 40,000 massive black basalt regular polygonal columns which were formed due to volcanic activity during the Tertiary period.

[1] Designated under criteria (vii) to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance; and (viii) to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features

World Heritage Sites (WHS) are non–statutory designations and their management plans are implemented within the context of the local, regional, national and international policies. The Giant's Causeway and Causeway Coast has a Management Plan in place which was commissioned by DOE. The Management Plan provides an agreed framework for the management of the site with the aim of achieving a sustainable future by guiding current and future actions on and around the site (Environment and Heritage Service, 2005).

European Overview

The following types of European protected sites, also referred to as Natura 2000 sites, occur within the Plan area:

- Special Areas of Conservation (SACs) - designated under the EC Habitats Directive (92/43/EEC); and,
- Special Protection Areas (SPAs) - designated in accordance with Article 4 of the EC Birds Directive (79/409/EEC).

SACs are part of a European wide network of important high quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Habitats Directive. It should be noted that of the Annex I habitats, 78 occur in the UK along with 43 of the Annex II species. SPAs are classified for rare and vulnerable birds (listed in Annex I of the Birds Directive) and for regularly occurring migratory species. Each of the sites have Conservation Objectives that ensure Member States take appropriate steps in avoiding the deterioration of interest features for which the site is designated for.

There are 6 SACs, 3 Sites of Community Importance (SCIs[2]) and 10 SPAs located within the Plan area. These are listed in Table 11 and shown in Figure 2.

National Overview

The following types of nationally protected sites occur within the Plan area:

- Marine Nature Reserve (MNR) - statutory sites designated under the Wildlife and Countryside Act 1981;
- National Nature Reserve (NNR) - designated under the Amenity Lands Act (Northern Ireland) 1965;
- Areas of Outstanding Natural Beauty (AONB) - originally designated under the Amenity Lands Act (Northern Ireland) 1965 but are now designated under the Nature Conservation and Amenity Lands Order (Northern Ireland) 1985; and,
- Areas of Special Scientific Interest (ASSI) - designated under Amenity Lands Order (Northern Ireland) 1985. Measures to improve ASSI protection and management are contained within the Environment (Northern Ireland) Order 2002.

Marine Nature Reserves (MNR) are designated to conserve marine flora and fauna and geological or physiographical features of special interest whilst providing opportunities for studying marine systems. The only MNR within the Plan area is Strangford Lough (Figure 2).

National Nature Reserves (NNRs) contain examples of the most important natural and semi-natural terrestrial and coastal ecosystems in the UK. They are managed in order to conserve their habitats or to provide special opportunities for scientific study. Within the Plan area there are 13 designated NNRs (Table 11 and Figure 2).

Areas of Outstanding Natural Beauty (AONB) are primarily designated to conserve natural beauty which includes wildlife, physiographic features and cultural heritage as well as landscapes and scenery. Notice is also taken of the need to conserve agriculture, forestry and other rural industries and the economic and social needs of local communities. There are 5 AONB within the Plan area (Table 11 and Figure 2).

[2] Sites of Community Importance (SCIs) are sites that have been adopted by the European Commission but not yet formally designated by the government of each country.

Areas of Special Scientific Interest (ASSIs) are the equivalent to SSSIs[3] in England, Scotland and Wales. They provide statutory protection for the best examples of flora, fauna or geological or physiographical features. They are also used to underpin other national and international nature conservation designations. ASSI designation may extend to the intertidal areas out to the jurisdiction limit of local authorities, which is generally Mean Low Water. Within the Plan area there are 46 designated ASSIs which overlap with a number of international and European protected sites (Table 11 and Figure 2). In 2008, over 75% of the features within coastal ASSIs in Northern Ireland were in favourable or recovering condition (DOE, 2011). This compares with a figure of 69% for features across all ASSIs within Northern Ireland.

The UK has signed up to international agreements that aim to establish an 'ecologically coherent network of Marine Protected Areas (MPAs)' by the end of 2012. This network will be made up of current MPAs as well as a new type of MPA called a Marine Conservation Zone (MCZ).

Within the Irish Sea, the development of recommendations for MCZ has been coordinated by the Irish Sea Regional MCZ Project (Irish Sea Conservation Zones website). In November 2013 Defra designated 27 new MCZs, none of which fall within the Plan area. In February 2014, Defra announced that work on a second tranche of MCZs is currently underway with the aim of holding public consultation in early 2015 and designating sites by the end of that year (Defra, 2014). For the second tranche, 37 sites from the Regional MCZ Project recommendations have been identified as suitable candidates for consideration. There are two recommended MCZ (rMCZs) that occur within the Plan area that have been proposed as candidate MCZs. These rMCZs are shown on Figure 2.

In addition to the rMCZ's, there are eight MCZ Areas of Search within the Plan area. This is stage 1 (of 5) of the selection process in order to identify and select potential sites for designation as an MCZ (DOE, 2013). These are also shown on Figure 2.

Key Issues, Problems and Future Trends

The restoration of features of protected sites that are currently in unfavourable condition can take time. In relation to ASSIs, for example, the Northern Ireland Environmental Agency (NIEA) is working with landowners and other stakeholders, in particular the Department of Agriculture and Rural Development (DARD) to ensure that sympathetic management of ASSIs is in place (DOE, 2011). The condition assessments of the ASSIs, however, are considered to be representative of the favourable condition status of overlapping European/Ramsar sites.

Anthropogenic stressors on the marine environment are increasing in number and magnitude. Of particular concern is the impact of climate change on the number and severity of occurrences of invasive non-native species (Thurston et al. 2008). A consequence of these cumulative stressors is that the resilience of the ecosystem is declining i.e. the ability of the ecosystem to recover from disturbance is reduced (Nellemann et al. 2008). In an attempt to manage this potential decline in marine ecosystem resilience, conservation bodies such as the NIEA are identifying more MCZs which will be conserved and protected under statutory law. Due to the location of some proposed MCZs, it may be necessary to include an assessment of their social and economic importance prior to designation. At time of writing, this assessment was currently being undertaken.

As stated in the baseline section, the UK will have a network of both MPAs and MCZs to meet its obligations to establish an ecologically coherent network within the marine environment. There are two recommended MCZ (rMCZs) that occur within the Plan area that have been proposed as candidate MCZs. In addition to the rMCZ's, there are eight MCZ Areas of Search within the Plan area which are shown on Figure 2.

5.8.3 Benthic and Intertidal Ecology

The following data sources have been used to characterise the benthic and intertidal ecology within the Plan area:

- Northern Ireland Habitat Action Plans (HAPs);
- SEA 6 Environmental Report. Strategic Environmental Assessment of Draft Plan for a 24th Seaward Round of Offshore Oil and Gas Licensing (DTI, 2005);
- An Introduction to the Benthic Ecology of the Rockall - Hatton Area (SEA 7) (Davies et al., 2006);
- Northern Ireland Sublittoral Surveys (1980s and 2006-2008) (Goodwin et al., 2011);
- Mapping European Seabed Habitats (MESH) Project GIS maps;

[3] Sites of Special Scientific Interest.

- Northern Irelands' Priority Species and Species of Concern list (National Museums Northern Ireland, 2006-7);
- Joint Nature Conservation Committee (JNCC) Marine Recorder database;
- Northern Ireland Habitat Action Plan Saline Lagoons (2003);
- Bamber, R.N., Gilliland, P.M. & Shardlow, E.A. (2001). Saline Lagoons: A guide to their management and creation; and,
- UK SeaMap 2010 (JNCC website).

Baseline Description

Northern Ireland boasts a high diversity of benthic and intertidal marine life and environments which range from northern rocky shores to sheltered inland sea loughs. There are 7 SAC sites within Northern Ireland waters designated for the protection of certain benthic habitats as a primary reason for designation or as a qualifying feature. The Annex I habitats within the Plan area which are designated as a SAC and their corresponding UK Biodiversity Action Plan (BAP) priority habitat are listed in Table 12.

Table 12 : Protected marine and coastal habitats

SAC/SCI site	SAC Feature	UK BAP priority habitat types likely to be found within the relevant SAC feature
Sublittoral Habitats		
Murlough, Rathlin Island, The Maidens (SCI)	Sandbanks which are slightly covered by seawater all the time.	Maerl beds, Sublittoral sands and gravels, Seagrass beds
Strangford Lough	Large shallow inlets and bays;	Maerl beds, Tidal rapids, mudflats, sheltered muddy gravel, seagrass beds
Red Bay, Strangford Lough, Rathlin Island, Pisces Reef Complex (SCI), The Maidens (SCI).	Reefs	*Sabellaria alveolata* reefs *Mytilus edulus* reef Littoral chalk
Intertidal and Coastal Habitats		
Strangford Lough	Coastal Lagoons	Saline Lagoons
Murlough, Magilligan, Bann Estuary, North Antrim Coast	Fixed dunes with herbaceous vegetation;	Coastal saltmarsh
Murlough	Atlantic decalcified fixed dunes;	Coastal Saltmarsh
Murlough, Strangford Lough	Mudflats and sandflats not covered by seawater at low tide;	Mudflats, Seagrass beds
Murlough, Strangford Lough, Bann Estuary, North Antrim Coast	Atlantic salt meadows	Coastal Saltmarsh
Murlough, Magilligan, Bann Estuary	Embryonic shifting dunes;	Coastal Saltmarsh
Murlough, Magilligan, Bann Estuary, North Antrim Coast	Shifting dunes along the shoreline with *ammophila arenaria*;	Coastal Saltmarsh
Murlough, Magilligan	Dunes with *Salix repens* ssp. argentea	Coastal Saltmarsh
Strangford Lough, North Antrim Coast	Annual vegetation of drift lines	Coastal Saltmarsh
Strangford Lough	Perennial vegetation of stony banks;	Coastal Saltmarsh
Strangford Lough	*Salicornia* and other annuals colonising mud and sand.	Coastal Saltmarsh
Magilligan	Humid dune slacks;	Coastal Saltmarsh
Rathlin Island, North Antrim Coast	Vegetated sea cliffs of the Atlantic and Baltic coasts	Coastal Saltmarsh
Rathlin Island	Submerged or partially submerged sea caves;	

Northern Ireland's coastal and marine environment is rich and diverse. Intertidal habitats comprise muddy habitat on sheltered coasts and sea loughs, exposed and sheltered rocky shores, and sandy shingle and gravel shores. Subtidal habitats comprise sheltered mud occurring mainly in the sheltered sea loughs, subtidal sand habitats off the north coast, subtidal gravel and cobble habitat, and rocky habitat characterised by bedrock or boulders colonised by kelp beds. Predicted broadscale benthic habitats in the wider Plan area, based on UKSeaMap 2012 modelling[4], are shown in Figure 3. Based on this model, the main broad scale habitat in Northern Ireland's waters are deep circalittoral mud (EUNIS A5.37) in the south-eastern part of the Plan area and deep circalittoral coarse sediment (EUNIS A5.15) towards the northeast and deep circalittoral sand (EUNIS A5.27) in the north.

The sections below provide further detail on the most prevalent fully marine priority habitats that are known to occur in the Plan area. This information has been extracted from the Northern Ireland HAPs.

Tidal Rapids

This habitat is defined as 'strong tidal streams resulting from a constriction in the coastline such as at the entrance to, or within the length of an enclosed body of water such as a sea lough, and also areas of very strong tidal streams on the open coast or between islands' (NIEA, 2003a). This habitat occurs in a large range of high energy environments, ranging from rocky seabeds to gravel in deep tidal streams and tide-swept habitats.

A rich biodiversity is associated with tidal rapid habitats which includes soft corals, hydroids, bryozoans, large sponges, anemones and dense mussels and brittle star beds. Bedrock and boulders often support kelp and sea oak plants, which may grow very long in the tidal currents and are often found with encrusting fauna such as *Tubularia spp.* and *Verruca stroema*.

Within the Plan area, tidal rapids are found at the following locations:

- Strangford Narrows;
- Entrance to Carlingford Lough;
- Dundrum Channel;
- Killough harbour mouth;
- Maiden Islands;
- Entrance to Larne Lough;
- Between Barney's Point and the Magheramourne spoil tip;
- Outer coast of Rathlin Island;
- Entrance to Lough Foyle between Greencastle and Magilligan Point;
- Outer coast of the Skerries; and,
- Copeland Islands.

Seagrass Beds

Within the Plan area seagrass beds occur on shallow, sheltered intertidal and subtidal sediments and are largely confined to sea loughs. Around Britain and Ireland five Seagrass species are found; three species of eelgrass (namely *Zostera marina*, *Z. angustifolia* and *Z. noltii*) and two species of tassel weed (*Ruppia maritima* and *R. cirrhosa*) (NIEA, 2003b).

Seagrass beds are highly productive and an important keystone habitat. They support a wide range of flora and fauna by providing nursery grounds for a diversity of fish species (some of which are commercially valuable) and an important food source for overwintering wildfowl.

[4] UKSeaMap 2012 predicts benthic habitats based on seabed geology, water depths and energy regime (JNCC website). It builds on the previous work of MESH (2008), UKSeaMap 2006 (Connor et al., 2006) and the Irish Sea Pilot (Vincent et al., 2004).

Surveys and documentation on the distribution of seagrass could be enhanced. The most extensive research on *Zostera spp* distribution has been carried out on Strangford Lough where the majority of the *Zostera spp* were found in the northern part of the Lough on the northern sandflats. *Zostera spp* distribution mapping by the RSPB on Lough Foyle also found *Zostera spp* on the upper half of the shore (NIEA, 2003b).

Within the Plan area, seagrass beds are known to occur at the following locations:

- Strangford Lough; and,
- Lough Foyle.

Maerl Beds

Maerl is a collective term that describes several species of non-jointed coralline red algae (*Corallinaceace*) (Hall-Spencer et al, 2010). Maerl grows slowly as unattached nodules on the seabed and can form extensive beds in coarse clean sediments of gravels and clean sands or muddy sediments. Over long periods of time the dead calcareous skeleton can accumulate into deep deposits which are overlain by a thin pink layer of living maerl (NIEA, 2003c).

Maerl beds occur either on the open coast, in tide-swept channels or in sheltered areas of marine inlets (Hall-Spencer et al, 2010). Currents need to be strong enough to remove fine sediments but weak enough not to break or disperse the brittle maerl branches (NIEA, 2003c). As maerl requires light to photosynthesise, they are generally found in shallower waters, with the depth restricted by the turbidity of the water.

Maerl beds support a rich flora and fauna and may be an important nursery area for commercially valuable molluscs and crustaceans (Hall-Spencer et al, 2010). In addition, maerl can be used in agriculture, cosmetics, pharmaceutical and other industries.

Although several research studies have been undertaken on various aspects of local maerl habitats, the location and condition of maerl beds within the Plan area could be improved. They are, however, known to occur at the following locations:

- Strangford Lough;
- The Maidens;
- Garron Point;
- Ballygally Head;
- Church Bay;
- Ringfad Point;
- Cushendun Bay;
- Carlingford Lough; and
- North Coast of County Antrim.

Saline Lagoons

Saline lagoons are bodies of water that have a restricted connection to the sea which creates an environment where the salinity of the water body is considered to be neither marine or fresh but may vary from brackish to fully saline or hyper-saline. The salinity of any particular lagoon depends on the specific hydrodynamics associated with that lagoon and may show considerable variation in both time and space (NIEA, 2003d).

As saline lagoons are so variable, the diversity of the flora and fauna usually consists of highly specialised species that are able to cope with varying conditions. These species can be spilt into three groups:

- Marine species that are tolerant of low salinity;
- Freshwater species that are tolerant of high salinity; and,
- Lagoonal specialists.

Saline lagoons are important habitats for large numbers of wildfowl and waders as they provide important locations for high tide roosts and offer a habitat for migrating birds.

Within the Plan area saline lagoons are not common, with 30 being reported by Bamber et al. (2001). Most that have been surveyed are considered to be artificial. Artificial lagoons are formed when engineering works cut off part of an estuary or the sea from direct tidal influences and/restricts the movement of the tide in and out of this body of water.

Mudflats

Mudflats are intertidal habitats created by sedimentary deposition in low energy coastal environments, particularly in estuaries and other sheltered areas such as sea loughs (NIEA, 2003e). Due to the low energy system, the substrate is formed of fine silts and clays and has a high organic content. When mudflats occur in higher energy systems, the percentage of sand in the substrate increases. Mudflats are often a transitional habitat that links to other coastal habitats such as soft cliffs and saltmarshes (NIEA, 2003d).

Mudflats dissipate wave energy and, therefore, have an important role in reducing the risk of erosion of saltmarshes, and protecting coastal defences from damage and reducing the risk of flooding of low-lying land. They also play an important role in intertidal nutrient cycling by sequestering contaminants within the organic sediments (NIEA, 2003d).

Mudflats support a high abundance of organisms but tend to have low macrofaunal diversity. The composition of the mudflat biota reflects environmental conditions. For example, if salinity is low, large numbers of oligochaetes occur, and if there is a high proportion of sand, a wider diversity of polychaetes is present. Mudflats are productive habitats which are important to large numbers of migratory, overwintering and breeding waterfowl and Annex I bird species.

Within the Plan area mudflats are found at the following locations:

- Lough Foyle;
- Bann Estuary;
- Larne Lough;
- Belfast Lough;
- Strangford Lough;
- Inner Dundrum Bay; and,
- Carlingford Lough.

Sheltered Muddy Gravels

Sheltered muddy gravel habitats occur principally in estuaries, rias and sea loughs in areas protected from wave action and strong tidal streams. In the marine environment this habitat is very species rich due to the complex nature of the substrate being able to support a high diversity of infauna and epifauna. Polychaetes and bivalve molluscs are the dominant species. Moving into the lower salinity estuarine environment, there is a sharp reduction in species richness (NIEA, 2003f).

Within the Plan area sheltered muddy gravels are found at the following locations:

- Carlingford Lough;
- Strangford Lough;
- Belfast Lough;
- Larne Lough; and,
- Lough Foyle.

Mud Habitats in Deep Water

Deep water mud is associated with relatively stable conditions. The presence of strong tidal streams within Northern Ireland waters prevents the formation of this habitat in much of the Plan area. The largest area of mud deposits lies off the east coast extending towards the Isle of Man and the Irish coast (NIEA, 2005a).

The relatively stable conditions associated with deep mud habitats often lead to the establishment of communities of burrowing megafauna, where deep water (>200m) species may occur with coastal species.

The burrowing megafaunal species include burrowing crustaceans such as Dublin Bay prawns *Nephrops norvegicus* which is commercially important (see Section 5.8.5) and *Calianassa subterranea*. Mud habitats in deep water can also support seapen populations including *Virgularia mirabilis* and *Pennatula phosphorea*. Epibenthic scavengers include *Asterias rubens*, *Pagurus bernhardus* and *Liocarcinus depurator*. Brittlestars may be present and the infauna can include richly diverse populations of polycheates and bivalves.

Surveys of the west of the Irish Sea undertaken by Department of Agriculture and Rural Development (DARD)[5] found that the deeper sites are dominated by the burrowing crustacean Calocaris macandreae and the heart urchin *Brissopsis lyrifera*, while the shallower eastern side is dominated by the starfish *Asterias rubens* and more mobile taxa such as the swimming crab, *Liocarcinus depurator*, suggesting the habitat supports a diverse range of crustacea and echinoderms (NIEA, 2005a). Mud habitats in deep water are used by several Northern Ireland priority species, including the sea pen *Virgularia mirabilis*, rugose squat lobster *Munida rugosa* and the sea cucumber *Ocnus planci*.

The habitat is associated with and supports the Dublin Bay Prawn *Nephrops norvegicus* which has been recorded off Kilkeel and Newcastle at depths of between 26 and 39m. This probably represents the fringes of the Irish Sea Nephrops fishery. An exception to this are the Nephrops beds in Strangford Lough, where the deep mud habitats are not currently fished and are relatively undisturbed.

Sabellaria alveolata Reefs

The polychaete worm *Sabellaria alveolata* lives in tubes constructed of sand grains cemented together which may occur in dense aggregations (reefs). These reefs are generally limited to areas of hard substratum including cobble, adjacent to sand and with moderate to considerable wave exposure within the intertidal zone and in areas where there is sufficient water movement to hold sand grains in suspension (NIEA, 2005b).

The species has a rapid growth rate which is increased with higher concentrations of suspended sand and an increase in temperature. The typical lifespan of worms in colonies or reefs has been recorded to be 4-5 years with a likely maximum of 9 years. There is evidence that intertidal reefs appear to be relatively unstable and undergo a natural cycle of development and decay (NIEA, 2005b).

S. alveolata reefs are not particularly diverse communities. The older, more stable reef colonies are known to support a higher diversity of fauna and flora than the younger less stable ones.

Within the Plan area, *S. alveolata* reefs have occasionally been recorded in the subtidal at Glassdrumman.

Sabellaria spinulosa Reefs

Similar to *S. alveolata*, the polychaete worm *Sabellaria spinulosa* builds tubes made of sand and shell fragments. Most commonly *S. spinulosa* occurs as a solitary worm and does not form reefs over the majority of its range. It can, however, form thin crusts or large reefs up to several metres across and 60cm high. The reef form of the species is highly protected Annex I habitat under the Habitats Directive. *S. spinulosa* reefs occur in turbid waters between a few meters to up to 40m depth (NIEA, 2005c) and are generally found subtidally but have occasionally been recorded in the intertidal.

S. spinulosa reefs can support a range of epibenthic species including specialised 'crevice' infauna.

Very few reefs are known to occur in the Plan area. The most important site is offshore of Magilligan Strand on the low lying pitted bedrock outcrops from mobile sand (NIEA, 2005c). There are two other sites, Rinnagree Point near Portstewart and at Portstewart Point, that have 'occasional' recorded reefs.

Sublittoral Sands and Gravels

This habitat is found within a wide range of physical environments, from sheltered gravels to mobile sandbanks. The sediments range from muddy sand, through to gravel, including combinations of the two. The sediments may be very thick but in large areas they may form only small deposits overlying bedrock (NIEA, 2005d).

A wide range of biotopes are associated with sublittoral sands and gravels. The presence of these communities is influenced by a range of factors including tidal currents, wave action, salinity, larval supply and stability of the seabed and particle size. For example, in areas where coarse sand is present and the habitat is exposed to wave action or tidal streams, the habitat would be dominated by polychaetes, burrowing bivalves and amphipods. In contrast, in areas where cobbles or pebbles occur, the organisms present are more likely to comprise hydroids and bryozoans. The variation in sediment structure and extensive range of this key habitat type is reflected in the fact that it includes in a total of 17 sublittoral

[5] http://www.doeni.gov.uk/niea/mudindeepwater-4.pdf

biotopes as defined in the JNCC Marine Nature Conservation Review (MNCR) biotope classification scheme (version 97.06) (NIEA, 2005d).

An area of particular significance with regard to this habitat is Outer Church Bay on Rathlin Island. This area has been recorded as being very stable and undisturbed, supporting some of the most important sand communities in Northern Ireland (NIEA, 2005d). Another area of significance in terms of sand deposits is Dundrum Bay. Here extensive dune systems have been formed overlying shingle ridges and separating the Inner Bay from the Outer Bay.

On the North coast, plains of highly mobile, soft, clean, well-sorted sand are present. In deep water this causes mega ripples but these are much less pronounced in shallower water. Within the Plan area shoals of sand eels are present in the sand and very little other life occupies the area.

Clean, firm, rippled sand with Sea Potato *Echinocardium cordatum* is present in a number of bays around the coast and is most frequent on the north coast and in Dundrum Bay. The burrowing brittlestar *Amphiura brachiata* and the crab *Corystes cassivelaunus* are also associated with the sea potato but are much less frequent. A number of bays and loughs which also contain clean, fine rippled sand are characterised by the worm *Arenicola marina* which is usually found in shallow water above 10m (NIEA, 2005d).

Sand habitat is also present as muddy, fine sand, which can support beds of the sea pen *Virgularia mirabilis* in association with the burrowing brittle stars *Amphiura chiajei* and *Amphiura filiformis*. Muddy fine sand also supports extensive Common Mussel *Mytilus edulis* beds in Lough Foyle and Dublin Bay prawn *Nephrops novegicus* populations in the deep water off Kilkeel and Newcastle.

Extensive beds of gravel are found in a number of areas off the Northern Ireland coast. They tend to occur where strong tidal currents or wave action prevent the deposition of finer material. Most gravel beds are in water deeper than 10m, where boulder slopes inshore give way to gravel plains. In many cases, these beds are circalittoral and animal dominated. Where they occur in the infralittoral, the communities present vary considerably depending on the composition of the gravel, the strength of the tide and the level of wave exposure (NIEA, 2005d).

Modiolus modiolus Beds

The horse mussel *Modiolus modiolus* is a long lived slow reproducing marine bivalve mollusc. True horse mussel beds forming distinctive biotopes are much more limited with only four bed areas known in Northern Ireland (NIEA, 2005e). Large beds occur in Strangford Lough and there is an extensive bed off the Millisle/Ballywalter coastline. Smaller beds occur in Carlingford Lough and inside the Skerries at Portrush. Where it forms biogenic reefs, these can vary greatly in size, density, thickness and form and provide a hard substratum in a usually sedimentary area, therefore significantly modifying the local habitat. The height and size of the reef can depend on the build up of biogenic sediments and water flow regimes. Horse mussel beds can occur in large continuous reefs or as isolated scattered clumps and occur between 5 and 50m depth.

M. modiolus beds can support a range of epibenthic species, increasing the biodiversity of the area. The Strangford Lough Ecological Change Investigation (SLECI) (Roberts et al., 2004) found a total of 272 species living on or in the *M. modiolus* beds in Strangford Lough, including the variegated scallop *Chlamys varia*, queen scallop *Aequipecten opercularis*, black brittlestar *Ophiocomina nigra*, common brittlestar *Ophiothrix fragilis* and the rugose squat lobster *Munida rugosa*.

Littoral and Sublittoral Chalk

Northern Ireland only has chalk of Upper Cretaceous age and is known as the Ulster White Limestone. These chalks are generally of high carbonate purity, typically greater than 95% calcium carbonate (NIEA, 2005f). In contrast to the often relatively soft chalks of England, the chalk found in Northern Ireland exhibits secondary calcite cementation within the pore spaces making it very resistant to erosion with limited potential for solution. The sedimentary rock chalk, is formed from the remains of invertebrate and algal exoskeletons, such as foraminiferans (protozoans), particles of bivalves and particularly coccolithophores.

Associated chalk habitats are considered to be of nature conservation importance because of their unusual features and specialised communities. Distinctive rock boring invertebrates and algal communities are found within the littoral zone, such as spionid worms, e.g. *Polydora sp*, and Piddocks (bivalves), e.g. *Pholas dactylus*. The porous, water retaining nature of the rock enables algae and lichen to bore into the surface layers allowing them to exist several metres above the high water mark. Many of the unusual algal species which are not found elsewhere on other rocky habitats (with few exceptions such as some calcareous sandstones), form some of the most interesting and scarce shoreline communities.

In the Plan area, chalk is exposed on the seabed off the Antrim coast where faults are present, and off Rathlin there are spectacular, deep subtidal cliffs affected by strong tidal currents. The White Rocks near

Portrush, exhibit the best example of coastal chalk morphology in Northern Ireland with cliffs, arches, platforms and caves representing a diversity of sublittoral, littoral and supra-littoral habitats.

Key Issues, Problems and Future Trends

Although many benthic habitats are well studied, understanding of the location and scale of benthic habitats across the entire Plan area could be improved. Long term survey work and surveys undertaken at the project-level will continue to characterise the area and further our scientific understanding of factors affecting distribution. For example, in the Sublittoral Survey of Northern Ireland (May 2006- May 2008) (Goodwin et al. 2011) new species to science were found in areas that were revisited.

In terms of future trends, water quality should improve with ongoing implementation of the Water Framework Directive (WFD) (including reductions in concentrations of pollutants and nutrients), which will have the potential to result in an increase in the diversity of benthic habitats. Climate change, however, presents various pressures to benthic habitats in terms of the likely increase in natural storms and sea level rise, and the potential for changes in water temperature and elevated threat from invasive non-native species. Coastal squeeze of intertidal sediment habitats due to rising sea levels and presence of immobile coastal defence structures is likely to continue to cause habitat loss.

Other ongoing activities which directly disturb the seabed and directly or indirectly impact benthic communities include trawling, dredging, coastal and offshore development (including ports, coastal defence, marine cables, marine renewables), yacht moorings, port and harbour works, bait digging and shellfish (e.g. periwinkles) collection.

5.8.4 Plankton

The following data sources have been used to characterise the plankton community within the Plan area:

- SEA 6 Environmental Report. SEA of Draft Plan for a 24thh Seaward Round of Offshore Oil and Gas Licensing. (DTI, 2005);
- SEA 7 Environmental Report. 25th Offshore Oil and Gas Licensing Round. (DTI, 2007);
- UK Offshore Energy SEA. Future Leasing for Offshore Wind Farms and Licensing for Offshore Oil & Gas and Gas Storage. Environmental Report. (DECC, 2009); and
- UK Offshore Energy Strategic Environmental Assessment 2: Environmental Report (DECC, 2011)

Baseline Description

A review of plankton ecology in the Irish Sea area has been undertaken based on data provided by the Continuous Plankton Recorder (CPR) survey, regional surveys and scientific literature (DTI, 2005). CPR coverage is limited in the northern Irish Sea. However, a number of relevant survey stations and transects have been operated by Port Erin Marine Laboratory (PEML) and the Environment Agency.

Plankton is a general term which covers a wide range of free-floating plants (phytoplankton) and animals (zooplankton). They form the base of most trophic interactions within the marine environment and changes in their distribution and abundance have important consequences for higher trophic levels. Due to their limited mobility, plankton distribution and abundance is strongly influenced by hydrographic factors such as depth, tidal mixing, temperature stratification and currents (see Section 5.9.2).

Phytoplankton

Coastal waters of the western Irish Sea tend to have spring chlorophyll values of 15-25µg/l, whilst offshore waters in the western Irish Sea tend not to exceed 15µg/l (DTI, 2005). In the western Irish Sea the spring bloom develops between March and May, and is dominated by diatom species, including *Chaetoceros spp.*, *Thalassiosira spp.*, *Leptocylindrus danicus* and *Leptocylindrus minimus* (DECC, 2009). By June the phytoplankton populations begin to decline. By this time the western central Irish Sea develops a strong thermocline associated with the development of the western Irish Sea gyre (see Section 5.9.3). After stratification has been established, nutrients are soon consumed by the phytoplankton and greater phytoplankton biomass is found at depth where there is nutrient exchange across the pycnocline. During the summer months, dinoflagellates dominate the community, with important genera including *Ceratium, Gymnodinium* and *Scrippsiella*, as well as the bloom forming *Noctiluca scintillans* (DECC, 2009).

In the north-east Atlantic, there have been a large scale changes in phytoplankton colour which reflects spatiotemporal changes in the patterns of sea surface temperature (DTI, 2007). These changes can be partly explained by trends in the North Atlantic Oscillation (NAO) and are most likely a reflection of opposing responses to wind mixing, sea surface temperature and other hydrodynamic factors although this is poorly understood.

Zooplankton

The most abundant zooplankton are copepods, small crustaceans ranging in size from 0.5-6.0mm. These generally feed on phytoplankton and are themselves the main food source for many organisms higher in the food chain such as larval and juvenile fish. Copepods constitute almost 70% of the zooplankton with smaller species (e.g. *Pseudocalanus elongatus*, *Temora longicornis* and *Acartia clausi*) dominating in the Irish Sea (DTI, 2005; DECC, 2009). Other species such as *Calanus helgolandicus* and *C. finmarchicus* were still an important component of the community but much less abundant. A similar population pattern is found the North Channel.

Crustacean decapod larvae (e.g. Crabs, Shrimps etc) are an important seasonal element of the meroplankton constituting about 9% of the zooplankton in the western Irish Sea survey. The larval forms of other benthic organisms including cirripedes (Barnacles), echinoderms (Urchins, Starfish) and gastropod molluscs were present at lower levels (1-2%). Other elements of the zooplankton include fish eggs and larvae, chaetognaths (Arrow Worms) as well as a range of gelatinous zooplankton including larvaceans, salps, doliolods, ctenophores and coelenterates.

General copepod distributions in the Irish Sea show a consistent pattern of elevated numbers west of the Isle of Man. The western Irish Sea gyre has been shown to retain organisms within this region (e.g. Dickey-Collas et al. 2006) and could be one reason for the elevated copepod abundances. Numbers of Nephrops larvae are greatest in the western Irish Sea probably as a result of the adults being confined to muddy substrates (see Sections 5.9.2 and 5.9.4).

Recently, a large scale reorganisation in the calanoid copepod biodiversity has been detected in the north eastern North Atlantic and adjacent seas (DTI, 2007). Strong biogeographical shifts in all copepod assemblages were found with a northward extension of more than 10 degrees in latitude of warm-water species associated with a decrease in the number of colder-water species. These changes have been attributed to regional sea surface temperature warming.

Key Issues, Problems and Future Trends

Plankton assemblage appears to be changing with range extension of warmer water species and restriction of colder water species. Furthermore, the duration of the main spring/summer phytoplankton bloom in the Irish Sea and surrounding waters appears to have lengthened and the intensity of the spring bloom also appears to have increased. There is also considerable variation in the timing of the spring bloom (Kennington & Rowlands 2005). Long-term signals in phytoplankton biomass and phytoplankton community shifts have been correlated with sea surface temperatures, Northern Hemisphere Temperature Anomaly and changes in the North Atlantic Oscillation (NAO) index (Edwards et al. 2001, Beaugrand & Reid 2003).

Rising carbon dioxide concentrations in the sea are expected to reduce levels of calcification by marine organisms, by lowering the calcium carbonate saturation state of seawater. However, there is also evidence to suggest that coccolithophore *Emiliania huxleyii* calcification and primary production has increased with CO_2 partial pressures (DECC, 2011). Meanwhile, field evidence shows there has been a 40% increase in average coccolithophore mass over the last 220 years, evidence of a rapid and impressive response from coccolithophores to ocean acidification. Under certain conditions (e.g. rapid reproduction, reduced grazing pressures, favourable environmental factors) blooms can occur involving nuisance or noxious species (DECC, 2009). These are referred to as Harmful Algal Blooms (HABs). The most common and abundant group of planktonic organisms that form cysts are the dinoflagellates and in the Irish Sea over 45 dinoflagellate cyst taxa have been identified (Marret & Scourse 2002). Dinoflagellates form cysts during either adverse environmental conditions or following sexual reproduction. These cysts sink to the seabed and tend to be concentrated in fine rather than coarse sediments. They can be transported a considerable distance by water currents, especially during winter storms (Marret & Scourse 2002). More information on the distribution of these cysts could assist tracking the potential for harmful algal blooms (cysts of the genus *Alexandrium*, associated with paralytic shellfish poisoning (PSP) have been observed in the Irish Sea (Marret & Scourse 2002)) and/or exceptional blooms which cause nuisance/eutrophication events.

Further, the introduction of new marine species from ballast waters has increased and is now thought to be responsible for about 20% of all new species introduced to the marine environment in Britain (Kennington &

Rowlands 2005). Many of these invasive species travel as cysts in ballast water tanks. Information on the distribution of these cysts following introduction would allow a more targeted response.

5.8.5 Fish and Shellfish

The following data sources have been used to characterise the fish and shellfish populations within the Plan area:

- Spawning and nursery ground of selected fish species in UK waters. (Coull et al, 1998; Ellis et al, 2012);
- MarLIN website;
- Northern Irelands' Priority Species and Species of Concern list (National Museums Northern Ireland 2006-7);
- DARD/MFA fisheries statistics (MFA 2009);
- Position statement on sharks, skates and rays in Northern Ireland waters. (Agri-Food & Biosciences Institute, 2009); and,
- National Report for Ireland on Eel Stock Recovery Plan. Including River Basin District Eel Management Plans. The Department of Communications, Energy and Natural Resources, Inland Fisheries Division (DCENR, 2008).

Baseline Description

Northern Ireland's coastal waters are home to approximately 100 species of regularly occurring marine fish. The key spawning and nursery grounds for cod, herring, mackerel, plaice, sand eel, sole, thornback ray, tope shark and whiting are shown in Figure 4. The southern region of the Plan area is a high intensity spawning area for plaice and cod, and low intensity spawning area for mackerel, sand eel, sole and whiting. The eastern and southern regions of the Plan area are high intensity nursery grounds for cod, herring and whiting and low intensity nursery grounds for mackerel, plaice, thornback ray and tope shark.

There is limited baseline data on the presence, distribution and population of sharks and rays in Northern Ireland. A recent survey to try to address this evidence gap has provided records of 17 species of elasmobranchs which includes 11 shark species and 6 ray species. This study highlighted the importance of a number of areas off the Northern Ireland coast as nursery grounds for several ray species. These hotspots included Belfast Lough, Carlingford Lough and off Dundrum Bay. Despite the status of some rays being stable or increasing in overall terms in the Plan area, their susceptibility to local depletions should be recognised.

The priority fish and crustacean shellfish species occurring in the Plan area are included in Table 13. In addition, Atlantic salmon is internationally protected and a qualifying interest feature of the following inland SACs in Northern Ireland:

- River Foyle and Tributaries;
- River Roe and Tributaries;
- River Faughan and Tributaries; and,
- Lough Melvin.

The Plan area is also known to support priority species of molluscs (e.g. Fan Mussel and Flat Oyster).

European eel is another important fish species in Northern Ireland. The latest scientific advice from the International Council for the Exploration of the Sea (ICES) concerning European eel is that the Irish stock is outside safe biological limits and that current fisheries are not sustainable (DCENR, 2008). ICES have recommended that a recovery plan be developed for the whole stock of European eel as a matter of urgency and that exploitation and other human activities affecting the stock be reduced to as close to zero as possible. In recognition of their importance, DARD has invested in an eel processing plant in 2013/14 for the Lough Neagh Fisherman's Cooperative under the European Fisheries Fund. In addition, protection is being afforded through an eel management plan in Lough Neagh/River Bann for the period 2010-2015.

Table 13 : Priority Fish and Shellfish Species within the Plan area

Species Name	Conservation Information	Distribution description
Basking Shark (*Cetorhinus* maximus)	Listed as Vulnerable on the IUCN Red List of threatened species, on Appendix 11 of CITES, Appendix 1 and 11 of the Bonn Convention on Migratory Species and Schedule 5 of the UK Wildlife and Countryside Act 1981. Listed as a UK Priority species and its UK Species Action Plan for this species was published in 1999.	May be seen in coastal waters from May to September where there is a good supply of plankton. The sea around Rathlin Island, County Antrim and the waters off Strangford Lough, County Down are areas where basking sharks are regularly seen. Actual population size is unknown.
Common Skate (*Dipturus batis*)	UK Priority species and has declined substantially. Classified as Critically Endangered on the IUCN Red List 2006. In 1976 the Irish Specimen Fish Committee (all-Ireland remit) removed the common skate from the list of eligible species in order to discourage capture and killing of large individuals by anglers.	Found occasionally throughout Northern Ireland especially on the north coast. Unlikely to be seen except by sea anglers. Egg cases can be found washed up on the beach.
Allis Shad (*Alosa alosa*)	Listed as a UK Priority Species. Current status is unknown and requires urgent investigation. Irish Red Data Book classified as Vulnerable. There is a UK Species Action Plan which was published in 1995.	Recorded from Lough Foyle and off the County Down coast. Found in the lower reaches of river and in estuarine and coastal waters. It is not known if spawning has ever occurred in Northern Ireland.
Twaite Shad (*Alosa fallax*)	Listed as a UK Priority Species and in the Irish Red Data Book classified as Vulnerable. The current status of twaite shad in the Plan area in unknown and requires urgent investigation. UK Species Action Plan which was published in 1995.	Recorded from Lough Foyle, Belfast Lough and the County Down coast. Spawns from May to June. Its preferred habitat is estuarine or coastal waters.
Smelt (*Osmerus eperlanus*)	A Irish Red Data Book and is classified as Vulnerable. Species has declined in other parts of European therefore it is likely that it has in Northern Ireland as well.	Found in shallow coastal and estuarine waters and recorded in Lough Foyle, Larne Lough and Belfast Lough. Spawns (February – March) in the lower reaches of rivers around the tidal limit.
Hermit Crab (*Cestopagurus* timidus)	Priority species as Northern Ireland is its only known Irish site, but it is not legally protected. There is no UK Habitat Action Plan for this species, but there is for seagrass, its preferred habitat.	Only known location is Rathlin Island. Preferred habitat is intertidal and shallow subtidal muds and sands with eelgrasses and algal beds.
Rugose Squat Lobster (*Munida rugosa*)	Has no legal protection. This species is widespread but the exact conservation status of this species is lacking. Its supporting habitat of sands and other sediments have declined, implying that numbers of this species may also be declining.	Widespread and common species throughout the Plan area. Found at low intertidal to about 100m depth on muddy/sandy substrate with stone and rocks. Key locations include Portrush Skerries, all round Rathlin, the Maidens, off Muck Island, Larne and the Gobbins, in the north end of Strangford Lough Narrows, and widely in its interior.
Crawfish (*Palinurus elephas*)	A priority species due to its scarcity and decline. It has no legal protection but is covered by fisheries regulations administered by the Fisheries Division	Only known to be found around Rathlin Island. It is vulnerable to impacts from fishing and its Northern Ireland population is declining.

Species Name	Conservation Information	Distribution description
	of DARD(NI).	Preferred habitat is subtidal rock faces, rocky seabed and occasionally open terrain.
Crab (*Atelecyclus rotundatus*)	It is a widespread species and has no legal protection. Although widespread, the species is listed as declining due to habitat loss.	Widely distributed, found in areas of sands and gravels extending to moderate depths. This habitat is vulnerable to disturbance from mobile fishing gear.
Crab (*Inachus leptochirus*)	Widespread and has no legal protection.	Found in sublittoral muds and muddy sands around the north-eastern and eastern coast of Northern Ireland, including Rathlin Island, Ballycastle, Garron Point, Red Bay, Larne, Donaghadee, and Strangford Lough.
Source: Northern Irelands' Priority Species and Species of Concern List. National Museums Northern Ireland 2006-7.		

Key Issues, Problems and Future Trends

The key issues faced by fish populations within the Plan area are overfishing and habitat loss. Some of the commercially valuable species are being fished at unsustainable levels, especially those which are slow growing and become sexually mature later. Some fisheries are partially non-selective and consequently catch non-target species (by-catch). This extra catch is often discarded, particularly if the fish have no commercial value, are under-sized or over quota. Habitat loss from development can result either through removal of habitat or smothering of benthic communities. The ability of species to avoid potential harm will depend to some extent on the mobility of the species at various stages of their life cycle.

Spawning grounds are selected due to the substrate and hydrodynamics of the region as these factors create a greater chance of fertilisation and/or egg and larvae distribution (dependent upon the species life cycle) and thus successful recruitment. If such habitats are lost, it is likely that this could lead to a reduction in fish population. Nursery grounds are also important to the success of a population. These are often intertidal sheltered areas where the threat of predation is reduced (Ellis et al, 2012) and, therefore, provide a valuable mechanism for increasing recruitment success. Juveniles are confined within these coastal and estuarine habitats, and therefore recruitment levels and population size can be affected by habitat loss.

Both spawning and nursery grounds could be affected by the impacts of fishing gear. Demersal otter trawls are designed to catch fish and shrimps that stay above the sea bed, from close to the bottom to several metres from the bottom. Beam trawls[6] and scallop dredges, on the other hand, are used to target species that stay on the bottom or that are partly buried in the sediment. Accordingly, the tickler chains of a beam trawl and the teeth of a dredge are specifically designed to disturb the seabed surface and penetrate the upper few centimetres of the sediment. This has the potential to damage the substrate or any biogenic structures present, making the region a less valuable spawning or nursery ground.

Elasmobranchs are particularly vulnerable to a decrease in population from a relatively small amount of disturbance given that they are slow growing and therefore reach sexual maturity later and have low fecundity (K-selected species) (Agri-Food and Biosciences Institute, 2009). The main pressures and impacts on these species in Northern Ireland waters are from targeted fishing, accidental by-catch and habitat issues relating to spawning and nursery areas. Some of the species were found to be in a state of rapid decline. More baseline data needs to be collected to complement information from recreational and commercial fisheries catch data, and help improve our scientific understanding of these species, as well as inform population studies and modelling of species dynamics. These in turn could be used to produce meaningful conservation management and mitigation measures.

5.8.6 Marine Mammals

The following data sources have been used to characterise the marine mammals within the Plan area:

- Irish Whale and Dolphin Group website;

[6] Although beam trawlers are not currently used by Northern Ireland's commercial fisheries they may be used in the future.

- Monitoring cetaceans in Irish Waters (Berrow et al, 2010);
- Atlas of the Distribution and Relative Abundance of Marine Mammals in Irish Offshore Waters 2005-2011 (IWDG 2013);
- Atlas of the Marine Mammals of Wales (Baines and Evans, 2012);
- Scientific advice on matter related to the management of seal populations (SCOS, 2012);
- Results of the thermal image survey of seals around the coast of Northern Ireland (Callan and Duck, 2006);
- Small Cetaceans in the European Atlantic and North Sea (SCANS II) Final Report;
- Discrete or not so discrete: Long distance movements by coastal Bottlenose Dolphins in UK and Irish waters. (Robinson et al, 2012);
- A review of cetacean bycatch in pelagic trawls and other fisheries in the north-east Atlantic (Whale and Dolphin Conservation Society (WDCS), undated); and,
- Second Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2001 to December 2006 (JNCC, 2007).

Baseline Description

27 species of marine mammal have been recorded within the Plan area: 24 cetaceans, 2 seals and the otter (DOE and Irish Whale and Dolphin Group website). Of these, 7 species of cetacean, 2 species of seal and the otter either inhabit or migrate annually to the Plan area (Table 14). The 7 species of whale and dolphin that are regularly sighted include the Harbour Porpoise, the Common Dolphin, the Bottlenose Dolphin and the Minke Whale. Occasionally Killer Whales, Long Finned Pilot Whales and Risso's Dolphin are also sighted. There have been 16 different species of cetacean stranded along the Northern Ireland coast which include the Atlantic White Sided Dolphin, Cuviers Beaked Whales and a single recording of a Blue Whale stranding at Magilligan in 1907 (DOE website).

Table 14 : Marine mammals regularly occurring within the Plan area

Species	Special Area of Conservation	Known Areas of Abundance
Harbour Seal (*Phoca vitulina*)	Strangford Lough Murlough	Strangford Lough, Murlough, Carlingford Lough
Grey Seal (*Halichoerus grypus*)	The Maidens (cSAC)	Strangford Lough, Copeland Islands, North Rocks Ards Peninsula.
Harbour Porpoise (*Phocoena phocoena*)	Skerries and Causeway (cSAC)	Sightings off the coast of Northern Ireland are common at all times of the year. The best places to see Harbour Porpoises are headlands and bays when the sea is calm.
Otter (*Lutra lutra*)	River Foyle and Tributaries; River Faughan and Tributaries; Owenkillew River and River Roe and Tributaries	Londonderry
Bottlenose Dolphin (*Tursiops truncatus*)	N/A	Portrush, Islandmagee, entrance to Belfast Lough, Rathlin Island
Common Dolphin (*Delphinus capensis*)	N/A	Portrush, Islandmagee
Minke Whale (*Balaenoptera acutorostrata*)	N/A	Portrush, Islandmagee, Entrance to Belfast and Strangford Lough, Rathlin Island
Risso's Dolphin (*Grampus griseus*)	N/A	Unknown
Pilot Whale (*Globicephala melas*)	N/A	Unknown
Killer Whale (*Orcinus orca*)	N/A	Unknown

(Note: The locations of sighting have not been plotted, as they only provide information on how individuals sighted use the locations and not information about how the species interacts with the location.)

Harbour Seal

Harbour Seals are found around the coasts of the North Atlantic and North Pacific from the subtropics to the Arctic. This is the smaller of the two native UK seals measuring up to approximately 1.85m in length and typically weighing 80-100 kg. Approximately 30% of the European population is found in the UK, of which 5% are within Northern Ireland (SCOS, 2012).

Genetic analysis on Harbour Seals in European waters has found evidence of significant genetic differentiation between different areas. Goodman (1998) identified six distinct population units: Ireland-Scotland, English east coast, Wadden Sea, western Scandinavia (Norway-Kattegat-Skagerrak-west Baltic), east Baltic and Iceland. Within the Ireland-Scotland population there is probably occasional movement of animals between regions, but there is no evidence from satellite telemetry of any long-range movements (for example, between the east and west coasts of Scotland) comparable to those observed in grey seals. Similarly, studies of the movements of branded seals in the Kattegat/Skagerrak indicate that there is only limited movement within the western Scandinavia population. However, satellite telemetry has revealed some interchange between the Wadden Sea and the English east coast populations outside the breeding season (SCOS, 2012). This evidence and the fact that the phocine distemper virus spread rapidly throughout European Harbour Seal populations indicates that movement of individuals between locations does occur, but reproduction does not occur in the regions they visit (SCOS, 2012).

Harbour Seals are widespread throughout the region but are most abundant in sheltered waters around County Down in particular StranSealgford Lough which is an important pupping site. Harbour Seals are part of large mobile populations that move around the Plan area and along the Irish coast to the west coast of Scotland. They are protected under the EU Habitats Directive and the Wildlife (Northern Ireland) Order 1985. There are two sites for which Harbour Seals are a qualifying feature (Murlough and Strangford Lough SACs).

Adult seal populations at Strangford Lough have fluctuated over recent years, but the 2012 population was recorded as 202 which is close to the average (199) for the last 10 years (DOE, 2013). The number of pups recorded in 2012 was 28, which was higher than the count the previous year of 19 (DOE, 2013).

Grey Seal

The grey Seal is the larger of the two seal species found in British waters, with males reaching a length of 2.45m and weighing over 300kg. Grey Seals give birth to their pups from September to early November.

Within Europe there are two apparently reproductively isolated populations, one that breeds in the Baltic, usually pupping on sea ice in the spring, and has a population of approximately 15,177; and one that breeds outside the Baltic, usually pupping on land in Autumn and early winter and has an estimated population of 111,300. These populations appear to have been reproductively isolated at least since the Last Glacial Maximum (between 26,500 and 19,000-20,000 years ago). The vast majority of European grey Seals breeding outside the Baltic breed around Britain (88%) (SCOS, 2012)

A range of studies have shown that Grey Seals can undertake long distance travel between different haul-out sites but foraging trips are generally much smaller. For example, Thompson et al. (1996) found that four seals tracked from the Moray Firth moved to haul-out sites 125-365km away, and provided evidence of interchange between the Moray Firth and other Grey Seal breeding areas in Orkney, the Firth of Forth and the Farne Islands. Those Grey Seals which foraged within Moray Firth travelled up to 145km from haul-out sites.

Grey Seals are most common on rugged and exposed sites of County Antrim. Grey Seal pup production estimates for the main colonies surveyed in 2010 recorded 100 pups (SCOS, 2012). Similarly to harbour seals, Grey Seals are part of large mobile populations that move around the Plan area and along the Irish coast to the west coast of Scotland. They are protected under the EU Habitats Directive and the Wildlife (Northern Ireland) Order 1985. The only protected site in the Plan area which is designated for Grey Seal is The Maidens SCI.

Harbour Porpoise

Harbour Porpoise distribution is restricted to temperate and sub-arctic (primarily 5-14ºC) seas of the Northern Hemisphere. The Harbour Porpoise is the most commonly recorded cetacean in UK waters, primarily occurring on the continental shelf. The first candidate SAC (cSAC) within the UK to be designated with Harbour Porpoise as a qualifying feature is Skerries and Causeway cSAC which is located within the Plan area. This is the only cSAC designated for cetaceans in Northern Ireland waters.

In coastal waters, Harbour Porpoise are often encountered close to islands and headlands with strong tidal currents. They may often show large seasonal variations in distribution (Read & Westgate, 1997 and Sveegard et al, 2011). These seasonal changes may be linked to migrations/changes in the distribution of prey (Sveegaard et al, 2011).

Bottlenose Dolphin

There are regular sightings of Bottlenose Dolphins in the Plan area but there are no designated sites for this species. They are most often recorded close inshore, even entering estuaries and rivers but are rarely observed in open water. There is some recent evidence of coordinated long distance migrations in several populations of Bottlenose Dolphins around the UK from six UK and Irish sites. Robinson et al (2012) recorded long term re-sightings between the Moray Firth, Inner Hebrides and across to the Republic of Ireland of 8 individuals (Robinson et al, 2012).

Common Dolphin

Although known to be common in deep water, this species is most frequently sighted in Northern Ireland off headlands during the summer. They are known to feed on a variety of fish and squid. The Common Dolphin is not protected under the EC Habitats Directive.

Risso's Dolphin

Risso's Dolphin is sighted regularly all year long around the Irish coast. They generally prefer deep offshore water but have been seen inshore during the summer months and have also been sighted off the coasts of Co. Down and Co. Antrim (IWDG). Risso's Dolphin is not protected under the EC Habitats Directive.

Killer Whale

The biggest concentrations of Killer Whales occur over the continental shelf. These are nomadic species in their distribution and have been known to hunt inshore and up rivers following salmon runs. Killer Whales are not protected under the EC Habitats Directive.

Pilot Whale

Long Finned Pilot Whales are widely distributed in deep pelagic waters from sub-polar to temperate regions, however, Short Finned Pilot Whales have never been recorded in Irish waters, preferring warmer waters. Long Finned Pilot Whales are rarely seen inshore, however they are frequently seen beyond the continental shelf, with over 70% of these sightings occurring between June and August (IWDG). Pilot Whales are not protected under the EC Habitats Directive.

Baleen Whales (Minke, Sei and Humpback Whales)

The Minke Whale is the smallest and most common of the baleen whales found around the coast of Northern Ireland. Sightings have increased over recent years as whale-watching has become more popular. The best places for whale-watching are headlands, islands and bays when the sea is calm between May to October. Humpback Whales and Sei Whales have also been observed in Northern Ireland waters, but are not frequently sighted. None of the baleen whales are protected under the EC Habitats Directive.

Otter

Otters are a good indicator of water quality as they need clean unpolluted water with a large and varied supply of food. Northern Ireland has a healthy population of Otters, however, there are no coastal SACs within the Plan area for which otters are a designated feature.

Key Issues, Problems and Future Trends

In 1988 and 2002 there were outbreaks of Phocine Distemper Virus (PDV) which caused significant mortality (estimates of about 50% of the total population) of harbour seals across Europe. Although present UK seal populations seem to be slowly recovering to pre-2002 numbers, if such an outbreak were to happen again a similar outcome is considered likely. In addition to disease, seals are also at risk from chemical pollution, in particular from oil pollution and also organochlorines which affect seal reproduction.

Marine mammals are at risk from by-catch and becoming entangled in fishing gear. The cetacean species caught in the greatest numbers in the north-east Atlantic are the Common Dolphin and the Harbour Porpoise (WDCS, undated). Between 2000 and 2004, post mortems of stranded Common Dolphin indicated that 61.1% of these died as a result of by-catch and a further 15.3% as a result of live strandings (Jepson, 2006, cited in JNCC, 2007). Additionally, two incidences of death as a result of gas emboli were also reported

during this period (Jepson et al., 2005, cited in JNCC, 2007). The Harbour Porpoise is particularly vulnerable to bottom-set gillnet fisheries. Observer monitoring in some areas has recorded large and unsustainable bycatch levels: some 2,200 porpoises per year in the Celtic Sea (WDCS, undated). By-catch has nevertheless decreased in the last few years, due to a combination of reduced fishing effort and the use of acoustic "pingers" (Seafish 2003, 2006, cited in JNCC, 2007).

The UK has been concerned about the levels of cetacean by-catch in fisheries for a number of years, funding research to identify which fisheries are responsible for by-catch and research on mitigation measures to reduce this by-catch to as low a level as possible. As most fisheries in which cetacean by-catch is an issue are also targeted by other Member States of the European Union, it is important that coordinated action is taken such as that proposed by Regulation 812/2004.

Otters in Northern Ireland are particularly threatened by water pollution (farm waste, pesticides and oil spills in coastal areas) and loss of habitat (removal of bankside vegetation and drainage of wetlands), as well as accidental death (e.g. drowning in fishing nets/traps).

Climate change issues, such as changes in temperature, can have significant consequences for marine mammals because of changes that may occur in the food web and consequently prey availability. This can lead to changes in distribution, abundance, health and reproduction, thus potentially affecting whole populations.

5.8.7 Marine Reptiles

In assessing the marine reptiles within the Plan area, the following data sources have been used:

- Review of marine turtle records in Northern Ireland. (King, 2006);
- Northern Ireland's Priority Species and Species of Concern list; and,
- SEA on Offshore Wind and Marine Renewable Energy in Northern Ireland (2009).

Baseline Description

Two species of turtle have been observed in Northern Ireland waters: Leatherback Turtles and Loggerhead Turtles, with leatherback being the most frequently observed.

Turtles are not protected in Northern Ireland waters, but are classified as critically endangered on the IUCN Red List, listed in Appendix I of CITES, listed in Appendix I and II of the Convention on Migratory Species, listed in Appendix II of the Bern Convention and listed in Annex IV of the EC Habitats Directive. They are also collectively listed in a Grouped Species Action Plan within the UK BAP.

Key Issues, Problems and Future Trends

There are significant gaps in scientific knowledge of the distribution of marine reptiles and their functional use of marine environments, so predicting future trends for these species is challenging. Some of the major issues these species face are eating marine litter such as plastic bags when they are mistaken for jellyfish which causes blockages on the gut and eventual death. Ship strikes are a key threat to marine reptiles. Marine reptiles have to come to the surface to breathe, making them vulnerable to being struck by a ship and/or its propeller. Turtles are also very susceptible to entanglement in fishing gear which can lead to drowning.

A change in temperature and a rise in sea level have the potential to affect marine reptile food availability and distribution. Jellyfish and algae are both major food sources for marine reptiles, and there is evidence that abundance of these species is changing as a result of climate change (Lynam, et al, 2010). The study provided evidence that the abundance of jellyfish is increasing, primarily due to climate change but also because the numbers of jellyfish predators are being overfished.

5.8.8 Birds

The following data sources have been used in assessing the status and prospects of birds within the Plan area:

- Seabird Population Trends and Causes of Change: 2012 Report (JNCC 2012);

- Waterbirds in the UK 2010/2011: The Wetland Bird Survey. (BTO 2011);
- WeBS Alert Reports (BTO 2009);
- Northern Ireland's Priority Species and Species of Concern list;
- An Atlas of seabird distribution in north-west European waters. (JNCC)
- OSPAR List of Threatened and/or Declining Species and Habitats;
- Birds of Conservation Concern 3 (BOCC3). (based on Eaton et al 2009);
- Birds of Conservation Concern Ireland (BOCCI) (based on Lynas et al 2009);
- RSPB website publications (http://www.rspb.org.uk/ourwork/policy/marine/fisheries/bycatch.aspx, http://www.rspb.org.uk/Images/longlinefishing_tcm9-163197.pdf)
- ASSI and SPA Citation documents; and,
- Northern Ireland Species Action Plans

Baseline Description

The wide range of coastal habitats available around the coast of Northern Ireland presents a similarly wide range of opportunities for exploitation by bird populations. Use of the different habitats varies between seasons, as breeding, wintering, roosting and migration stopover sites. Some sites may be occupied throughout the year; estuaries and sea loughs may fulfil all the functions noted above. Use of other sites may be more or less restricted to a single function; for example vertical cliffs may support intensive breeding activity by large numbers of birds only during the summer months. This wide variation means that habitats, seasonality, and the differences in bird behaviours and requirements between species must all be considered when the potential impacts of developments in coastal and marine environments are assessed.

Northern Ireland coastal and marine areas support nationally and internationally significant numbers of birds. In some cases the significance depends on the numbers of a single species or small number of species; elsewhere it is the total number of birds of a large number of species that make a site important. Where these numbers exceed defined thresholds, sites are designated as Special Protection Areas (SPAs) under the Birds Directive, or as Areas of Special Scientific Interest (ASSIs) under the Environment (Northern Ireland) Order 2002 or its predecessor instruments.

Eleven coastal SPAs have been designated in Northern Ireland for the protection of individual species or for the protection of large concentrations of birds. A majority of SPAs have been designated as Ramsar sites. SPAs are also protected as ASSIs, and bird species are also designation features of a number of additional ASSIs. These sites and their designation features are listed in Table 15.

Table 15 : Sites designated for their bird interest

Site and Designation	SPA designation Feature	Nationally important species (additional to SPA species)
Lough Foyle SPA, Ramsar, ASSI	Whooper Swan, Light-bellied Brent, Bar-tailed Godwit. >20, 000 wintering waterfowl	Red-throated Diver, Great Crested Grebe, Mute Swan, (Bewick's Swan), Greylag Goose, Shelduck, Teal, Mallard, Wigeon, Eider, Red-breasted Merganser, Heron, Oystercatcher, Golden Plover, Lapwing, Knot, Sanderling, Dunlin, Curlew, Redshank, Greenshank
Sheep Island SPA, ASSI	Cormorant	
Rathlin SPA Rathlin Coast ASSI	Peregrine Razorbill, Guillemot, Kittiwake >20,000 breeding seabirds	Puffin, Chough,
The Maidens ASSI		Shag
The Gobbins ASSI		Kittiwake, Razorbill
Swan Island SPA	Common Tern, Roseate Tern	Sandwich Tern

Site and Designation	SPA designation Feature	Nationally important species (additional to SPA species)
Larne Lough SPA, Ramsar, ASSI	Light-bellied Brent Goose	Great Crested Grebe, Goldeneye, Red-breasted Merganser, Shelduck, Eider, Redshank, Greenshank (winter) Common Gull (breeding)
Belfast Lough SPA, Ramsar Outer Belfast Lough ASSI Inner Belfast Lough ASSI	Redshank	Oystercatcher, Purple Sandpiper, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Turnstone.
Belfast Lough – Open Water SPA Belfast Lough Ramsar	Great Crested Grebe	Red-throated Diver, Great Crested Grebe, Shelduck, Mallard, Shoveler, Scaup, Eider, Goldeneye, Red-breasted Merganser,
Copeland Islands SPA, ASSI	Manx Shearwater, Arctic Tern	Common Gull
Strangford Lough SPA, Ramsar Site, Strangford Lough Part I ASSI Strangford Lough Part II ASSI Strangford Lough Part III ASSI Quoile ASSI	Sandwich Tern, Common Tern, Arctic Tern (breeding) Light-bellied Brent Goose, Knot, Redshank (winter) >20, 000 wintering waterfowl	Mute Swan, Whooper Swan, Shelduck, Wigeon, Scaup, Gadwall, Teal, Mallard, Pintail, Shoveler, Eider, Goldeneye, Red-breasted Merganser, Cormorant, Shag, Heron, Little Grebe, Great Crested Grebe, Oystercatcher, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Greenshank, Turnstone
Killough Harbour SPA, Killough Bay and Strand Lough ASSI Killough Bay Ramsar	Light-bellied Brent Goose	
Outer Ards SPA, Ramsar, ASSI	Arctic Tern (breeding) Golden Plover (winter)	Light-bellied Brent Goose, Golden Plover, Ringed Plover, Turnstone
Murlough ASSI		Light-bellied Brent Goose, Common Scoter, Red-breasted Merganser, Oystercatcher, Redshank, Greenshank, Dunlin
Carlingford Lough SPA, Ramsar, ASSI	Sandwich Tern, Common Tern	Oystercatcher, Ringed Plover, Grey Plover, Dunlin, Redshank

Because of the large number of species that use Northern Ireland's marine and coastal waters, and littoral habitats, and the wide range of available habitats as outlined above, the following baseline description discusses groupings of bird species. Groupings are based on bird families or closely related families. Individual species accounts are given for those species that are most dependent on the marine environment or are of particular conservation importance.

Shearwaters and petrels

Two species, Manx Shearwater *Puffinus puffinus* and Fulmar *Fulmaris glacialis*, breed in Northern Ireland, while a number of other species occur on migration, during post-breeding dispersion or as vagrants. Two colonies of Manx Shearwater are known, both on the Copeland Islands, where an estimated 4,633 pairs were counted during the Seabird 2000 census, or around 1.5% of the UK population. Large numbers of shearwaters breed on Rum, and it is therefore likely that Northern Ireland waters are used frequently by birds migrating, dispersing or foraging from this, as well as other, colonies. The species is a summer visitor, and is generally absent from the North Atlantic in winter.

Fulmars breed on cliffs along both the east and north coasts of Northern Ireland, but around 60% of the Northern Ireland population breeds on Rathlin. Seabird 2000 suggested that around 3000 nest sites were occupied in Northern Ireland at that time, which equates to around 1.1% of the UK population. There has been a recent decline of this species, following an almost constant increase during the twentieth century. Numbers at Rathlin in 2011 were around 25% lower than in 1999 (JNCC website). As a result the species is

Amber-listed in BOCC3. Declines are likely to be related to decreases in discards and offal from fishing fleets, and declines in natural prey that may be caused or moderated by climate change. Densities at sea are generally low.

Storm Petrels *Hydrobates pelagicus* occur regularly around the Irish coast but are not known to breed in Northern Ireland. The species is most frequent at sea, albeit at low densities, in July and August. A small number of shearwater species occur as migrants or vagrants in small numbers, the most frequent being Sooty Shearwater *Puffinus griseus*.

Gannet

Gannet *Morus bassanus* does not breed in Northern Ireland, but breeds in small numbers in Galloway (around 40 km to the east) and in large numbers on Ailsa Craig, (60km to the east). The species is mainly a summer visitor and frequently uses Northern Ireland offshore waters for foraging, and may enter the inner waters of Belfast Lough. Other birds are likely to use local waters during migration and as a route to foraging areas in the wider Atlantic. The species is most frequent at sea between May and August, when Ailsa birds are incubating or rearing chicks. The species is Amber-listed in BOCC3 because of its restricted distribution in the UK.

Cormorant and shag

These two species are present in Northern Ireland waters throughout the year. Cormorant *Phalacrocorax carbo* breeds at a limited number of coastal sites, the largest being Sheep Island and Strangford Lough. Numbers have generally increased over recent years, but the population at Sheep Island has declined, against the UK trend, for reasons that are at present unclear. During the Seabird 2000 census an estimated 663 breeding individuals were counted, comprising around 5.8% of the UK population. Densities at sea are low outside inshore waters, and there is a notable concentration around Belfast Lough during much of the year. Shag *P. aristotelis* breeds on cliffs and in caves around all coasts, and is almost exclusively maritime in its habits. Numbers declined between the Seabird Colony Register (SCR) count (1985-88) of 440 apparently occupied nests to 301 in 1998-2002, and this decline appears to be continuing. Densities at sea are generally low, with greatest densities around the North Channel. The species is Amber- listed in BOCCI.

Auks

The members of the auk family that breed in Northern Ireland are the Guillemot *Uria aalge*, Razorbill *Alca torda*, Puffin *Fratercula arctica* and Black Guillemot *Cepphus grylle*. Guillemots breed in large numbers on Rathlin – 130,445 individuals were counted at the colony in 2011, making it the largest in the UK. Significant numbers also breed at The Gobbins, while smaller numbers occur along the north coast. Breeding populations have varied considerably in recent years, probably reflecting annual differences in the abundance of prey species. Foraging and loafing birds are concentrated in the general areas of breeding sites, but following breeding birds disperse widely over the North Atlantic. There are concentrations at sea in late summer around Rathlin and off the south east coast, in the vicinity of the Irish Sea Front. Small numbers are then generally present in Northern Ireland waters in winter. The species is Amber-listed in both BOCC3 and BOCCI.

Razorbill has a similar breeding distribution to Guillemot and has also shown great variability in breeding population over recent years. However, a count in 2011 of 22,975 individuals suggested that Rathlin is now the largest colony in the UK. The species shows a similar seasonal dispersion pattern to guillemot. Summer concentrations occur off the north west coast, around the location of the Islay front. The species is Amber-listed in both BOCC3 and BOCCI.

Rathlin held 98% of the Northern Ireland population of puffins in 2002. Numbers were declining at that time, and this trend has continued, with only 695 apparently occupied burrows at the colony in 2011, compared with 1,579 in 1999. Elsewhere, small numbers breed at The Gobbins. Following breeding, birds disperse widely over the North Atlantic and the species is virtually absent from Northern Ireland waters during winter. The species is Amber-listed in both BOCC3 and BOCCI.

Black Guillemot breeds in small numbers at many cliff or boulder sites around the Northern Ireland coasts, but larger number are concentrated in man-made structures such as piers, jetties and harbour walls. Numbers declined at Rathlin between 2003 and 2007, but it is not known whether this is part of a general pattern or whether this population has continued to decline. Birds generally remain within the vicinity of breeding sites throughout the year. The species is Amber-listed in both BOCC3 and BOCCI.

Gulls

Seven species of gull breed in Northern Ireland – Kittiwake *Rissa tridactyla*, Black-headed Gull *Chroicocephalus ridibundus*, Mediterranean Gull *Larus melanocephalus*, Lesser Black-backed Gull *Larus*

fuscus, Herring Gull *Larus argentatus* and Great Black-backed Gull *Larus marinus*. Species vary considerably in their lifestyles, and consequently make different uses of the marine and littoral habitats.

Kittiwake is an exclusively maritime species, generally only coming to land to breed. The species has around 13 colonies in Northern Ireland, but by far the largest is at Rathlin, with 9,896 apparently occupied nests in 2007. Colony size in Northern Ireland has been relatively stable when compared with elsewhere in the UK, but numbers have fallen recently. This may reflect low productivity as recorded at Rathlin in a number of recent years. Following breeding, birds disperse widely, although storm-driven birds may be frequent in Northern Ireland waters at times. Higher densities occur in late summer off the south east coast in the vicinity of the Irish Sea front. The species is on the OSPAR List of Threatened and/or Declining Species and Habitats and is Amber-listed in both BOCC3 and BOCCI.

Black-headed Gull has more catholic requirements for breeding sites and is as likely to nest inland as on the coast. However the largest colony is at Strangford Lough, where numbers have tended to vary considerably, although with an overall upward trend in recent years. In the Seabird 2000 census, an estimated 4,037 breeding individuals, equating to 5.1% of the UK population, were counted in Northern Ireland. Many birds use the coast during the non-breeding season, and numbers are augmented by immigrants from the continent. Birds are infrequent at sea, although there may be increased densities in the North Channel during migration periods. The coast is therefore used extensively throughout the year. The species is Amber-listed in BOCC3, but is Red-listed in BOCCI due to historic declines.

Mediterranean Gull nests in very small numbers in Counties Antrim and Down, and is not a significant constituent of the coastal avifauna of Northern Ireland. However, it is Amber-listed in BOCCI due to its small population.

Of approximately 30 colonies of Lesser Black-backed Gulls in Northern Ireland, around half are coastal. The species has increased in recent years, from a total of 1033 apparently occupied nests at the time of the Seabird 2000 census. In the main, the species is a summer visitor, with reduced numbers present in coastal waters in winter. There are widespread, but low densities of birds at sea during the summer months. The species is Amber-listed in both BOCC3 and BOCCI because of localised breeding populations.

Herring Gull has in the recent past had frequent small coastal colonies, but it has declined severely since the 1980s, when there were around 16,000 apparently occupied nests in Northern Ireland. The Seabird 2000 census found 709 nests, and some colonies became extinct. Botulism has been implicated as a major cause of this decline. Consequently, the species is Red-listed in both BOCC3 and BOCCI. Distribution is mainly coastal during the summer months, but extends into, particularly, the North Channel in winter.

Colonies of Great Black-backed Gulls around Northern Ireland generally contain few birds, but the colony in Strangford Lough holds some tens of pairs. The species has recovered somewhat from recent declines, but is Amber-listed in both BOCC3 and BOCCI. Densities at sea are generally low during the breeding season, although there is some concentration of birds near the Irish Sea front. Larger concentrations occur here and off the north coast in winter, presumably reflecting increases due to immigration from the north and east.

Terns

Four species of Tern, Sandwich Tern *Sterna sandvicensis*, Common Tern *S. hirundo*, Roseate Tern *S. dougallii* and Arctic Tern *S. paradisaea*, currently breed in Northern Ireland. There are approximately seven colonies of Sandwich terns in Northern Ireland. Population numbers vary widely at both the country and the colony scale, but there has been a decline in recent years. The population at the time of Seabird 2000 was 1,954 apparently occupied nests. Distribution at sea is dominantly coastal; the species is absent during the winter months. It is Amber-listed in both BOCC3 and BOCCI as a bird of European concern, a restricted distribution and recent decline.

Apparently occupied nests of common tern were estimated at 1,704 during the Seabird 2000 census, but have declined somewhat since. However, species abundance fluctuates considerably over time, and low site faithfulness means that birds frequently move between colonies, so that local variability is not unexpected.

There are around ten Arctic Tern colonies in Northern Ireland, with a recently variable population of 1,500-2,000 pairs. Most colonies are small, but that on Copeland consists of 800-1,000 pairs. Maritime distribution of both common and Arctic tern is predominantly coastal. The species are Amber-listed in both BOCC3 and BOCCI because of localised breeding populations.

There is a single Roseate Tern colony in Northern Ireland, in Larne Lough, where it has declined to near extinction in recent years. The species is Red-listed in BOCC3, Amber-listed in BOCCI and is on the OSPAR List of Threatened and/or Declining Species and Habitats.

Waders

Around 16 species of waders occur in substantial numbers along the coasts of Northern Ireland at one or more stages of their annual cycle, while a further five species occur regularly in small numbers. The largest numbers occur during migration and winter periods, when significant numbers of Oystercatcher, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Sanderling, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Whimbrel, Curlew, Redshank and Greenshank use the intertidal of muddy and sandy estuaries and sea loughs as migration stopovers or wintering sites. A number of species such as Purple sandpiper and Turnstone *Arenaria interpres* also use rocky and shingle shorelines at these times. The most important of these sites have been designated as SPAs, Ramsar sites and/or ASSIs (Table 11). The conservation status and scientific names of wader species are provided in Table 16.

Wader species generally have specialised foraging requirements, so that different species may exploit different parts of the intertidal and littoral zones. However, different species may also exploit different food resources within the same area, and a wide range of species may share high tide roost sites close to their foraging habitats.

Two wader species, Ringed Plover and Oystercatcher, breed regularly around the coasts of Northern Ireland. The former is restricted to sites that have areas of shingle that are used as nest sites, while the former nests on both bare and vegetated shorelines. Both species are vulnerable to increasing recreational use of the coast and have declined as breeding species in Northern Ireland.

Table 16 : Conservation status of wader species that use the Northern Ireland coast in significant numbers

Species	BOCC3	BOCCI	Main sites
Oystercatcher *Haematopus ostralegus*	Amber	Amber	Strangford Lough, Belfast Lough, Lough Foyle, Outer Ards, Dundrum Inner Bay
Ringed Plover *Charadrius hiaticula*	Amber	Amber	Strangford Lough, Outer Ards, Belfast Lough, Carlingford Lough
Golden Plover *C. apricaria*	Amber	Red (breeding)	N/A
		Amber (winter)	Strangford Lough, Lough Foyle
Grey Plover *Pluvialis squatarola*	Amber	Amber	Strangford Lough
Lapwing *Vanellus vanellus*	Red	Red (breeding)	Strangford Lough, Lough Foyle
Knot *Calidris canutus*	Amber	Red	Dundrum Inner Bay, Lough Foyle
Sanderling *Calidris alba*	Green	Green	Lough Foyle, Dundrum Bay, Bann Estuary
Purple sandpiper *Calidris maritima*	Amber	Green	Outer Ards
Dunlin *Calidris alpine*	Red	Amber	Strangford Lough, Carlingford Lough, Lough Foyle, Dundrum Inner Bay
Black-tailed Godwit *Limosa limosa*	Red	Amber	Strangford
Bar-tailed Godwit *L. lapponica*	Amber	Amber	Strangford Lough, Belfast Lough
Whimbrel *Numenius phaeopus*	Red	Green	No nationally important sites.
Curlew *N. arquata*	Amber	Green	Lough Foyle, Strangford Lough, Belfast Lough, Outer Ards, Carlingford Lough
Redshank *Tringa tetanus*	Amber (breeding)	Red (breeding)	N/A

Species	BOCC3	BOCCI	Main sites
	Amber (winter)	Green (winter)	Belfast Lough, Carlingford Lough, Outer Ards, Lough Foyle, Dundrum Inner Bay, Larne Lough
Greenshank *T. nebularia*	Green	Amber	Strangford Lough, Lough Foyle, Carlingford Lough, Dundrum Inner Bay
Turnstone *Arenaria interpres*	Amber	Green	Outer Ards, Belfast Lough, Strangford Lough, Carlingford Lough

Wildfowl

This group includes Swans, Geese and Ducks. Three species occur at sites on the Northern Ireland coast in internationally important numbers. Whooper Swan (Annex I of the Birds Directive) occurs in large numbers in the close vicinity of Lough Foyle, where short-term concentrations of up to 3,000 birds may occur during autumn pulses of immigration of Icelandic birds. Birds may use both the shallow waters of the lough or adjacent agricultural fields as arrival points. Birds that winter around the lough use the relatively safe waters of the lough as an overnight roost.

Pale-bellied Brent Goose winters almost exclusively around the coasts of Ireland, with at least 75% of the population generally occurring in Northern Ireland in the autumn, primarily in Strangford Lough. The species mainly forages in the intertidal zone, but may also graze on littoral grasslands. Shelduck forages mainly in the intertidal zone, and reaches internationally important numbers in winter in Strangford Lough (around 4,000 birds). The species also breeds coastally around Northern Ireland.

Conservation status and location of sites holding nationally important numbers of wildfowl species are summarised in Table 17. A number of duck species use the, mainly, inshore waters of Northern Ireland, and are among the designation features of a number of protected sites (see Table 11). A number of surface-feeding ducks also use the, mainly intertidal, zone, particularly of the sea loughs. Most duck species are winter visitors, but eider breeds in substantial numbers around the Northern Ireland coast. Other duck species generally breed in inland sites.

Table 17 : Conservation status of wildfowl species that use the Northern Ireland coast in significant numbers

Species	BOCC3	BOCCI	Main sites
Mute Swan *Cygnus olor*	Green	Green	Strangford Lough
Whooper Swan *Cygnus Cygnus*	Red	Amber	Lough Foyle, Strangford Lough
Greylag Goose *Anser anser*	Amber	Amber	Lough Foyle, Strangford Lough, Belfast Lough
Pale-bellied Brent Goose *Branta bernicla hrota*	Amber	Amber	Strangford Lough, Lough Foyle, Outer Ards, Carlingford Lough, Killough Harbour, Dundrum Inner Bay, Larne Lough
Shelduck *Tadorna tadorna*	Amber	Amber	Larne Lough, Carlingford Lough, Belfast Lough, Lough Foyle.
Wigeon *Anas Penelope*	Amber	Amber	Lough Foyle, Strangford Lough.
Teal *Anas crecca*	Amber	Amber	Strangford Lough, Lough Foyle, Carlingford Lough, Belfast Lough
Mallard *Anas platyrhynchos*	Amber	Green	Strangford Lough, Lough Foyle
Pintail *Anas acuta*	Amber	Red	Strangford Lough, Lough Foyle
Shoveler *Anas clypeata*	Amber	Red	Strangford Lough
Scaup *Aythya marila*	Red	Amber	Belfast Lough, Carlingford Lough
Eider	Amber	Amber	Belfast Lough, Outer Ards, Lough Foyle, Strangford Lough.

Species	BOCC3	BOCCI	Main sites
Somateria mollissima			
Common Scoter *Melanitta nigra*	Red	Red	Outer Dundrum Bay
Goldeneye *Bucephala clangula*	Amber (breeding)		N/A
		Amber	Strangford Lough, Belfast Lough, Larne Lough
Red-breasted Merganser *Mergus serrator*	Green	Green	Strangford Lough, Larne Lough, Belfast Lough, Carlingford Lough, Lough Foyle. Outer Ards

Divers and Grebes

Divers are almost exclusively maritime species during the winter months. Red-throated Diver *Gavia stellata* is the most numerous diver species around Northern Ireland. Although recorded in generally small numbers, over 100 birds are present on occasion in Lough Foyle, and there are indications that the species uses the offshore waters of outer Belfast Lough in locally significant numbers. Great Northern Diver *Gavia immer* may occur in a few tens at a few sites around the coast, particularly Lough Foyle and Carlingford Lough. Occasional Black-throated Divers *Gavia arctica* may occur almost anywhere, perhaps most reliably in Strangford Lough. All diver species are Amber-listed in BOCC3, while Red- and Black-throated Divers are Amber-listed in BOCCI.

Great Crested Grebe *Podiceps cristatus* occurs in substantial numbers, in excess of 1,000 and occasionally over 2,000 birds, in inner Belfast Lough during the winter months. Smaller numbers are also present in other sea loughs at that time. The species is Amber-listed in BOCCI. Small numbers of Slavonian Grebes *Podiceps auritus* occur, particularly in Lough Foyle, in winter. This species is Amber-listed in both BOCC3 and BOCCI.

Other species

A number of other bird species use the coast of Northern Ireland at some stage in their annual cycle, but rarely as a significant proportion of their Northern Ireland populations. Examples are Heron *Ardea cinerea*, present throughout the year, and Kingfisher *Alcedo atthis*, present mainly in winter.

Key Issues, Problems and Future Trends

As can be seen from the above account, a high percentage of the bird species using the marine and littoral environments are listed as of conservation concern because of population declines or because of their reliance on a limited number of sites for wintering or breeding. Key issues affecting their conservation status are not restricted to factors affecting Northern Ireland waters alone; many bird species that use Northern Ireland marine and littoral habitats are wide-ranging and may be affected by distant events. Key issues include:

- Coastal development, which can remove habitats from use either as a result of direct destruction of breeding, foraging or roosting areas, or indirectly as a result of increased disturbance;
- Increasing use of the coast for recreation, which can cause disturbance and, particularly during cold weather, can lead to excessive energy consumption by disturbed birds, with consequent potentially increased mortality;
- Increasing storminess as a result of climate change, which has the potential to result in increased mortality as birds at sea are unable to feed for prolonged periods of time;
- Declining reproductive success in some places and in some years, possibly as a result of changes in prey distribution as a result of climate change;
- Overfishing of fish and mollusc prey species, with a potential for increased mortality both of adults and young due to starvation, or failure to breed;

- Marine pollution, which can affect populations of seabirds either in their distant wintering grounds or in UK coastal and offshore waters, and may be chronic (e.g long term exposure to toxins) or acute (oil spills). Results may include lowered reproductive success or direct mortality;
- Mortality arising from bird bycatch in fixed fishing nets, or on hooked lines, generally in offshore waters;
- Increased mortality arising from diseases such as botulism, which has been suggested as a cause of significant declines in herring gull populations;
- Reduced availability of food at sea as less fisheries bycatch and offal is dumped, and on land as landfill sites are closed and/or are managed more hygienically;
- Management of coastal areas that will allow human and bird interests to co-exist, including the provision of protected areas and control on development; and,
- "Short-stopping" of migrant wader and wildfowl species, as birds that would normally winter around Northern Ireland do not need to travel so far as climate amelioration allows them to stay on wintering grounds nearer their Arctic or eastern breeding areas.

Future trends affecting marine and littoral bird species are speculative because in some instances (bird mortality records from hooked lines) are not reported within the public domain. Climate amelioration is likely to continue to be an important issue affecting seabird productivity, as prey species distributions change. There is a potential for some breeding seabirds to undertake longer foraging trips, which may affect reproductive success. If there is a general trend for important prey species to shift northwards there is a potential for some seabird colonies to become unsustainable because of increased distances between breeding and feeding areas. Climate change will interact with fisheries policy and practice, as new fish populations are exploited, other populations are overfished, and fish population recovery may be complicated by interspecific competition. Climate change thus has the potential affect seabird distribution both for breeding and wintering species.

Sea level rise associated with climate change may affect wintering wader and duck species using Northern Ireland littoral habitats, and seabirds that nest in low-lying coastal habitats. Habitats may be squeezed, and benthic and intertidal prey species composition and distribution may change. Elsewhere, there is a potential for coastal realignment to provide new habitats for feeding and breeding birds as vulnerable coastal areas are allowed to flood.

Short-stopping may become accentuated, as distant breeding birds are able to winter nearer to their breeding grounds. Fewer birds from the Arctic and eastern Europe/western Asia may thus reach Northern Ireland. However, this phenomenon may be reliant to an unknown extent on land use policies elsewhere, as it will be important that sites are available in these new preferred wintering areas for these increased numbers of birds to exploit.

The provision of Marine Nature Reserves both as a conservation measure to support breeding seabirds and as a measure to allow fish populations to expand may counteract some of the effects of climate change. By allowing damaged ecosystems to recover and conserving ecosystems that are at present relatively intact, reserves have the potential to have a significant impact on the viability of Northern Ireland seabird populations.

At present there are no offshore or coastal windfarms around Northern Ireland, but future exploitation of the wind environment has the potential to affect wintering, breeding and migrant bird species. There will be a potential for collision of birds arriving, leaving or passing through Northern Ireland. Coastal windfarms sited in the vicinity of seabird colonies have the potential to affect breeding success as birds may be intercepted between colonies and feeding grounds. For some species, offshore windfarms may provide additional feeding areas as seabed habitats are changed, with a potential to become more productive, and become less likely to be fished commercially. Conversely, large wind farms in shallow sea areas may conflict with the feeding distributions of seabirds, notably seaducks, if these are displaced due to disturbance and consequently excluded from their main feeding areas. Offshore windfarms also have the potential for barrier effects, with consequences for the energy budgets of birds commuting between feeding and breeding areas and possible effects on breeding success.

5.8.9 Marine Noise

As part of the MSFD, Member States are required to seek to achieve GES including in relation to the introduction of energy (Description 11). This descriptor includes consideration of anthropogenic noise in the

marine environment. As a result, it is accepted that the assessment of the Plan should include the impact of marine noise resulting from the policies within the Plan. To facilitate this assessment, baseline information sources include:

- Assessment of the environmental impact of underwater noise (OSPAR Commission 2009); and,
- Northern Ireland State of the Seas Report (NIEA and AFBI, 2011).

Baseline Description

As a result of the Environmental Noise Directive (2002/49/EC), preliminary noise mapping has been produced for Northern Ireland. Within the Plan study area, noise data was collected for Derry, Limavady, Coleraine, Larne, Belfast and Bangor. From this information, noise mapping has been undertaken in relation to transport and industry.

There is little information on background underwater noise levels within the Plan area. It is considered likely that some areas, like the north Antrim coast, to be naturally noisy from strong wave action and currents whilst we might expect port areas, like Belfast, may be impacted by noise from man-made (anthropogenic) sources (e.g. shipping, dredging and port activities).

AFBI undertakes underwater acoustic surveys off the north Antrim coast using sensitive listening devices (AFBI, 2011). These surveys have identified the potential for future acoustic monitoring in population studies of whales and dolphins, in addition to the assessment of background noise levels.

Although there is little knowledge or monitoring of background underwater noise, noise reduction and avoidance have been a condition of many marine licences. Marine construction projects are often prohibited during known sensitive periods of the year in order to protect the passage of migratory fish. This mitigation approach is reasonably successful where the behaviour of the animals is known. However, for many fish or marine mammals, relatively little is known about movements and behaviour.

Key Issues, Problems and Future Trends

There is considerable uncertainty about the impacts of the long-term continuous underwater noise that is anticipated in the growth of the marine renewable energy industry. Up until now, even noisy sea areas like ports have quiet periods within their operation. Information on the impacts of ambient anthropogenic noise will increasingly be needed as marine renewable energy installations will operate around the clock. However, it is important to note that the oil and gas sector has been operating in the marine environment for many years and will also be contributing to the background noise in a continuous manner.

In the recent licensing of a marine current turbine within Strangford Lough, one of the conditions of the licence is to record and interpret sound information. Observations have shown that the Harbour Seal *Phoca vitulina* will show avoidance behaviour around the turbine. It is not yet clear if this is due to the noise emitted from the turbine. Further studies are required over time to see whether the avoidance behaviour could result in long-term effects on the seal population.

Further information is needed on background underwater noise levels, the noises of marine activities such as shipping and renewables and also on the impact of man-made noise on marine ecology receptors.

5.9 Water and Soil

5.9.1 Introduction

This section contains an overview and summary of the data collected in relation to water and soils. Due to the linkages between sediment processes and water quality, these headings have been reported in their combined state to highlight their interconnected nature. This section has been split under three main headings which are:

- Bathymetry and hydrography (including circulation and tides)
- Geology, geomorphology and sediment processes (including coastal and marine processes)
- Sediment and water quality

5.9.2 Bathymetry and Hydrography (including circulation and tides)

The following data sources have been used to characterise the bathymetry and hydrography (including circulation and tides) of the Plan area:

- Oceanwise Digital Elevation Model (DEM) data;
- Quality Status Report 2000. Region III – Celtic Seas (OSPAR Commission, 2000);
- Joint Irish Bathymetric Survey (JIBS) 2008 data (Marine Institute website);
- Charting Progress 2 (Defra, 2010);
- Dickey-Collas, M., Brown, J., Fernand, L., Hill, A.E., Horsburgh K.J. and Garvine, R.W. (2006). Does the wesern Irish Sea gyre influence the distribution of pelagic juvenile fish? Journal of Fish Biology 1: 206-229;
- Horsburgh, K.J., Hill, A.E., Brown, J., Fernand, L., Garvine, R.W., and Angelico, M.M.P. (20002). Seasonal evolution of the cold pool gyre in the western Irish Sea. Progress in Oceanography 46: 1-58; and,
- The Western Irish Sea Front – A Potential MPA (WWF, undated).

Baseline Description

Bathymetry

The Plan area borders the Irish Sea to the east, the North Channel to the northeast and the Malin Sea to the north. The Irish Sea is a small regional sea, about 58,000 km^2 in area. In character, it has the form of a fairly shallow basin, with depths ranging from 20 - 100m over considerable areas, and with a deeper channel, extending north to south in the western part of the Irish Sea, and reaching a maximum depth of 315m in the North Channel (See Figure 5). This deeper channel connects with the Celtic Sea via St George's Channel in the south, and with the Malin Sea via the North Channel. The bathymetry of the Plan area is shown in Figure 5.

Hydrography –Circulation

Water generally moves from south to north from the Atlantic Ocean (see Image 2), although in the Irish Sea there are complex intermediate water movements. Surge and density-driven currents both contribute significantly to the overall long-term mean circulation of the Irish Sea (Defra, 2010). Flows are strongest in winter and spring but can be overwhelmed during periods of strong winds. Most regions of the Irish Sea are continuously mixed because tidal currents are strong.

The Western Irish Sea Front (WISF) represents a distinct, though temporal, oceanographic feature (WWF, undated). Research has indicated high productivity in the area and associated important feeding grounds for a number of marine species. The high productivity identified with the front may result in modifications of associated communities and ecosystems, particularly benthic communities. The WISF forms seasonally in the late springtime (at approximately March/April) and persists throughout the summer until September or October. The WISF marks the boundary between tidally mixed water to the southeast, and stratified water to the north-west. The front remains in a relatively static position throughout the summer and develops particularly along the southern and eastern edge.

As a consequence of the stratified water development and the tidal mixing front between the Isle of Man and Dublin there is restricted flushing in the bottom water of this region. Thus winter water persists for much of the spring and summer as a dome of cold water overlying the deep (>100m) basin of the western Irish Sea, to the immediate north-west of the front. The resulting density structure and geostrophic forces generate a cyclonic gyre of near surface water (Dickey- Collas et al., 2006; Horsburgh et al., 2000). This gyre dominates the circulation of the region during late spring and summer and is characterised by anticlockwise current speeds which exceed 0.2 m/s, after removal of tides (Dickey-Collas et al., 2006). This western Irish Sea gyre tends to retain material in that area (e.g. plankton, fish larvae and juveniles) and means there is a southerly flow along the Irish coast (OSPAR Commission, 2000). Following the breakdown of stratification in autumn, the mean flow is then weakly northwards until the following spring.

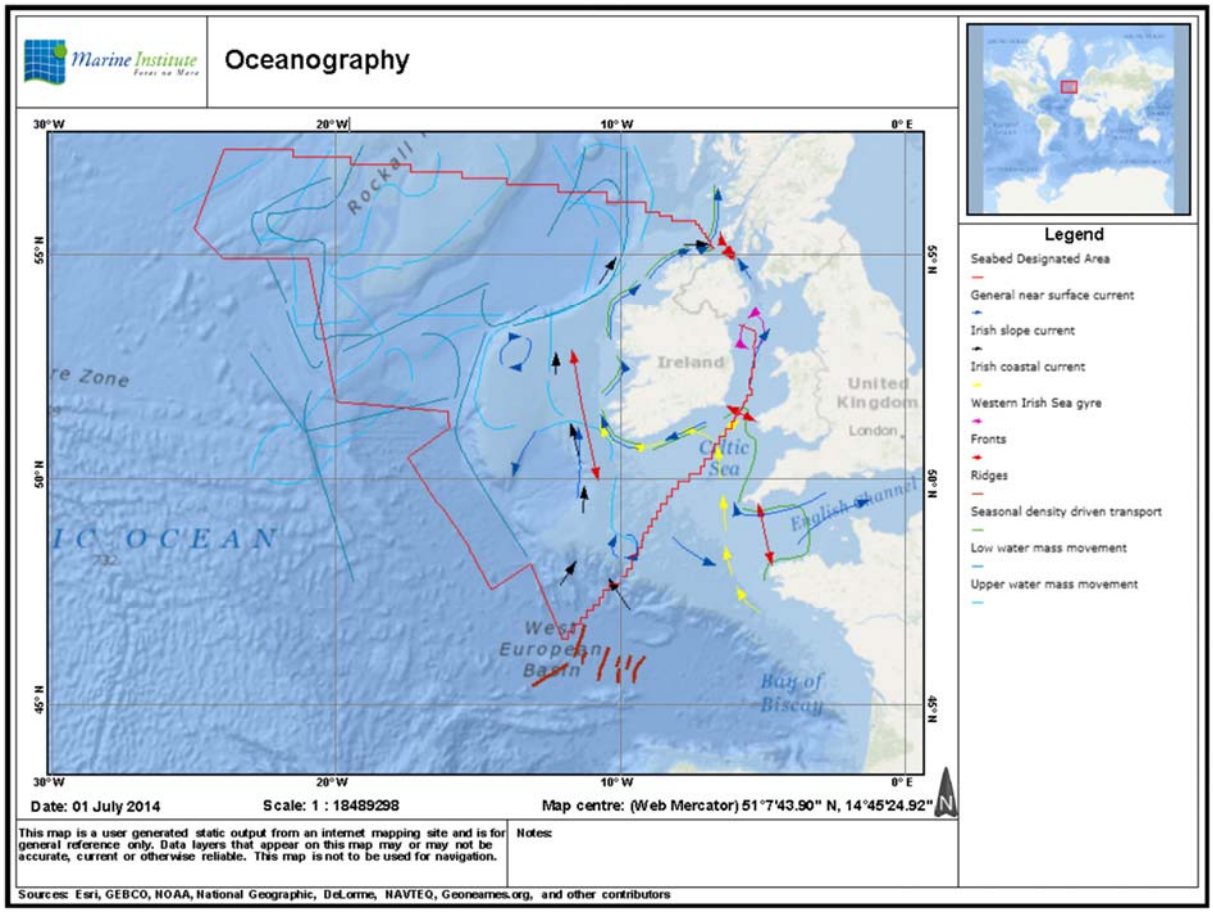


Image 2 : General circulation on and around the Irish Shelf (Source: Marine Institute website)

Tides

Tides propagate from the Atlantic Ocean, northwards through the Celtic Sea and southwards through the North Channel. Tidal fronts meet adjacent to the Isle of Man and these areas are characterised by weak peak tidal currents (OSPAR, 2000). Mid-water mean peak spring tidal currents of <0.5 m/s occur in areas of mud, >1m/s occur in most areas of sandy gravel, and >1.25m/s occur in areas of gravel and exposed rock and diamicton (BGS, 2005, Image 3).

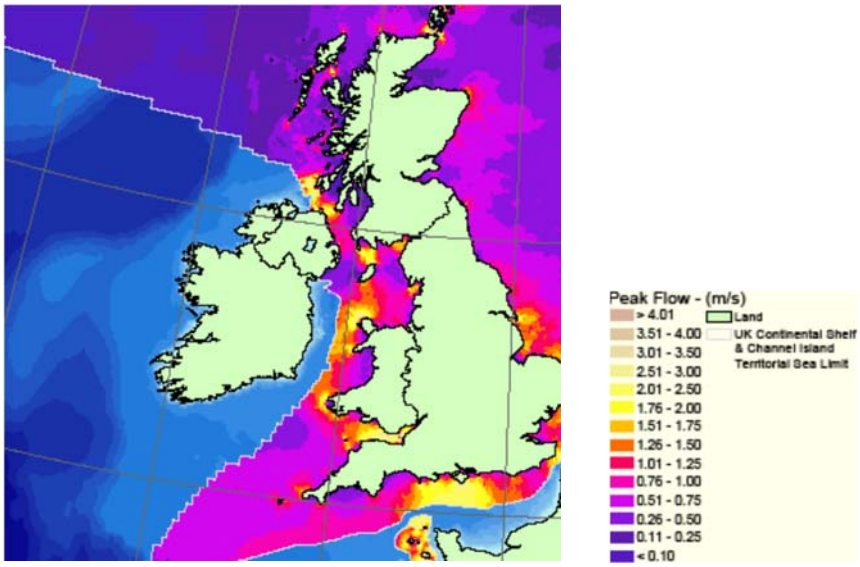


Image 3 : Peak flow for a mean spring tide (Source: Atlas of Marine Renewable Energy Resources, 2004)

Key Issues, Problems and Future Trends

Circulation is subject to a wide range of natural variability on many time-scales. Whilst certain types of seabed development, such as capital and maintenance dredging, and marine installations may result in localised changes to bathymetry, there is no evidence to suggest human activities have substantially altered flow patterns or characteristics within Northern Ireland waters.

Some change in the Atlantic Meridional Overturning Circulation which influences the climate of NW Europe, can be expected this century, as indicated in climate model experiments. Such changes will influence existing circulation patterns in the Plan area and these will be detectable, given sufficient time, by the array of monitoring equipment deployed in recent years in UK shelf seas (Defra, 2010).

5.9.3 Geology, geomorphology and sediment processes (including coastal and marine processes)

The following data sources have been used to characterise the Geology, geomorphology and sediment processes (including coastal and marine processes) within the Plan area:

- JNCC Coastal Directories Series: Region 17 Northern Ireland (JNCC, 1997);
- JNCC Coastal Directories Series: Region 13 Northern Ireland (JNCC, 1996);
- The Geology of the Malin - Hebrides sea area; The geology of the Irish Sea. BGS UK Offshore Regional Reports. (BGS, 1993);
- The geology of the Irish Sea. BGS UK Offshore Regional Reports (BGS, 1995);
- Technical report on seabed and geology from DTI SEA 6 & 7 (BGS, 2005);
- BGS chart and GIS data;
- ASSI/SSSI designations for geology (JNCC website);
- MB 0102 data layers for geomorphological features. Mapping of Geological and Geomorphological Features. (Brooks, et al., 2009); and,
- SEA of Offshore Wind and Marine Renewable Energy in Northern Ireland (DETI, 2009a).

Baseline Description

Northern Ireland has a greater variety of geology than any other area of similar size in Britain (NIEA and AFBI, 2011). Every geological system from the Precambrian to the Quaternary, apart from the Cambrian period, is represented, much of which is exposed along the coast (JNCC, 1997). The area around Lough Foyle is underlain by poorly-exposed rocks of Carboniferous and Mesozoic age, but the geomorphology of most of the rest of the coastline north of Belfast is determined by the Tertiary basalt lavas and Ulster White Limestone, which protect the underlying Mesozoic rocks from erosion. The basalt and limestone cliffs of County Antrim are unstable and huge portions of the cliff show the effects of rotational landslip due to slippage in the underlying Lias clays (JNCC, 1997). South-west from Belfast, Lower Palaeozoic rocks (Ordovician and Silurian) underlie most of the area.

Geology

The geological environment of the area can be spilt into three main groups based on age:

- Bedrock (solid geology): This is material which is more than 1.8 million years old and formed before the last ice age. Along the coast of Londonderry and Antrim, Tertiary basalts are present with a series of faults exposing Jurassic and Cretaceous rocks. In north-east Antrim Dalradian rocks occur and extend several kilometres offshore, although between Antrim and the Mull of Kintyre these are covered by sedimentary Permo-Triassic deposits. Large areas of the Irish Sea comprise sedimentary basins with thick sequences of Mesozoic sediments that extend onshore into southern Antrim. Ordovician and Silurian rocks extend offshore from the entire coast of County Down to the area between the Isle of Man and the Irish coast, where they are covered by Carboniferous rock. Folded rocks of the Carboniferous age underlay the majority of the north-west Irish Sea, with a few areas of Lower Palaeozoic rock embedded within;
- Pleistocene: This is material which is between 1.8 million – 10,000 years old. This material was deposited at the start of the last ice age. During the Pleistocene era the Earth's surface experienced

a number of glacial and inter-glacial climatic cycles which led to rapid changes in sea level. These extreme changes in climatic conditions acted upon the bedrock and superficial sediments and are largely responsible for the bathymetry of the offshore area. There is extensive drift material across the Plan area due to the retreat of the last major ice-sheet about 10,000 years ago. Four distinct lithologies are present in the Plan area. Most dominant in this region are glacial tills, extending several kilometres off the coast of Down, and soft muds, comprising large areas between the Isle of Man and Down and south of the Mull of Kintyre, along with smaller areas between Magilligan and Portrush. Additional Pleistocene deposits include an area south-east of Dundrum Bay and channel fill in Beaufort's Dyke in the North Channel (JNCC, 1997). The majority of the till here is less than 10m thick, although further south between the Isle of Man and the Down coast sediments are thicker, from 30m up to 100m thick (JNCC, 1997); and,

- Holocene: material which is less than 10,000 years old. This group represents the youngest material and is formed from reworking of either the Pleistocene or Bedrock material, river inputs of sediments or the creation of new material such as biogenic shells. These gravelly sediments occur extensively in the Irish Sea (JNCC, 1997). They tend to occur in places of strong tidal current and/or wave action. Within the Plan area there are two significant coastal deposits of sand: One along the northern coast which extends eastwards from Lough Foyle along the Antrim coast. This is a typical Holocene site, formed between the periods of high sea level 7,000 – 6,500 years ago and the present sea level between 2,000 – 1,500 years ago. The second is across Dundrum Bay. At this site mud deposits lie offshore of the sand deposits at Dundrum Bay and expand to the Isle of Man. There is a smaller area of muddy deposits that extends across Belfast Lough.

Geomorphology

The seabed is composed of outcrops of bedrock and glacigenic sediments that form relict seabed features. In the other areas, relatively thin mobile seabed sediments transit across a variety of thick relict sediments (BGS, 2005). Seabed bedforms can be broadly classified into static and dynamic bedforms.

Static bedforms are important because they provide stable sites for distinctive biota and, where occurring in isolation, they contribute to the local diversity and patchiness of the seabed habitat. By redirecting the stress imposed on the seabed by the directed currents, the static bedforms also generate useful indicators of the direction of bedload sediment transport. Excepting shipwrecks, pipelines, power cables, telephone cables and the static bedforms built up by living biota (bioherms or reefs), the static bedforms provide snapshots of former terrestrial, submarine, glacial, periglacial and early postglacial features and processes (Figure 6). The main static bedforms of the Plan area are as follows:

- Rock and Diamicton: The largest areas of outcrops of rock, rock and sediment and diamicton (unsorted sediment consisting of gravel, sand and mud) occur with rough and very varied seabed topography, usually with seabed gravels, in areas of very high seabed stress and seabed scour (BGS, 2005). The location of rock outcrops are shown in Figure 6. Some of these outcrops, such as the roche moutonnee, were formed subglacially. An unusual environment is found where rock outcrops occur, with a thin layer of seabed sediments covering the upstanding rock. In this case, the rock outcrop is not an indication of a very high energy environment, rather it is isolated because it has not yet been buried by mud deposited from suspension (BGS, 2005). The exposed rock faces are swept clean of fine-grained muddy sediments because of acceleration of weak near-bed currents around the feature. The Pisces Reef, which has been designated as a candidate Special Area of Conservation (cSAC) provides an example of such an environment. The reef provides a refuge habitat, partly because the upstanding rock is hazardous to near-bed commercial fishing operations. Other isolated and upstanding seabed crops of rock and diamicton that are set in unconsolidated sediments also provide discrete patches of diverse habitats set in otherwise relatively uniform seabed.
- Narrow Enclosed Deeps: Narrow enclosed deeps are static bedforms relict from subglacial ice gouging. These features are depicted as glacial bathymetric deeps in Figure 6.
- Pockmarks: The seabed is eroded when methane gas or other fluids are expelled from point sources on the seabed and when sediment particles are also vertically entrained by the fluids into suspension by seawater. The suspended particles are then be carried away laterally by near-bed currents. Over a period of time this process erodes the seabed into hollows or 'pockmarks'. Although they are commonly elongated in the direction of dominant tidal current flow, the pockmarks are essentially static bedforms (BGS, 2005). Pockmarks are typically identified in areas with an overall smooth seabed consisting of Holocene very soft mud or silty very fine-grained sand. Fields of such pockmarks occur in the Western Irish Sea within the Plan area (Figure 6). Most of the pockmarks are

currently inactive and relict. In the active pockmarks, an increase in the biological production of carbonate occurs in the gas conduits buried in shallow sediments below seabed and at the locations of gas expulsion from the seabed into the water column.

- Bioherm Features: The Plan area has living reefs, bioherms, of the bivalve Modiolus and tube-building polychaete Sabellaria (Figure 6). These features are important habitats and are described in terms of their ecological function in the Biodiversity, Flora and Fauna Section 5.8. Modiolus bioherms form stacks of pebble-size bivalves, the ridge-axes of which are aligned transversely to the near-bed currents. They do not occur in the extremely high-energy scour environments. Modiolus is also absent from areas of relatively low seabed stress where there is a high risk of the biota being covered by deposited sediment.

Mobile bedforms mainly occur between extremes of high seabed stress typified by static bedforms of rock and diamicton outcrop at the seabed and the lowest seabed stress associated with a smooth seabed, typically consisting of large areas of essentially static seabed in the mudbelts. The main mobile bedforms that occur in the Plan area are as follows:

- Sand Ribbons: Sand ribbons are sometimes connected to the downstream side of static seabed obstacles such as pebbles, cobbles, boulders, upstanding rock outcrop, and commonly feature in areas of seabed scour and very high seabed stress (BGS, 2005). In this environment they usually align parallel to the peak tidal streams. Thus the smaller sand ribbons are mobile in the sense that they may change positions in response to changes in the amount and direction of seabed stress with the cycles of flood and ebb tides. The location of sand ribbon fields in the Plan area are shown in Figure 7.
- Transverse Sandwaves and Sandbanks: The bedforms that are formed transversely to tidal streams include sand ripples and sandwaves. Sandbanks are commonly formed sub-parallel to the prevailing tidal streams and in wave dominated areas sub-parallel to longshore drift. The location of these features in the Plan area are shown in Figure 7.
- Sand Patches: There is a relatively large area of sand patches off the north coast of Northern Ireland (Figure 7). The distribution patterns of sand patches interdigitate with those of transverse sandwaves (Figure 7). Because of the interdigitation of the sandwaves with sand patches it is thought possible that some sand patches may have formed by a process of sandwave flattening following the imposition of stress transmitted from seawaves to the seabed (BGS, 2005).

Coastal Processes

Coastal change in Northern Ireland is generally not as rapid as in some parts of England. The coasts of Northern Ireland are subject to a wide range of wave and tidal regimes, with the north coast being affected by Atlantic swells while the east coast is influenced by the more local wave climate generated in the Irish Sea (JNCC, 1997).

Marine Processes

Sediment grains are winnowed on the seabed depending on how strong the near-bed currents are in relation to the threshold speeds of near-bed currents required for grain suspension into seawater and grain bedload transport (BGS, 2005). The seabed-sediment grain-size distribution patterns reflect the exposure of the seabed to physical processes, which are driven by the stress put on the seabed by directional ocean, wind, storm surge and tidal currents and by non-directional currents from wind and swell waves. The trend in the Plan area is for sediment grains to move across or away from seabed with higher stress towards the seabed with a lower stress. The amount of stress imposed on the seabed and thus the amount and type of sediment imported into, deposited, or exported out of the Irish Sea varies with position and time. As a result, in areas of seabed scour and grain bedload transport, there are continuous processes of sediment reworking and redistribution resulting in 'seabed polishing'. These sediment processes result in large areas of (a) exposed bedrock and diamicton and (b) muddy sediment. Large areas of exposed rock and diamicton are swept clean of unconsolidated sand in the most highly stressed seabed environments, perhaps leaving some pebbles, cobbles and boulders (collectively termed gravel). Areas of least seabed stress are characterised by more or less stable fine-grained muddy sediments, significant proportions of which have been deposited from suspension in conditions where there are very low seabed currents.

There is an overall very strong correlation between the annual mean peak tidal currents and annual mean seabed stress in the Plan area. The strong correlation between the distribution patterns of coarser sediments and the stronger mean peak spring tidal currents establishes that the stress put on the seabed by the tidal currents is a major influence on sediment composition. The positive correlation between the stronger mean

peak tidal currents and seabed stress with constrictions to tidal flow by coastal configuration also means that on the open continental shelves of the Irish Sea and the North Channel there is little regional correlation between the water depth and sediment composition (BGS, 2005).

Net sand-transport pathways and directions in the Plan area are complex and are shown in Image 4. These have been predicted from observations of the geometries of the mobile bedforms and bedforms generated around static obstacles. Image 4 shows the there is a sand parting zone in the North Channel. This zone separates the northern section of the Plan area, where the direction of sand transport is in a northerly direction, from the southern section of the Plan area, where the direction of sand transport is in a southerly direction. There is also a sand divergence zone between the North Channel and across the Irish Sea west of Anglesey (Image 4). The sand-grade sediment moves along near the seabed while the mud-grade sediment moves largely in suspension.

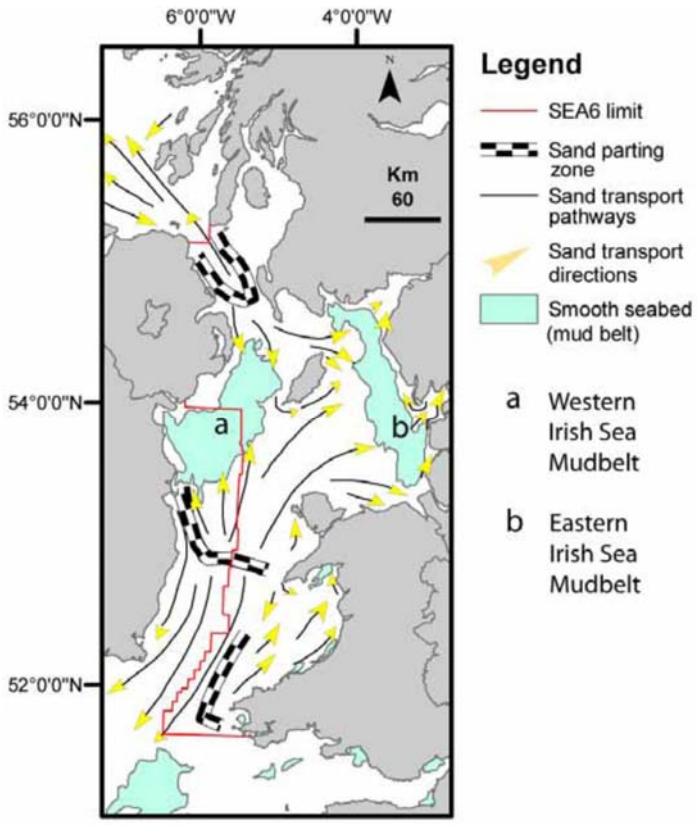


Image 4 : Net sand transport pathways and directions (Source: BGS, 2005)

Key Issues, Problems and Future Trends

Within the Plan area, capital and maintenance dredging will have short term localised impacts on marine sedimentary processes (DETI, 2009). Developments on the seabed, such as marine renewables, have the potential to change the sediment dynamics of the region. However, these structures are temporary and so there will be little long term effect.

The main issue that could impact the geomorphology of the area is climate change. There is the potential for climate change to cause an increase in extreme weather and waves, which in turn will have an influence on the sediment and hydrodynamics of the region and result in sediment transport changes (erosion and deposition patterns).

The rapid evolution of the seabed in the Plan area has resulted in superficial strata below the seabed sediments having significantly different properties to those of the seabed sediments. As a result, new developments which require foundations set below the seabed could encounter geohazards that might affect the safety and cost of seabed and shallow sub-seabed development operations (BGS, 2005).

5.9.4 Sediment and Water Quality

The following data sources have been used to characterise sediment and water quality within the Plan area:

- Sensitive Areas under UWWTD (DOE website);
- Northern Ireland, regional report of the National Marine Monitoring Programme (Marine Pollution Monitoring Group, MPMMG, undated);
- UK National Marine Monitoring Programme - Second Report 1999 – 2001 (Marine Environmental Monitoring Group, 2004);
- Monitoring of the quality of the marine environment, 2004-2005 (Centre for Environment, Fisheries and Aquaculture Science (CEFAS), 2005);
- Percentage of identified bathing waters that complied with the European Community Bathing Water Directive (DOE website);
- Quality Status Report 2000 Region III Celtic Seas, Chapter 4, Chemistry (OSPAR, 2000);
- Northern Ireland State of the Seas Report (NIEA and AFBI, 2011);
- North Eastern River Basin Management Plan (NIEA, 2009);
- Northern Ireland Environmental Statistics Report (DOE, 2013);
- Northern Ireland Coastal Zone - Indicators of Sustainable Development (DOE, 2011);
- Northern Ireland Bathing Water Compliance (1998-2014) (DOE website); and,
- SEA of Offshore Wind and Marine Renewable Energy in Northern Ireland (DETI, 2009a).

Baseline Description

Sediment Quality

Within the Plan area, the sediment quality is generally good, which is due both to a lack of contamination source and the energetic nature of the marine environment. The underlying rocks of Northern Ireland tend to underpin the sediment chemical composition of the surface soils and coastal sediments. This is seen in areas dominated by the Antrim basalts which have elevated levels of metals such as nickel and chromium.

In order to monitor and assess the marine sediment quality in Northern Ireland, Northern Ireland Environment Agency (NIEA) and Agri-Food and Biosciences Institute (AFBI) have 14 stations which have been monitored for over 10 years (NIEA and AFBI, 2011). These sites form part of the UK monitoring network for the Clean Seas Environmental Monitoring Programme (CSEMP) which is a network of almost 500 sites around the UK. At the Northern Ireland sites, there has been a general reduction in the concentration of metals, in line with the trend in inputs.

All 14 sites have shown a reduction in the level of contamination with the greatest reductions observed in Belfast Lough. In the past this has been Northern Ireland's most industrialised Lough but improvements in sediment quality, with particular emphasis on Zinc, Mercury, Cadmium and Lead, have been observed in cores and surveys at the site (NIEA and AFBI, 2011). The decrease in the concentration of metals can be linked to industrial closures in the 1980s. Most of the metals in the area are now similar to background levels. Only Chromium persists at a higher concentration, which may be due to the underlying geology of the region (NIEA and AFBI, 2011).

The lowest levels of man-made inorganic substances such as PAHs and PCBs occur in Strangford Lough (NIEA and AFBI, 2011) and off the north coast. Sites offshore tended to have concentrations 2 to 4 times the background concentration, with little change year on year.

In 2010, a quality status assessment of the area was conducted which found that the concentration of radionuclides had reduced in the region with respect to the previous survey which was carried out in 2000. The main source of contamination of radionuclides comes from the discharges at Sellafield on the Cumbrian coast in England. As a result, the more elevated levels of radionuclides are confined to the eastern part of the Irish Sea (DETI, 2009a). Tributyltin (TBT) levels were also found to be at an acceptable level, but were still of concern in some harbours and busy shipping lanes.

There may be military waste present on the seabed in the Plan area as a result of:

- Intentional disposal (official and unofficial);
- Live firing ranges and naval exercise areas;
- Wrecks of military vessels and some merchant ships;

- Minefields; and,
- Migration from the original deposition site.

The density and distribution of military waste varies over the area depend upon whether the area has been or is currently used for military operations. Between WWII and the 1970s the deep water channel (Beaufort's Dkye) between Northern Ireland and south west Scotland was used as a dumping ground for military munitions. It is possible that during this period 1,000,000 tonnes of all types of munitions were deposited (DETI, 2009a). Some experts are worried about the risk of explosion from these dumping grounds as the munitions start to erode with time (BBC News Article, http://news.bbc.co.uk/1/hi/sci/tech/4032629.stm [Accessed March 2013]).

As well as military waste, there are also wartime wrecks, both military (including aircraft) and merchant vessels. While the positions of some wrecks are known, there are many others, particularly in deeper waters, where the locations are unknown. Some munitions may have migrated away from wreck sites overtime and, therefore, it should be assumed that the Plan area is potentially at risk from unswept mines from WWI and WWII (DETI, 2009a).

Water Quality

Waters within the Plan area are generally well mixed and deoxygenation is rare (OSPAR, 2000). However, the Western Irish Sea Front and Gyre have a tendency of retaining particles, including nutrients, with implications for water quality. Direct inputs of contaminants in the Plan area consist of mainly industrial and municipal sources, which are centred on the highly populated industrial centres of the North West of England, the Clyde and Belfast. Any contaminants in Northern Ireland's waters are, therefore, considerably diluted. In terms of the longer-term, concentrations of carbon dioxide (CO2) are increasing in the atmosphere and the oceans are acting as net sink for CO2 in a process that is known as ocean acidification. This process is substantially reducing the rate of increase in the atmosphere but making the oceans more acidic with implications for marine fauna.

Many standards for water quality are regulated at EU level through a range of environmental directives. The most relevant to the Plan area are reviewed in the following sections.

The following sections detail the Directives under which better planning can be achieved for water quality

Water Framework Directive

The EU Water Framework Directive (WFD) (2000/60/EC) establishes a legal framework for the protection, improvement and sustainable use of all waterbodies across Europe, including rivers, canals, lakes, estuaries (transitional waters) and coastal waters as well as groundwater (European Commission, 2000). In Northern Ireland, the WFD covers inland, transitional and coastal waters out to 1 nm offshore (from territorial baseline). Within the Plan area, there are 7 transitional and 20 coastal water bodies (Figure 8).

The main objective of the Directive is to protect and improve the aquatic environment throughout the EU (WISE, 2008). This includes a commitment to prevent the deterioration of aquatic ecosystems and, where possible, restore surface waters damaged by pollution, water abstraction and dams and engineering activities to at least 'good ecological status' or 'good ecological potential' by 2015. This is being achieved through River Basin Management Plans (RBMPs), consistent management standards and improved monitoring. Each RBMP has a reporting cycle of six years. The RBMPs that cover the Plan area are the North Eastern, North Western and Neagh Bann RBMPs (Figure 8).

In 2012, 17% of transitional and coastal water bodies were classified as high status, 72% at good status and the remaining 11% at moderate status (DOE, 2013). In 2011, these figures were 17%, 31% and 52% respectively indicating that the overall water quality has improved over this period (DOE, 2011).

The NIEA (formally Environment and Heritage Service Northern Ireland (EHSNI)) has developed a WFD monitoring plan. This involves appropriate ongoing classification and compliance assessment programmes, which not only ensure surface waters comply with the WFD objectives, but also with other international conventions and agreements which includes OSPAR, the Environmental Change Network (ECN) and the National Marine Monitoring Programme. There are new contaminants entering the environment from various sources and there is less information on newer pollutants that may accumulate in the sediments. As such, new detection techniques are being developed to help assess and monitor these new pollutants (NIEA and AFBI, 2011).

Shellfish Water Directive

Shellfish Waters are designated under the Shellfish Waters Directive 2006/113/EC, in order to ensure a suitable environment for shellfish growth. There is close cooperation between NIEA, who monitor shellfish waters and shellfish for compliance with the Shellfish Waters Directive, and the Food Standards Agency, who monitor shellfish flesh for compliance with the Food Hygiene Regulations (NIEA, 2009).

The Shellfish Waters Directive was subsumed by the Water Framework Directive in 2013 (DOE website). Mandatory and guideline standards were associated with the Shellfish Waters Directive and monitoring was carried out before and after spawning within designated shellfish waters. These standards have now been superseded by the environmental quality standards developed for WFD.

During 2009 the DOE, following consultation, identified several new shellfish waters and amalgamated many small ones into larger areas. Additional sites in Belfast Lough and Killough were designated in 2009. In the past, pollution reduction programmes for shellfish waters have guided discharge standards for wastewater treatment works and sewerage systems. In addition, tighter controls on agricultural practices have been introduced through the Nitrates Action Programme across the total territory of Northern Ireland, which will contribute to better shellfish water quality. Pollution reduction programmes are currently being revised to reflect these changes and to incorporate the new designations (NIEA, 2009).

There are currently 10 Shellfish Waters in Northern Ireland (Figure 8) and all of these achieved the mandatory standard in 2011 (DOE, 2013).

Bathing Water Directive

Bathing Waters are areas protected for recreational bathing use and must meet mandatory and guideline standards for microbiological quality in order to protect human health. Waters that comply with the guideline standards are termed excellent quality and waters complying with the mandatory standard are termed good quality. Those bathing waters that fail to comply with the mandatory standards are recorded as poor and this constitutes a failure under the Bathing Water Directive 2006/7/EC, which has replaced Directive 76/160/EEC. The water quality standards of the Bathing Waters Directive are used to set discharge limits for coastal waste water treatment works and sewerage systems. In addition, tighter controls on agricultural practices have been introduced through the Nitrates Action Programme across the total territory of Northern Ireland, which will contribute to better bathing water quality (NIEA, 2009).

In Northern Ireland there are 23 designated bathing waters (see Figure 8). In 2013, 20 of Northern Ireland's bathing water beaches (87%) passed with excellent water quality and no beaches failed standards. This is an improvement of around 17% from the 2012 results. Only two months of 2014 monitoring data are available for 2014 at the time of writing and these indicate a further improvement in water quality, with 21 out of the 23 bathing waters reaching at least excellent quality (see Table 18).

Urban Waste Water Treatment Directive

Nutrient sensitive areas comprise nitrate vulnerable zones and polluted waters designated under the Nitrates Directive and areas designated as sensitive areas under the Urban Waste Water Treatment Directive in relation to nutrient enrichment.

A total territory approach has been adopted in Northern Ireland under the Nitrates Directive (NIEA, 2009). Under the Urban Waste Water Treatment Directive, there are 17 areas that have been designated as sensitive, including Inner Belfast Lough, the Tidal Lagan and the River Lagan catchment, the River Bush Catchment, the north end of Strangford Lough, the River Enler catchment, and the Quoile Pondage and catchment (Table 18 and Figure 9). Waste water treatment works discharging into these areas, with a population equivalent greater than 10 000, are required to have nutrient reduction, or another form of further treatment in place within seven years of the designation.

Table 18 : Summary of sensitive areas in Northern Ireland

Sensitive area name	Identification date	Sensitive Area type	Length (km)	Area (ha)
Upper and Lower Lough Erne	1994	Eutrophic Water	2,346.26	13,600.00
Lough Neagh	1994	Eutrophic Water	4,617.91	38,200.00
Inner Belfast Lough	2001	Eutrophic Water	-	5,295.27
Tidal River Lagan	2001	Eutrophic Water	-	37.36
Quoile Pondage	2001	Eutrophic Water	-	59.15
Foyle (freshwater catchment)	2006	Eutrophic Water	2,037.01	-
Roe catchment	2006	Eutrophic Water	567.17	-
Faughan catchment	2006	Eutrophic Water	326.75	-
River Lagan catchment	2006	Eutrophic Water	436.48	-

Sensitive area name	Identification date	Sensitive Area type	Length (km)	Area (ha)
Lower Bann catchment	2006	Eutrophic Water	1,026.65	-
Enler catchment	2006	Eutrophic Water	108.45	-
Bush catchment	2006	Eutrophic Water	441.52	-
Newry River catchment	2006	Eutrophic Water	264.34	-
Strangford Lough (north end)	2006	Eutrophic Water	-	1,117.46
Newcastle	2006	Bathing Water	-	10.01
Ballyholme	2011	Bathing Water	-	23.5
Paddy's Point, Reagh Bay	2006	Shellfish Water	-	1,069.22
Source: Defra website				

Floods Directive

As part of the plan to implement the Floods Directive (2007/60/EC), DARD Rivers Agency is the competent authority to implement the legislation (The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009). The Directive identifies the three principles of flood risk management as prevention, protection and preparedness. As part of the implementation of the Directive enabling legislation, DARD Rivers Agency identified Significant Flood Risk Areas (SFRAs) in Northern Ireland. Within the on shore study area of the Plan, Table 19 identifies the urban areas which were identified as SFRA and in relation to the WFD, which River Basin District they are in.

Table 19 : SFRAs within the Study Area

SFRA	River Basin District
Strabane	North West
Derry / Londonderry	North West
Coleraine	Neagh Bann
Ballymena	Neagh Bann
Antrim	Neagh Bann
Carrickfergus	North East
Bangor	North East
Belfast	North East
Banbridge	Neagh Bann
Newtownards	North East
Downpatrick	North East
Newcastle	North East
Newry	Neagh Bann

Key Issues, Problems and Future Trends

Over the last three decades, coastal sediment and water quality has improved dramatically, in particular, as a result of the application of full treatment to sewage discharges, improved treatment of industrial effluents, and work to reduce diffuse pollution. Despite this, the following key pressures have been identified in all of the RBMPs in the Plan area:

- Abstraction and flow regulation;
- Diffuse pollution from rural and urban land, including nutrient enrichment;
- Point source pollution from sewage and industry;
- Changes to morphology (physical habitat); and,
- Invasive alien species.

In addition to the list above, marine fish farming has grown in extent and value in Northern Ireland. Potential pressures this industry could bring on the sediment and water quality of the area include an increase eutrophication and anoxic conditions.

DARD Rivers Agency has certain obligations as a result of the Floods Directive, including the eventual publication of the Flood Risk Management Plan for Northern Ireland which will result in policies that influence flood risk within coastal regions.

In the longer term, it is predicted that the acidity of the surface ocean will double by 2100 (Defra, 2010). This is because dissolving CO_2 gas in water releases hydrogen ions, increasing acidity and reducing pH. Such acidification is a major threat to marine resources, with impacts on ecosystem function across the spectrum from molecular processes to food web dynamics affecting large organisms.

5.10 Air

Air quality within the onshore Study Area for the Plan is regulated by a designation framework which requires LGDs to designate Air Quality Management Areas (AQMAs). AQMAs are the result of degradations in air quality standards against European quality standards. There is no such designation framework for marine air quality. The following data sources have been used to characterise the air quality within the coastal environment:

- Air Quality Management Areas (AQMAs) and,
- The United Kingdom Pollutant Release and Transfer Register (UK PRTR) website.

Baseline Description

5.10.1 AQMAs

Areas and locations where there are air quality issues will generally have been identified through the AQMA designation and monitoring process. Given the nature of air quality issues, AQMAs are generally designated in urban areas, however within the rural environment they are generally designated as a result of high traffic flows. Table 20 shows the number of AQMAs designated in the LGDs which abut the coastline.

Table 20 : Summary of AQMAs within the Coastal LGDs

LGD	Number of AQMAs	Designation pollutant
Newry and Mourne	2	Nitrogen Dioxide / Particulate Matter < 10um
Belfast	4	Nitrogen Dioxide / Particulate Matter < 10um
Newtownabbey	3	Nitrogen Dioxide
Derry	4	Nitrogen Dioxide
Limavady	1	Nitrogen Dioxide
Strabane	3	Particulate Matter <10um

Out of the 12 LGDs which abut the coast, six have designated AQMAs, the other six have not designated any AQMAs.

5.10.2 Registered Pollutant Releases

Pollutant Release and Transfer Registers (PRTRs) are inventories of pollution from industrial sites and other sources. A PRTR is a national environmental database or inventory of potentially hazardous chemical substances and/or pollutants released to air, water and soil and transferred off-site for treatment or disposal.

In Northern Ireland, PRTR information is collated on a county basis. Within the study area for the Plan, data has been collected for the three counties which encompass the coast (Counties Down, Antrim and Londonderry). Information has been collated for emissions to air which contain chlorinated substances, greenhouse gases and “other” gases. The information used in this section is taken from year 2011.

County Antrim had information provided under all three gas types, with four facilities recorded as emitting chlorinated substances, four types of facility emitted greenhouse gases and four facilities emitting "other" gases.

County Down had information provided under the greenhouse gases and "other" gases headings, four facilities emitted greenhouse gases and three facilities emitting "other" gases.

County Londonderry also had information provided under the greenhouse gases and "other" gases headings, four facilities have been emitting greenhouse gasses and one facility emitting "other" gases.

Key Issues, Problems and Future Trends

The management of air quality in Northern Ireland is based on the requirements of EU Air Quality Directives (Directives 2008/50/EC and 2004/107/EC) and the UK Air Quality Strategy. In 2012 the levels of nitrogen dioxide and particulate matter in the atmosphere were within national objectives; however levels of ozone in Northern Ireland do not appear to be decreasing. While this issue does have a weather variable, exceedences are possible. If exceedences become the norm, AQMAs may be designated because of ground level ozone. For other pollutants, downward trends have been measured and are predicted.

In relation to industrial emissions, the majority of emission source sectors have measured a decreasing trend since 2008 (base year).

Where coastal LGDs which have ports activity, see an increase in this activity (particularly in relation to freight) one of the impacts associated with the increase would relate to air quality(for more information on Shipping in the study area, please refer to section 5.13.3).

5.11 Climate Factors

The following data sources have been used to characterise climatic factors within the Plan area:

- Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990-2012, Report to the Department of Energy and Climate Change, The Scottish Government, The Welsh Government and The Northern Ireland Department of the Environment. (Aether & Ricardo AEA, 2014);
- First Steps Towards Sustainability – A Sustainable Development Strategy for Northern Ireland (DOE, 2006);
- Digest of UK Energy Statistics 2012, (DECC, 2012);
- Guidelines to Defra / DECC's Greenhouse Gas Conversion Factors for Company Reporting (Defra and DECC, 2012);
- 2012 UK Greenhouse Gas Emissions (DECC, 2014);
- Offshore wind – economies of scale, engineering resource and load factors (Garrad Hassan, 2003);
- European Commission;
- UK Climate Projections 2009 (UKCP09);
- Turn down the heat. Why a 4ºC warmer world must be avoided (The World Bank, 2012);
- A climate change risk assessment for Northern Ireland (2012);
- Northern Ireland Climate Change Adaptation Programme (2014);
- Marine Climate Change Impacts Partnership (MCCIP) 2009;
- Cross-Departmental Working Group on Climate Change (DOE, 2014);
- Coastal Erosion in MCCIP Annual Report Card 2010-11, (Masselink and Russell, 2010);
- Flood and coastal erosion risk management policy evolution in Northern Ireland: "Incremental or leapfrogging?" (Dodds et al., 2010);
- Air Pollution Information System website http://www.apis.ac.uk/overview/regulations/overview_shipping_emissions.htm; and,

- Devolved Administrations' Emissions (Committee on Climate Change website http://www.theccc.org.uk/charts-data/devolved-administrations-emissions/).

There are many aspects to climate change that should be considered. These include the following:

- The release of greenhouse gases, such as carbon dioxide, methane and nitrous oxide, into the atmosphere, which is generally considered the driving force behind climate change;
- Changes to the climate itself and the physical environment such as sea level rise, change in temperature and extreme weather with consequences for the frequency and intensity of storms, storm surges and extreme wave conditions;
- The potential for ocean acidification in the longer-term;
- The vulnerability of ecosystems and infrastructure; and,
- Society's reaction to these changes, such as risk assessment and adaptation measures.

Baseline Description

Climate change has primarily being brought about by the burning of fossil fuels and the consequent emission of greenhouse gases. The main greenhouse gas is carbon dioxide (CO2), accounting for about 82% of the total UK greenhouse emissions in 2012. In 2010, Northern Ireland had a 3.7% share of UK total net greenhouse gas emissions, and the trend since the base year has been a decline of 16.0% (Aether & Ricardo AEA, 2014).

Climate change takes place at a global scale but may result in locally variable results. In the UK in the context of coastal processes, the parameters which may be affected are:

- Winds;
- Wave;
- Surges;
- Mean Sea Level; and,
- Rainfall and runoff through rivers.

Projections of UK coastal absolute sea level rise (not including land movement) for 2095 are in the range from approximately 24.5 - 40 cm (UKCP09 website). There is also predicted to be a slight increase in seasonal mean and extreme waves to the SW of the UK and a decrease towards the North of the UK. In the waters around Northern Ireland, the projected trends suggest a decrease in wave height to the North and no significant change in the Irish Sea. These tentative projections are, however, based on maps with a very coarse grain, and considerable uncertainty is reported.

The most up to date evidence base for the UK's future climate predictions is provided by the UK Climate Projections 09 (UKCP09). For Northern Ireland, the medium emissions scenario predictions are shown in Table 21. The medium scenario for all years predicts that there will be warmer, wetter winters and warmer, drier summers. Overall, average annual temperatures in Northern Ireland could increase by up to 3ºC by 2080 and mean sea levels could rise by between 9cm and 69cm (UKCP09).

Whilst flooding is regarded as a major hazard in the United Kingdom (UK), to date Northern Ireland's experiences of coastal flooding have been infrequent and less severe compared to those in England and Wales (Dodds et al., 2010).

Despite coastal erosion occurring along 20% of Northern Ireland's coastline (Masselink and Russell, 2010), this issue has historically been, and remains, only a minor concern in Northern Ireland (Dodds et al., 2010). Partly as a result of this, Government administrative arrangements for Flood and Coastal Erosion Risk Management (FCERM) in Northern Ireland operate in the absence of any statutory provision for coastal erosion, as well as without formal or strategic shoreline management planning and any integrated flood and coastal erosion risk management policy (Dodds et al., 2010). Further information on the risks of coastal erosion in relation to coastal defence considerations are provided in Section 5.13.8.

Table 21 : UKCP09 medium emissions scenario prediction for mean winter and summer temperature and precipitation changes for Northern Ireland

Year	Mean Winter Temperature Change	Mean Summer Temperature Change	Winter Mean Precipitation Change	Summer Mean Precipitation Change
2020	1.1 ºC	1.3 ºC	4%	-5%
2050	1.7 ºC	2.2 ºC	9%	-13%
2080	2.3 ºC	3.2 ºC	11%	-15%
Source: UKCP09				

Northern Ireland Climate Change Risk Assessment

The Climate Change Risk Assessment (CCRA) for Northern Ireland was published in 2012, it has identified that the entire population of Northern Ireland lives within approximately 35 miles from the coast and that approximately three quarters of the coastline has some type of environmental designation, ranging from local to world status. It has also identified potential consequences of climate change along coastal areas, which are as follows:

- Loss of existing beaches, foreshores, salt marches and sand dunes, due to more frequent flooding of the existing floodplain; higher extreme flood levels and potentially greater erosion. It is anticipated up to 100 hectares of beach may be lost by the 2080s.
- An increase in cliff instability and weakening of existing sea defences, due to coastal erosion. It is anticipated this will impact cultural heritage sites, infrastructure and the coastal landscape.
- Changes in species migration patterns, which may impact on biodiversity and tourism activities.
- A longer tourism season with more visitors and increased tourism revenues with effects to limited natural assets and infrastructure.

In addition to the impacts on the coast, the consequences to coastal waters and marine environments have also been predicted and they are as follows:

- An increase in harmful algal and jellyfish blooms, affecting both people and wildlife;
- Damage to aquaculture and sea fisheries (including shellfish) due to sea level rise, a deterioration in water quality and ocean acidification.
- A shift in marine species, resulting in changes to biodiversity that may include a reduction in commonly fished species and the introduction of new species.
- An increase in non-native species, which could have significant economic and environmental consequences where they occupy the same niche as native or commercial species if they become invasive.
- The opening of the North East and North West Arctic passages, providing new opportunities for shipping routes.

Northern Ireland Climate Change Adaptation Programme

The Adaptation Programme contains the Government's response to the risks and opportunities identified in the Climate Change Risk Assessment (CCRA) for Northern Ireland. It provides the strategic objectives in relation to adaptation to climate change, the proposals and policies by which each department will meet these objectives, and the timescales associated with the proposals and policies identified. The adaptation programme will be updated every five years and has identified adaptation under the following headings:

- Flooding;
- Water;
- Natural Environment; and,
- Agriculture and Forestry.

Greenhouse Gases

On a global scale, the effects of greenhouse gas emissions reported by the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment (AR5) in 2013 have continued to intensify. The report states that since the 1950s, many of the observed changes in climate are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased. The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. Carbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification. The atmospheric concentrations of the greenhouse gases carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) have all increased since 1750 due to human activity. In 2011 the concentrations of these greenhouse gases were 391 ppm, 1803 ppb, and 324 ppb, and exceeded the pre-industrial levels by about 40%, 150%, and 20%, respectively. Concentrations of CO2, CH4, and N2O now substantially exceed the highest concentrations recorded in ice cores during the past 800,000 years. The mean rates of increase in atmospheric concentrations over the past century are, with very high confidence, unprecedented in the last 22,000 years.

The Kyoto Protocol is an international agreement which commits its parties by setting internationally binding emission reduction targets. The Protocol entered into force in February 2005 and the first commitment period ran from 2008-2012. In 2012, UK emissions of six greenhouse gases covered by the Kyoto Protocol were provisionally estimated to be 573.5 million tonnes carbon dioxide equivalent. This was 3% higher than the 2011 figure of 554.9 million tonnes (Aether & Ricardo AEA , 2014). This increase is said to be predominantly driven by a shift from natural gas to coal in the power generation sector due to the impact of changes in global fuel prices, and an increase in the consumption of natural gas in the residential sector due to colder average temperatures. In 2012 the 'Doha Amendment to the Kyoto Protocol' was adopted which included new commitments for Parties which will run from 2013-2020. During this second commitment Parties (of which the UK and Northern Ireland is part of) have committed to reduce greenhouse gas emissions by at least 18% below 1990 levels.

At the European level, in addition to the commitments as part of the Kyoto Protocol, the European Union (EU) as part of the Europe 2020 growth strategy has offered to increase its emissions reduction to 30% by 2020 if other major emitting countries in the developed and developing world commit to undertake their fair share of a global emission reduction target. EU leaders have also endorsed an aim of cutting Europe's greenhouse gas emissions by 80-95% by 2050 (EC Website).

Within the UK, the Climate Change Act 2008 provides an additional impetus towards decarbonising the economy. It requires carbon emissions to be reduced by 80% (from 1990 baseline) by the year 2050, with an interim target of a 34% reduction by 2020.

In June 2014, the Northern Ireland emission figures were published for 2012. Northern Ireland's 2012 greenhouse gas emissions are estimated at 21 million tonnes of carbon dioxide equivalent. This is an increase of 2% compared to 2011. There are two main reasons for this increase. Firstly, the 2012 figures include emissions from widespread forest wildfires which occurred during a spell of particularly dry, windy weather. Secondly, global fuel prices have caused a shift from burning natural gas to coal in the energy supply sector. The 2012 emission levels show a longer term decrease of 16% since 1990 (base year). The current Programme for Government has set a target for a 35% reduction in greenhouse gas source emissions by 2025 from the base year.

The largest sources of emissions in 2012 are agriculture (30%), transport (20%), energy supply (18%) and residential (15%). This signals a decreasing trend from the base year, where the main decreases have been observed in the energy supply and residential sectors. Emissions from the transport sector have increased over the same period, although they have been reducing since reaching their peak level in 2007 which it is proposed is related to the economic downturn.

Vessel Fuel Emissions

Emissions from ships are an important source of air pollutants including sulphur dioxide (SO_2) and nitrogen oxides (NO_x). International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. Annex VI of this convention covers the "Prevention of Air Pollution from Ships". The regulations in this annex set limits on sulphur dioxide and nitrogen oxide emissions from ship exhausts and prohibit deliberate emissions of ozone depleting substances.

Emissions of SO_2 from the maritime sector in Europe are projected to surpass total emissions from all land-based sources by 2020 according to the European Commission's Clean Air for Europe (CAFE) emission estimates, assuming no action is taken. This is due in a large part to considerable reductions made by shoreside industry and other terrestrial sources. To address the significant health and environmental impacts of ship emissions, the Commission adopted an EU strategy in November 2002 to reduce such emissions. The strategy resulted in an amended Directive, known as the Sulphur Content of Marine Fuels (SCMF) Directive (2005/33/EC) which came into force in July 2005. The basic obligations of the SCMF Directive included:

- A 1.5% sulphur limit for fuels used by all ships in the SO_x Emission Control Areas of the Baltic Sea and the North Sea and English Channel;
- A 1.5% sulphur limit for fuels used by passenger ships on regular services between EU ports;
- A ban on the marketing of marine diesel oils with sulphur content exceeding 1.5% by mass; and,
- A ban on the marketing of marine gas oils with sulphur content exceeding 0.1% by mass, from 1 January 2010.

As an alternative to the use of low sulphur marine fuels to comply with Articles 4a and 4b of the Directive, Member States can allow trials of unapproved and, use of approved, emission abatement technologies as an alternative to low sulphur fuel provided that these ships '…continuously achieve emission reductions which are at least equivalent to those which would be achieved through the limits on sulphur in fuel specified in this Directive.' (Article 4c, paragraph 4).

The Merchant Shipping (Prevention of Air Pollution from Ships) (Amendment) Regulations 2010 implement the marine fuel elements of the Sulphur Content of Marine Fuels (SCMF) Directive (2005/33/EC) (henceforth referred to as "the Directive"). The UK is a party to Annex VI of the MARPOL Convention which contains provisions on the sulphur content of liquid fuels and is implemented by the Regulations.

Key Issues, Problems and Future Trends

The NI Executive is committed through the Programme for Government to continue to work towards a reduction of at least 35% in greenhouse gas emissions by 2025 against the 1990 baseline. DOE takes the lead role in delivering this through the Ministerially chaired Cross-Departmental Working Group on Climate Change that has representation from all government departments. The latest greenhouse reduction action plan is available on http://www.doeni.gov.uk/index/protect_the_environment/climate_change/ni_greenhouse_gas_emissions_annual_progress_reports.htm.

In addition to the Climate Change Act, the Northern Ireland Executive approved the Strategic Energy Framework (DETI, 2010) which set a target of 40% of Northern Ireland's electricity consumption to come from renewable resources and 12% with regard to renewable heat by 2020. Higher levels of renewable energy within the overall energy mix will increase the diversity and security of Northern Ireland's energy supply and reduce carbon emissions (DETI, 2010).

DETI is encouraging increased levels of renewable power generation and is working with the independent Northern Ireland Utility Regulator, Northern Ireland Electricity (NIE)[7] and SONI[8] on the development of associated new electricity infrastructure necessary to improve Northern Ireland's security of energy supply and manage increase renewable energy levels as set out in the Strategic Energy Framework 2010. Emissions associated with the power sector have already decreased by almost 30% from 1990 levels and are predicted to decrease by over 60% by 2025 (DOE, 2013).

The Department for Regional Development (DRD) sets the vision and long term framework for regional development, regional transportation and sustainable travel (DETI, 2012). A major role of this department is reducing greenhouse gas emissions from road transport. In 2012 road transport emissions increased by almost 25% from 1990 levels (Aether and Ricardo-AEA, 2014) and are predicted to have increase from 1990 levels by around 9% by 2025 (DOE, 2013). A slight decrease in road transport emissions in the last few years has been seen since a peak in 2007 and it is predicted that this decrease will continue to 2025, with the levels being around 13% lower in 2025 compared with 2012 (DOE, 2013).

The Department for Social Development (DSD) aims to reduce domestic energy costs by introducing the Warm Homes scheme which has already seen a reduction in 2009 emissions compared to 1990. Following

[7] NIE is the owner of the transmission assets and distribution system operator in Northern Ireland.
[8] SONI is the transmission system operator and is owned by Eirgrid plc (Eirgrid).

these improvements emissions from the domestic sector heating are projected to decrease by 22% on 1990 levels by 2025 (DOE, 2013).

The role of the Department of Agriculture and Rural Development (DARD) is to balance sustainable development with the challenges climate change presents to agriculture worldwide i.e. the need to produce more food and non-food products whilst reducing the impact on the local and global environment. To achieve this, DARD will work closely with agriculture, forestry and environmental representatives within an Implementation Partnership to promote Northern Ireland sustainable development and demonstrate both issues can be effectively addressed.

5.12 Socio-Demographics

5.12.1 Introduction

Under the heading of socio-demographics, there is a basic overview of population change within the coastal LGDs and general information about general population projections within Northern Ireland. The section continues with an overview of various aspects of general socio-demographics.

5.12.2 General Demography

The general demography section contains an overview of population change along with information about deprivation and education standards within Coastal LGDs. The following information sources have been used to characterise the Plan area:

- NISRA website; and,
- Northern Ireland Environmental Statistics Report 2014.

Baseline Description

Figure 10 shows the amount of the coastline which is considered to be 'development land'. It shows the settlement limits of each city, town and village along the coast. Within the coastal LGDs of Northern Ireland, there has been steady population change, which since 2001 has resulted in an older population within coastal LGDs without replacement from the younger generations. Table 22 shows the 2012 components of population change for each coastal LGDs and Northern Ireland as a whole.

Table 22 : Components of Population Change (2012)

	2012						
LGD	**Mid Year Estimate**	**Births**	**Deaths**	**Natural Change**	**Internal In Migration**	**Internal Out Migration**	**Net Internal Migration**
Northern Ireland	1823634	25324	14235	11089	53194	53194	0
Ards	78550	927	645	282	2108	1883	225
Belfast	280537	4134	2696	1438	12115	13269	-1154
Carrickfergus	39096	479	319	160	1078	1167	-89
Coleraine	58993	689	483	206	2651	2631	20
Derry	108586	1646	791	855	1779	1777	2
Down	70440	989	540	449	1649	1403	246
Larne	32191	341	291	50	743	738	5
Limavady	33761	452	227	225	701	788	-87
Moyle	17129	195	154	41	522	517	5
Newry and Mourne	100858	1524	682	842	1662	1768	-106
Newtownabbey	85322	1116	678	438	3220	3195	25
North Down	79420	932	761	171	2129	1869	260

	2012						
LGD	**Mid Year Estimate**	**Births**	**Deaths**	**Natural Change**	**Internal In Migration**	**Internal Out Migration**	**Net Internal Migration**
Strabane	40033	544	293	251	646	760	-114

Key Issues, Problems and Future Trends

The 2012 components of population change mid year estimate calculated that 56% of Northern Ireland population live in coastal LGDs. The highest numbers of births are projected for Belfast, which may be a function of the demography of the area (this area has the largest number of women in their child bearing years).

5.12.3 Deprivation

Spatial measures of deprivation have been used to inform policy and target areas of need in Northern Ireland since the 1970s. In relation to deprivation in coastal LGDs, the top nine most deprived areas in Northern Ireland are within the Belfast LGD and number ten is in the Derry LGD. There are also pockets of deprivation in Strabane LGD. The majority of areas in the least deprived decile[9] are in the east of Northern Ireland.

The Northern Ireland Multiple Deprivation Measure (NIMDM) 2010 provided information on seven types of deprivation and an overall multiple deprivation measure comprising a weighted combination of the seven types of deprivation. The seven types of deprivation and associated weightings are as follows:

- Income Deprivation (25%);
- Employment Deprivation (25%);
- Health Deprivation and Disability (15%);
- Education Skills and Training Deprivation (15%);
- Proximity to Services (10%);
- Living Environment (5%); and,
- Crime and Disorder (5%).

Income Deprivation

The purpose of the Income Deprivation type was to identify the proportion of the population experiencing income deprivation. This was calculated by obtaining a non-overlapping count of individuals living in households in receipt of income related benefits and tax credits.

The distribution of income deprivation is similar to the distribution of multiple deprivation in Northern Ireland with Belfast and Derry LGDs containing the majority of areas in the most deprived decile. Newry and Mourne, Strabane and Newtownabbey LGDs contain clusters of deprived areas. The least deprived areas are generally located in the east of Northern Ireland with the majority located in Ards, Belfast, Newtownabbey and North Down LGDs.

The distribution of income deprivation affecting children is broadly similar to the income domain distribution. Belfast and Derry LGDs contain much of the most deprived decile of areas. The least deprived areas are located mostly in the east of Northern Ireland as was the case with the income deprivation domain.

As with income deprivation and income deprivation affecting children, Belfast and Derry LGDs contain the majority of the areas in the most deprived decile for income deprivation affecting older people.

Employment Deprivation

The employment deprivation domain was defined as involuntary exclusion of the working age population from work.

[9] Decile – one of the values of a variable that divides the distribution of the variable into ten groups having equal frequencies.

The distribution of employment deprivation is similar to the distribution of multiple deprivation in Northern Ireland with Belfast and Derry LGDs containing the majority of areas in the most deprived decile. Newry & Mourne, Newtownabbey and Strabane LGDs also contain clusters of the most deprived areas in Northern Ireland. The least deprived areas tend to be located in the east of Northern Ireland with a cluster of areas with low levels of deprivation evident in Coleraine LGD.

Health Deprivation and Disability

The health deprivation and disability domain identified areas with relatively high rates of premature deaths and areas where relatively high proportions of the population's quality of life is impacted by poor health or who are disabled.

The distribution of health and disability deprivation is similar to the distribution of multiple deprivation. Belfast and Derry LGDs contain a large number of the areas in the most deprived decile. The least deprived areas tend to be in the east of Northern Ireland with clusters of low deprivation also visible the Coleraine LGD.

Education Skills and Training Deprivation

The education skills and training deprivation domain measured the extent of deprivation in education, skills and training at the small area level for both children and working age adults.

The most deprived areas are located in Belfast and Derry LGDs. Belfast LGD contains clusters of areas in both the most and least deprived deciles in Northern Ireland. A large proportion of the remaining least deprived areas are located in the east of Northern Ireland, in Ards, Newtownabbey and North Down LGDs.

Proximity to Services

The purpose of this domain is to measure the extent to which people have poor geographical access to key services, including statutory and general services.

The distribution of proximity to services deprivation is unlike all of the other domains and captures an important aspect of deprivation. The highest concentrations of deprivation with respect to proximity to services occur outside of towns and cities. There are deprived areas on the outskirts of towns in Strabane, Down and Newry and Mourne LGDs. The least deprived areas are located in Belfast and Derry LGDs.

Living Environment

The living environment domain is to identify areas experiencing deprecation in terms of the quality of housing, access to suitable housing, and the outdoor physical environment.

The highest concentrations of deprived areas are located in Belfast and Derry LGDs and in the north. Clusters of deprived areas exist in the Larne LGD. The least deprived areas are spread across most of Northern Ireland with particular clusters of areas with low levels of deprivation visible in the North Down LGD.

Crime and Disorder

The crime and disorder domain measured the rate of crime and disorder, which included recorded crime, deliberate fires and incidents of anti-social behaviour. This domain has two subdomains of crime and disorder. The crime subdomain includes violence, robbery and public order, burglary, vehicle theft and criminal damage. The disorder sub domain includes information regarding deliberate primary and secondary fires and anti-social behaviour incidents.

The most deprived areas are clustered in towns and cities while the least deprived areas are rural. The majority of areas in the most deprived decile are in Belfast LGD with clusters visible in large towns and cities. The least deprived areas are generally located away from towns and cities and involve many LGDs across all of Northern Ireland with the exception of the Greater Belfast area.

Key Issues, Problems and Future Trends

To address deprivation in Northern Ireland, the Programme for Government 2011-15 contains priority two "Creating Opportunities, Tackling Disadvantage and Improving Health and Well-being". Priority two "*seeks to address the challenges of disadvantage and inequality that afflict society and to address the relatively poor health and long-term shorter life expectancy of our population; its purpose is to stimulate interventions that break the cycle of deprivation, education under-achievement, and to address health inequalities and poor health and well being as well as economic disengagement*".

Some of the key commitments within priority two are:

- "provide £40 million to address dereliction and promote investment in the physical regeneration of deprived areas through the Social Investment Fund (SIF)"
- "invest £40 million to improve pathways to employment, tackle systematic issues linked to deprivation and increase community services through the SIF".
- "Deliver a range of measures to tackle poverty and social exclusion through the Delivering Social Change delivery framework".

The SIF is a fund which will run until March 2016 and has been allocated £80 million by the Northern Ireland Executive. The first projects to be funded through the programme include 12 capital projects and 11 revenue projects, which aim to tackle poverty and deprivation through improved community based services and facilities. The initial projects have been allocated £33million.

5.12.4 Life Expectancy and Median age at death

The baseline data sources used to describe life expectancy and median age at death are:

- Life Expectancy dataset (2010-2012) NISRA; and,
- Median year of death (2012) NISRA.

In Northern Ireland, between 2010 and 2012, the life expectancy from birth for a female was 82.28 years and for a male was 77.82 years. Within the coastal LGDs, the life expectancy range for females is between 80.4 years (Derry) and 83.6 years (Larne), whilst the life expectancy range for males is between 75.2 years (Belfast) and 79.4 years (North Down).

The median age of death in Northern Ireland in 2012 was 80 years of age (aggregated for gender). In the coastal LGDs, the lowest median age of death was 77 years (Derry) and the highest median age of death was 82 years (North Down).

Key Issues, Problems and Future Trends

Life expectancy and median year of death, correlate negatively with deprivation, where the most deprived areas in Northern Ireland have the lowest life expectancy and median year of death.

5.12.5 Neighbourhood Renewal

The baseline data sources used to characterise neighbourhood renewal are:

- People and Place – A strategy for Neighbourhood Renewal (Housing Executive 2003); and,
- Mid programme review (Housing Executive 2011).

In June 2003, Government launched "People and Place – A strategy for Neighbourhood Renewal". This long term (7 – 10 year) strategy targets those communities throughout Northern Ireland suffering the highest levels of deprivation. Neighbourhood Renewal is a cross government strategy and aims to bring together the work of all Government Departments in partnership with local people to tackle disadvantage and deprivation in all aspects of everyday life.

Neighbourhoods in the most deprived 10% of wards across Northern Ireland were identified using the Noble Multiple Deprivation Measure. Following extensive consultation, this resulted in a total of 36 areas, and a population of approximately 280,000 (one person in 6 in Northern Ireland), being targeted for intervention. The areas include:

- 15 in Belfast;
- 6 in the North West (including 4 in the city of Londonderry); and,
- 15 in other towns and cities across Northern Ireland.

Neighbourhood Partnerships have been established in each Neighbourhood Renewal Area as a vehicle for local planning and implementation. Each Neighbourhood Partnership should include representatives of key political, statutory, voluntary, community and private sector stakeholders. Together, they have developed long term visions and action plans designed to improve the quality of life for those living in the area.

As part of the mid programme review published in 2011, the following social and economic statistics were recorded across all the Neighbourhood Renewal Areas in Northern Ireland. The overall trends were as follows:

Demography

Between 2001 and 2008 the population of the Neighbourhood Renewal Areas fell by 0.9% whilst the Northern Ireland population increased by 5.1%.

Economic Activity / Inactivity

Between 2001 and 2007 there was a substantial increase in the number of employee jobs in Neighbourhood Renewal Areas (+25,553). A 14% increase compared to 8% in the rest of the country.

The number of Neighbourhood Renewal Areas residents claiming JSA and IS fell from just over 11, 000 to 8,300 and 42,000 to 39,000. Numbers on DLA have remained consistently high (approximately 50,000). The overall picture remains one of comparatively higher levels of unemployment and economic inactivity than the population as a whole.

Education

The percentage of schools leavers within Neighbourhood Renewal Areas with no GCSEs has fallen from 13.1% to 6.7 %. The gap between Neighbourhood Renewal Areas and the rest of NI has closed from 9.1% to 3.6%. The percentage of pupils achieving the expected level for English and Maths at Key Stage 2 has improved. Between 2004/05 and 2007/08 for Maths the percentage increased from 67.7% to 71.4% (gap closed from 14.1 to 11.5 percentage points) and for English 64.4% to 70.1% (gap closed from 15.2 to 10.8 percentage points). The percentage of pupils achieving 5+ GCSEs grades A*-C increased from 2003/04 to 2007/08 from 39.8% to 48.3% (gap closed from 25.5 to 22.1 percentage points).

Health

The proportion of people in Neighbourhood Renewal areas dying prematurely (under 75) has improved slightly, by 1% between 2005 and 2008. Life expectancy for both males and females has also risen by a small amount.

Suicide rates have increased significantly from 16.2 (per 100,000) to 24.0 between 1999/03 and 2004/08. The rate is twice that of the rest of the country. Births to teenage mothers 13-16 and 13-19 have decreased between 2001 and 2008.

Crime and Anti-social Behaviour

Between 2007 and 2008, there were over 10,000 less incidents recorded (73,360 to 62,734) within Neighbourhood Renewal areas.

Key Issue and Future Trends

Neighbourhood renewal areas are all over Northern Ireland, but they illustrate how location is not the only factor in relation to lack of opportunity. Once the final programme review is published, it should further detail if improvements in opportunity have been made. The information presented is for all the NRAs in Northern Ireland, it has not been adjusted to address NRAs within coastal LGDs.

5.12.6 Education

Table 23 details the percentages of educational attainment for coastal LGDs in comparison to the rest of Northern Ireland based on 2011 figures collected by the various Northern Ireland Education Boards.

Table 23 : Educational qualification in Coastal LGDs in comparison to Northern Ireland

LGD	No qualifications : Aged 16+ years (%)	Highest level of qualification: Level 1 qualifications : Aged 16+ years (%)	Highest level of qualification: Level 2 qualifications : Aged 16+ years (%)	Highest level of qualification: Apprenticeship: Aged 16+ years (%)	Highest level of qualification: Level 3 qualifications: Aged 16+ years (%)	Highest level of qualification: Level 4 qualifications and above: Aged 16+ years (%)	Highest level of qualification: Other qualifications: Aged 16+ years (%)
Northern Ireland	29	12	15	4	12	24	4
Ards	27	13	16	6	12	22	4
Belfast	30	11	13	3	13	26	4
Carrickfergus	25	13	16	6	13	23	4
Coleraine	29	11	15	4	13	24	4
Derry	33	12	15	4	12	22	3
Down	26	11	16	5	13	25	4
Larne	28	12	16	6	13	21	4
Limavady	34	12	15	4	12	18	4
Moyle	31	12	15	5	11	22	4
Newry and Mourne	30	11	15	5	12	22	5
Newtownabbey	26	12	16	5	14	24	4
North Down	20	11	16	4	13	31	4
Strabane	41	12	14	3	11	16	4

The level information refers to the following:

- No qualifications: No academic or professional qualifications;
- Level 1: 1-4 O Levels/CSE/GCSEs (any grades), Entry Level, Foundation Diploma, NVQ level 1, Foundation GNVQ, Basic/Essential Skills;
- Level 2: 5+ O Level (Passes)/CSEs (Grade 1)/GCSEs (Grades A*-C), School Certificate, 1 A Level/ 2-3 AS Levels/VCEs, Intermediate/Higher Diploma, Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma, RSA Diploma. 4. Apprenticeship;
- Level 3: 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced Diploma, NVQ Level 3; Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC National, RSA Advanced Diploma;
- Level 4+: Degree (for example BA, BSc), Higher Degree (for example MA, PhD, PGCE), NVQ Level 4-5, HNC, HND, RSA Higher Diploma, BTEC Higher level, Foundation degree, Professional qualifications (for example teaching, nursing, accountancy); and,
- Other: Vocational/Work-related Qualifications, Qualifications gained outside the UK (Not stated/ level unknown).

Key Issues, Problems and Future Trends

Educational achievement within coastal areas appears to be on a par with the rest of Northern Ireland, however in 2011 29% of the Northern Ireland population do not have any academic or professional qualifications at age 16+.

5.12.7 Housing

The baseline information source used to characterise existing social housing environment is:

- Northern Ireland Housing Allocation (2012/2013)

Baseline Description

During the 2012/2013 period, 11208 housing allocations where made by the Housing Executive and housing associations to applicants on the Common Waiting List who were already social sector tenants. Of this total, 64% of the allocation was within coastal LGDs. The most allocations were within the Belfast area (total 3248, 29%) the range of allocations among the rest of the coastal LGDs was between 1% and 6%.

Key Issues, Problems and Future Trends

'Number of Allocations to NIHE transfers' refers to the number of properties allocated by the Housing Executive and housing associations to tenants on the Common Waiting List who had applied for a transfer from a Housing Executive tenancy. 'Number of Allocations to housing association transfers' refers to the number of properties allocated by the Housing Executive and housing associations to tenants on the Common Waiting List who had applied for a transfer from a housing association tenancy.

5.12.8 Northern Ireland Economy

The baseline information sources used to characterise the Northern Ireland economy are:

- Northern Ireland Economic Strategy (DETI 2012);
- Northern Ireland Economic Strategy – 1st Annual Monitoring Report (DETI 2013); and
- Economy and Jobs Initiative (DETI 2012).

Baseline Description

The Northern Ireland Assembly through DETI have identified the need to rebalance the Northern Ireland economy to reduce dependency on public sector employment. The strategic framework aims to increase employment and wealth by building a larger and more export-driven private sector. To achieve this, it was planned to:

- stimulate innovation, R&D and creativity so that we widen and deepen our export base;
- improve the skills and employability of the entire workforce so that people can progress up the skills ladder, thereby delivering higher productivity and increased social inclusion;
- compete effectively within the global economy and be internationally regarded as a good place to live and do business;
- encourage business growth and increase the potential of our local companies, including within the social and rural economies; and,
- develop a modern and sustainable economic infrastructure that supports economic growth.

The first annual monitoring report for the Northern Ireland Economic Strategy was published in 2013. As part of the monitoring report, the key performance indicators have been collated (Table 24).

Table 24 : Northern Ireland Economic Strategy : Key Performance Indicators

Indicator	Baseline	Update	Target
Business Expenditure on Research and Development (BERD) as a % of GVA	1.2% (2010)	1.2% (2011)	1.2% (2012
% of Firms that are innovation active	31% (2006-2008)	27% (2008-2010)	32% (2015)
Gross Expenditure on R and D (GERD) as a % of GVA	1.8% (2010)	1.9% (2011)	1.9% (2015)
% of those qualifying from NI HE Institutions with graduate and post graduate qualifications in STEM	18.0% (2010/2011)	18.5% (2011/2012)	At least 22% (2020)
% of school leavers GCSE A*-C or equivalent (inc	58.6%	62.0%	66%

Indicator	Baseline	Update	Target
English & Maths)	(2009/10)	(2011/12)	(2014/15); 70% (2019/20)
% of those people in employment with level 2 skills and above.	74.0% (2010)	74.2% (Q1 2013)	At least 84.0% (2020)
Manufacturing Export Sales	£5.73bn (2010/11)7	£5.71bn (2012/13)	£6.87bn (2014/15)
Manufacturing Exports to emerging economies	£241m (2010/11)	£326m (2012/13)	£385m (2014/15)
% of Foreign Direct Investment (FDI) Jobs promoted by Invest NI above Private Sector Median (PSM)	74.8% (2008-2011)	80% (2011-2013)	75% (2011-2015)
Total visitor revenue	£640m8 (2011)	£683m (2012)	£676m (2014); £1 billion (2020)
% of Jobs in locally owned companies supported by Invest NI above PSM	N/A (2008-2011)	60% (2011-2013)	50% (2011-2015)
% of Large Scale Investment Planning Decisions made within 6 months	N/A (2011)	64% (2012/13 target 60%)	90% (14/15)
Journey Times on Key Transport Corridors (compared to 2003 baseline)	1.4% below 2003 baseline (2009)	6.6% below 2003 baseline (2011)	2.5% below 2003 baseline (2015)
% of premises able to access a broadband service of at least 2 mbps	89% (2009/10)	87.4% (2012)	100% (2015)
% of electricity consumption from renewable sources	12.54% (2011/12)	13.7% (March 2013)	20% (2015); 40% (2020)
Jobs promoted through the Invest NI Jobs Fund	N/A	5,060 (March 2013)	6300 (2011-2015)
Working age benefit clients into employment	97,000 (2008-2011)	76,841 (2011 –March 2013)	114,000 (2011-2015)

In addition to the indicator update, further initiatives to rebalance and rebuild the local economy, these include:

- a new Innovation Strategy for NI;
- a new strategy to tackle economic inactivity;
- further actions to build on what we are already doing to improve business access to finance;
- further detail on the actions we will take to boost our trade performance;
- a strategic action plan to support further growth in the agri-food sector; and
- a review of apprenticeships and youth training.

Key Issues, Problems and Future Trends

The Northern Ireland economy as a whole is considered to be over dependant on public sector employment and the KPIs identified in Table 24 are used as to identify when and how rebalance in the local economy can

continue. As the KPIs are regional, they are applicable across the province, not just in coastal areas. The overall economic condition of Northern Ireland relates to and interacts with the programme for government, the RDS 2035 and the Sustainable Development Strategy.

5.12.9 Coastal Communities Fund

Baseline data on the Coastal Communities Fund has been supplied by:

- DOE Marine Division; and,
- www.biglotteryfund.org.uk/global-content/programmes/uk-wide/coastal-communities.

Baseline Description

Established in 2012, the Coastal Communities Fund (CCF) is financed by the UK Government through the allocation of funding equal to 50 % of the revenues from The Crown Estate's marine activities in each UK country and is designed to support the economic development of coastal communities. The CCF is a UK-wide programme and the single outcome is that "coastal communities will experience regeneration and economic growth through projects that directly or indirectly create sustainable jobs, and safeguard existing jobs". However there are also some country specific requirements and priorities.

Operated on a bid basis, it is managed by the Big Lottery Fund and the DOE in Northern Ireland. Revenues from TCE marine activities in Northern Ireland are currently around £1M per annum, therefore approximately £500,000 has been available per annum for bids since April 2012. This level of funding could increase with the deployment of offshore renewable energy projects. The Department is responsible for the Coastal Communities Fund (CCF), which the Big Lottery Fund administers on its behalf.

In Northern Ireland, the CCF is aimed at projects that help contribute to the Executive's Economic Strategy. The Strategy's key priorities include growing a sustainable economy, investing in the future, creating jobs and tackling disadvantage, and CCF priorities are focused on applications:

- from small and medium size coastal communities facing economic challenges;
- that promote regeneration and job creation through investment in tourism, business and the built and natural environments of coastal settlements; and
- that promote training and skills development, linked directly to the project activity, to enable local people to secure jobs in local industry growth sectors.

In 2012-13 the budget was £450,000 of which £423,465 was awarded to two projects. The Seaview Heritage Activity Centre in Glenarm was awarded £265,000, and the Water Wheel Project in Magheramorne was awarded £158,465. In 2013-14 the budget was £500,000 of which £447,342 was awarded to two projects. The NI Lobster and Marine Hatchery Research Centre in Kilkeel was awarded £260,782, and the Coastal Centre at Waterfoot was awarded £186,560.

The third round of the CCF opened on 7 March 2014 and closed on 30 April 2014.

Key Issue and Future Trends

The Coastal Communities Fund will run until the end of the 2016/17 financial year, and round three combines the budgets for this period, thus increasing the size of the fund available. Although it is not possible to forecast the exact size of this larger sum as it is dependent on the Crown Estate marine revenue generated, which can change from year to year, it is expected to be in excess of £1.5m. This is to encourage more ambitious projects.

5.13 Uses and Activities

5.13.1 Introduction

A range of uses and activities occur in or adjacent to Northern Ireland's marine environment including:

- Commercial Fisheries;
- Aquaculture;
- Ports, Shipping, Navigation, Dredging and Disposal;

- Recreation and Tourism;
- Aviation;
- Military Activity;
- Coastal Defences;
- Noise;
- Lighting; and,
- Marine Litter.

5.13.2 Commercial Fisheries

The following data sources have been used to characterise commercial fisheries within the Plan area:

- DARD/MFA fisheries landings statistics 2007 to 2012 (DARDNI website);
- Report of the International Bottom Trawl Survey Working Group (IBTSWG) (ICES, 2011);
- Northern Ireland Fleet Futures Analysis 2004-2013 (Tingley, 2006) and 2008-2013 update (Tingley, 2009);
- United Kingdom Sea Fisheries Statistics 2011 (MMO, 2012a; b; c);
- UK Offshore Energy SEA technical reports (DECC, 2009);
- SEA 6 Environmental Report. Strategic Environmental Assessment of Draft Plan for a 24th Seaward Round of Offshore Oil and Gas Licensing (DTI, 2005);
- An Introduction to the Benthic Ecology of the Rockall – Hatton Area (SEA 7) (Davies et al., 2006); and
- Marine Irish Digital Atlas Fishing Areas (Marine Irish Digital Atlas website);
- 2012 Survey of the UK Seafood Processing Industry (Curtis and Barr, 2012);
- Development of spatial information layers for commercial fishing and shellfishing in UK waters to support strategic siting of offshore windfarms (ABPmer, 2009);
- Charting Progress 2 (Defra, 2010);
- Northern Ireland Coastal Zone – Indicators of Sustainable Development (DOE, 2011);
- Mapping the Spatial Access Priorities of the Northern Irish Fishing Fleet (Yates, 2012. The Diverse Seas Project, Environmental Science Research Institute, University of Ulster, Northern Ireland); and,
- SEA of Offshore Wind and Marine Renewable Energy in Northern Ireland (DETI, 2009a).

Baseline Description

Commercial fishing is a historic and significant industry in Northern Ireland. It is based largely around the three east coast ports of Ardglass, Kilkeel and Portavogie, from which the majority of the fleet of vessels in excess of 10m length operate. Landings are dominated by Nephrops, scallops and whitefish. In addition to Nephrops, the main species in terms of value of landings are crab, lobster and scallop. Yates (2012) sought to map the spatial access priorities of the Northern Ireland fishing fleet. The maps were based on interview data that represented almost half of the active fleet and scaling the results up to reflect the entire fleet, using data supplied by DARD. These maps indicate that the most important fishing area to the fleet is in the south-eastern part of the Plan area.

In 2011 there were around 12,400 fishermen in the UK, down 17% since 2001. Of these, 700 were based in Northern Ireland (up 23%). Part-time fishermen accounted for 19% of the total, a proportion that has changed little over the last ten years (MMO 2012a). There has been a change in the composition of the Northern Ireland fishing fleet between 1995 and 2011 as shown in Table 25. In 2011, a much larger percentage of the fleet was made up of smaller vessels. This reflects the fact that the inshore commercial fisheries sector is becoming more important. Additional evidence is shown in Table 26 which summarises the Northern Ireland landings of demersal and pelagic fish and shellfish from 2007 to 2011. Demersal fish decreased in both tonnage and value over this period. Pelagic fish increased slightly in tonnage but increased more significantly in value by 135% and shellfish increased in tonnage landed and value by 39% between 2007 and 2011. Table 26 shows the landings in quantity (tonnes) and value (£'s) to the major ports within the Plan area. Ardglass has significantly higher landings than the other major ports.

Table 25 : Change in composition of Northern Ireland fishing fleet from 1995-2011

Vessel Size	Year	
	1995	2011
Vessels <10m	161 (44%)	231 (61%)
Vessels >10m	206 (56%)	148 (39%)
Total	**367**	**379**

Table 26 : Landings into Northern Ireland by UK vessels: 2007- 2011

	Quantity ('000 tonnes)					Value (£million)				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
Brill	-	-	-	-	-	0.1	0.1	-	0.1	0.1
Cod	0.4	0.5	0.4	0.3	0.2	1.0	1.2	0.8	0.6	0.3
Dogfish	0.1	-	0.1	-	-	0.1	-	0.1	-	-
Haddock	0.5	0.5	0.3	0.4	0.3	0.5	0.5	0.3	0.4	0.3
Hake	0.1	0.2	0.2	0.2	0.1	0.4	0.6	0.4	0.4	0.2
Monks/Anglers	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.2	0.3
Plaice	-	0.1	-	-	-	-	-	-	-	-
Pollack	-	-	-	0.1	-	-	0.1	0.1	0.1	0.1
Stakes and Rays	0.1	0.1	0.1	0.1	0.1	-	0.1	-	0.1	0.1
Sole	-	-	-	-	-	0.1	0.1	0.1	-	-
Turbot	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1
Witch	0.1	0.1	0.1	-	0.1	-	-	-	-	-
Other Demersal	0.1	0.1	0.1	-	0.1	-	0.1	-	-	-
Total Demersal	**1.7**	**1.9**	**1.5**	**1.3**	**1.1**	**2.6**	**3.2**	**2.3**	**2.2**	**1.7**
Herring	5.1	5.7	5.3	5.5	4.7	0.9	1.3	1.4	1.6	2.1
Horse Mackerel	-	-	-	0.1	0.1	-	-	-	-	0.1
Mackerel	1.6	1.8	2.7	2.7	2.5	1.2	1.3	2.4	2.1	2.5
Other Pelagic	-	-	-	-	0.2	-	-	-	-	-
Total Pelagic	**6.7**	**7.5**	**8.1**	**8.2**	**7.6**	**2.0**	**2.6**	**3.8**	**3.7**	**4.7**
Cockles	-	0.1	0.1	-	-	-	0.2	0.1	-	-
Crabs	1.4	1.1	1.2	1.5	1.4	1.3	1.0	1.1	1.4	1.2
Lobsters	0.1	0.1	0.1	0.1	0.1	0.6	0.5	0.5	0.6	0.6
Mussels	1.0	1.0	-	-	0.2	0.4	0.6	-	-	0.1
Nephrops	6.2	7.9	7.2	7.0	7.2	11.7	14.1	10.3	10.7	15.4
Scallops	0.6	0.6	1.7	3.9	4.2	0.7	0.9	1.5	2.5	2.9
Shrimps and Prawns	-	-	-	-	-	-	-	0.1	0.1	0.1
Squid	-	-	-	-	-	-	-	-	-	0.1
Whelks	0.1	0.1	0.1	-	0.1	0.1	0.1	0.1	-	0.1
Total Shellfish	9.5	10.9	10.4	12.5	13.2	14.8	17.5	13.8	15.4	20.54
Total All Species	**17.8**	**20.3**	**19.9**	**22.1**	**21.9**	**19.4**	**23.3**	**19.9**	**21.3**	**26.8**
Source: MMO (2012b)										

Table 27 : Landings into major ports in Northern Ireland by UK vessels 2011

Species	Northern Ireland Ports											
	ARDGLASS		KILKEEL		PORTAVOGIE		BALLYCASTLE		OTHERS NI		TOTAL NI	
	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)
Bass	-	-	..	..	..	..	-	-	-	-	**..**	**..**
Brill	3	14	6	32	5	22	..	..	..	..	**14**	**67**
Catfish	-	-		-	-	-	-	-	-	-	**-**	**-**
Cod	8	14	89	197	58	132	..	..	-	-	**156**	**343**
Conger Eels	..	..	6	5	7	4	-	-	-	-	**14**	**9**
Dabs	-	-		-	-	-	-	-	-	-	**-**	**-**
Dogfish	12	2	23	5	5	1	-	-	-	-	**39**	**7**
Flounder or Flukes	-	-		-	-	-	-	-	-	-	**-**	**-**
Gurnard	7	5	20	15	3	2	-	-	-	-	**30**	**22**
Haddock	12	9	241	252	56	74	..	..	-	-	**309**	**336**
Hake	6	9	25	62	65	147	..	..	-	-	**95**	**218**
Halibut	-	-	..	..	-	-	-	-	-	-	**..**	**..**
Halibut, Greenland	-	-		-	-	-	-	-	-	-	**-**	**-**
Lemon Sole	1	1	2	3	..	1	-	-	-	-	**3**	**4**
Ling	10	6	22	17	7	6	..	..	-	-	**39**	**29**
Megrim	..	..	1	1	-	-	..	..	-	-	**1**	**1**
Monks or Anglers	23	66	57	171	15	40	..	..	..	..	**96**	**278**
Plaice	6	3	38	23	2	1	..	..	-	-	**46**	**27**
Pollack (Lythe)	1	2	19	38	22	46	-	-	-	-	**43**	**87**
Redfish	-	-		-	-	-	-	-	-	-	**-**	**-**
Saithe	..	..	1	1	1	1	-	-	-	-	**2**	**2**
Sand Eels	-	-		-	-	-	-	-	-	-	**-**	**-**
Skates and Rays	10	13	49	67	7	8	-	-	-	-	**66**	**87**
Sole	1	7	4	27	3	16	..	..	..	..	**8**	**49**
Torsk (Tusk)	-	-		-	-	-	-	-	-	-	**-**	**-**

Species	Northern Ireland Ports											
	ARDGLASS		KILKEEL		PORTAVOGIE		BALLYCASTLE		OTHERS NI		TOTAL NI	
	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)
Turbot	3	26	6	46	5	29	..	..	-	-	**14**	**101**
Whiting	1	1	10	10	1	1	-	-			**12**	**11**
Witch	20	11	33	20	10	3	..	..	-	-	**62**	**34**
Other Demersal (a)	8	2	44	9	..	..	-	-	-	-	**52**	**11**
Fish Roes	-	-	2	2	..	..	-	--	--	-	**2**	**3**
Total Demersal	**130**	**189**	**698**	**1,001**	**274**	**534**	**..**	**1**	**..**	**..**	**1,103**	**1,725**
Blue Whiting	-	-		-	-	-	-	-	-	-	**-**	**-**
Herring	4,581	2,064	31	8	-	-	-	-	117	28	**4,728**	**2,099**
Horse Mackerel	-	-		-	-	-	-	-	102	54	**102**	**54**
Mackerel	2,459	2,447	4	3	-	-	-	-	17	13	**2,480**	**2,463**
Sardines	-	-		-	-	-	-	-	-	-	**-**	**-**
Sprats	248	44	-	-	-	-	-	-	-	-	**248**	**44**
Tuna	-	-		-	-	-	-	-	-	-	**-**	**-**
Other Pelagic	-	-		-	-	-	-	-	-	-	**-**	**-**
Total Pelagic	**7,288**	**4,554**	**35**	**10**	**-**	**-**	**-**	**-**	**236**	**96**	**7,559**	**4,660**
Cockles	-	-		-	-	-	-	-	..	..	**..**	**..**
Crabs	77	64	556	452	172	205	81	73	546	453	**1,433**	**1,246**
Cuttlefish	-	-		-	-	-	-	-	-	-	**-**	**-**
Lobsters	3	25	8	73	4	43	7	85	41	416	**63**	**642**
Mussels	-	-	10	5	..	..	-	-	168	85	**178**	**90**
Nephrops	2,312	4,736	2,952	6,238	1,948	4,316	5	11	10	59	**7,228**	**15,360**
Oysters	-	-		-	-	-	-	-	..	..	**..**	**..**
Periwinkles	-	-		-	-	-	-	-	-	-	**-**	**-**
Scallops	159	235	1,785	1,135	218	394	1,737	775	265	336	**4,164**	**2,875**
Shrimps and Prawns	..	6	1	7	..	2	-	-	3	38	**4**	**54**
Squid	7	20	25	70	9	22	-	-	..	..	**41**	**112**
Whelks	-	-	1	1	4	1	-	-	105	79	**110**	**81**
Other Shellfish	-	-	1	1	..	..	-	-	-	-	**1**	**1**

Species	Northern Ireland Ports											
	ARDGLASS		KILKEEL		PORTAVOGIE		BALLYCASTLE		OTHERS NI		TOTAL NI	
	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)	Quantity (tonnes)	Value (£'000)
Total Shellfish	**2,559**	**5,086**	**5,338**	**7,981**	**2,356**	**4,983**	**1,830**	**944**	**1,139**	**1,467**	**13,222**	**20,461**
Total All Species	**9,977**	**9,829**	**6,071**	**8,992**	**2,630**	**5,518**	**1,830**	**944**	**1,375**	**1,563**	**21,883**	**26,846**
Source: MMO (2012b)												

Nephrops

In terms of both landings and value, Nephrops is the most important species targeted by the Northern Ireland fishing fleet (see Table 27) through deployment of single-rig and twin-rig trawl gears by vessels larger than 10m. The fishery is concentrated on an expansive area of muddy sediment between Northern Ireland and the Isle of Man which extends from inshore waters to well outside the 12 nm limit. Nephrops trawlers are active year-round with the greatest catches during the summer months and during periods of weak tide.

The management of Nephrops stock in the Plan area is assessed on the basis of Total Allowable Catch (TAC) throughout the International Council for Exploration of the Seas (ICES) Sub-Area Area VII which includes stocks from the Irish Sea, Celtic Sea, Porcupine Bank and the Aran ground of western Ireland. In order to gain estimates of abundance, sophisticated underwater video survey techniques have been developed. The ICES advice for 2010 resulted in a reduction to the TAC by 9% in Sub-Area Area VII because of particular concern about the status of the Porcupine Bank stock. The Nephrops stock in the western Irish Sea has maintained a stable size composition and sex ratio during the past four decades, suggesting that the stock is harvested sustainably. This is supported by the perception of most fishermen that consider the Nephrops stock to be stable (Yates, 2012).

Potting Fisheries

Potting takes place along the entire Northern Ireland coast, targeting lobster, brown crab, velvet crab, whelk and some pot-caught Nephrops. The County Antrim coast from Rathlin to Larne is the principal lobster fishing area in Northern Ireland waters while the County Down coast is considered to be the most productive area for brown crab.

Lobster numbers have been conserved through V-notching programmes which have been in operation for over 10 years. Through this scheme any berried female (egg-bearing) landed is marked by cutting a 'V' in one of the uropods of the tail of the lobster before returning it to the sea. If these lobsters are subsequently caught they should not be landed but returned to the sea to protect the breeding stock. By doing this the fishermen are compensated by receiving half the market value of each lobster released. There are currently two such V-notching schemes in Northern Ireland: North Coast and North East Coast (Yates, 2012).

The geographic range of the pot fishery is limited by the size of the vessels. Most vessels are less than 10m and, therefore, tend to involve day trips as they cannot venture far from their harbour base. Additionally, in the south east, the use of pots is restricted to the inshore area due to trawling activity for Nephrops in muddy substrates offshore.

Scallops

Due to a rapid growth rate and high market value (see Table 27), the scallop fishery is of high economic importance. Fishing for King scallops has occurred in Northern Ireland since 1935 although commercial exploitation of Queen scallops did not occur until the 1970s. The fishing technique for King and Queen scallops reflects their differing behaviour (King scallops bury into the sediment whilst Queen scallops are active swimmers). King scallop is taken in Northern Ireland waters by small vessels towing a group of spring loaded dredges with 8 or 9 teeth placed vertically along the front of the dredge which is attached to a beam. Queen scallops tend to swim if disturbed and so are fished using skid dredgers or otter trawls. These dredgers do not have teeth, rather a tickler chain which disturbs the Queen scallops (AFBI website).

Up to 15 County Down based vessels represented by the Northern Ireland Scallop Fishermen's Association operate mostly off the east coast. A small number of Scottish and Isle of Man boats also participate in this fishery, dredging the east Antrim coast during November/December. In addition, small quantities of scallop are taken by divers around the Copeland Islands. Key areas that are harvested for scallop are the south-eastern inshore part of the Plan area (Yates, 2012). Landings of scallop into Northern Ireland ports since 2007 are shown in Table 27.

Fishing restrictions for scallops were put in place in 2008, reducing the permitted daily fishing time, limiting the number of dredges used by each boat and extending regulation to 'fishing by any means' including divers. In addition, scallops must have a minimum shell length of 110mm to be legally landed for commercial use. This minimum legal landing size within ICES rectangle VIIa ensures that scallops spawn at least twice before becoming vulnerable to direct fishing mortality. Fishermen perceive these restrictions to be helping to manage stocks, although there is still concern that an ever increasing number of fishermen are diversifying into scallops to subsidise other fishing activities (mainly Nephrops), and that this will put too much pressure on the stocks (Yates, 2012).

Finfish

The types of catch that Northern Ireland fishing vessels are landing has changed in recent years. Restrictions to the fishing of whitefish such as cod, due to the collapse or near collapse of stocks within the Irish Sea, has led local fishermen focussing efforts on catching shellfish. The Cod Recovery Plan that has been in force for the Irish Sea since the year 2000 has seen severe restrictions being placed upon the number of days that fishermen can spend at sea here and on the type and quantity of fish they can catch. In this regard, it is very clear that the TAC figures and Cod Recovery Plan have had and continue to have a very direct effect on both the size, profitability and target species of the Northern Ireland fishing industry (Northern Ireland Assembly, 2011).

Whitefish are targeted by trawlers (>15m in length) using semi-pelagic gear in the Irish Sea, North Channel and along the north coast to the west of Rathlin Island. The Irish Sea and North Channel grounds are fished mainly by County Down based vessels while the north coast area is exploited by vessels from Greencastle and Moville in County Donegal and some smaller boats from Portrush and Portstewart. Landings of the main demersal species are presented in Table 27. Whilst not all fish landed are taken from the Plan area, the table can give some idea of the level of catch of the main species together with landings of non-quota species.

The main species of interest are cod, haddock, hake, whiting, plaice and sole, although as discussed above, landings have declined significantly due to the deteriorating state of Irish Sea stocks and the lowering of TACs, most notably for cod (see Image 5). Over the period between 2000 and 2007, there has been a reduction in spawning stock biomass estimates for cod since 2002, with estimates falling 73% to 1,658 tonnes by 2007 (DOE, 2011). Spawning stock biomass estimates for sole have also experienced a downward trend over this period since 2001, with estimates dropping 58% to 1,492 tonnes by 2007. However, plaice spawning stock biomass estimates indicate an upward trend, with a 72% increase from 3,953 tonnes in 2000 to 6,802 tonnes in 2007 (Source: AFBI & ICES Stock Assessments (WGCSE 2010 report), cited in DOE, 2011,).

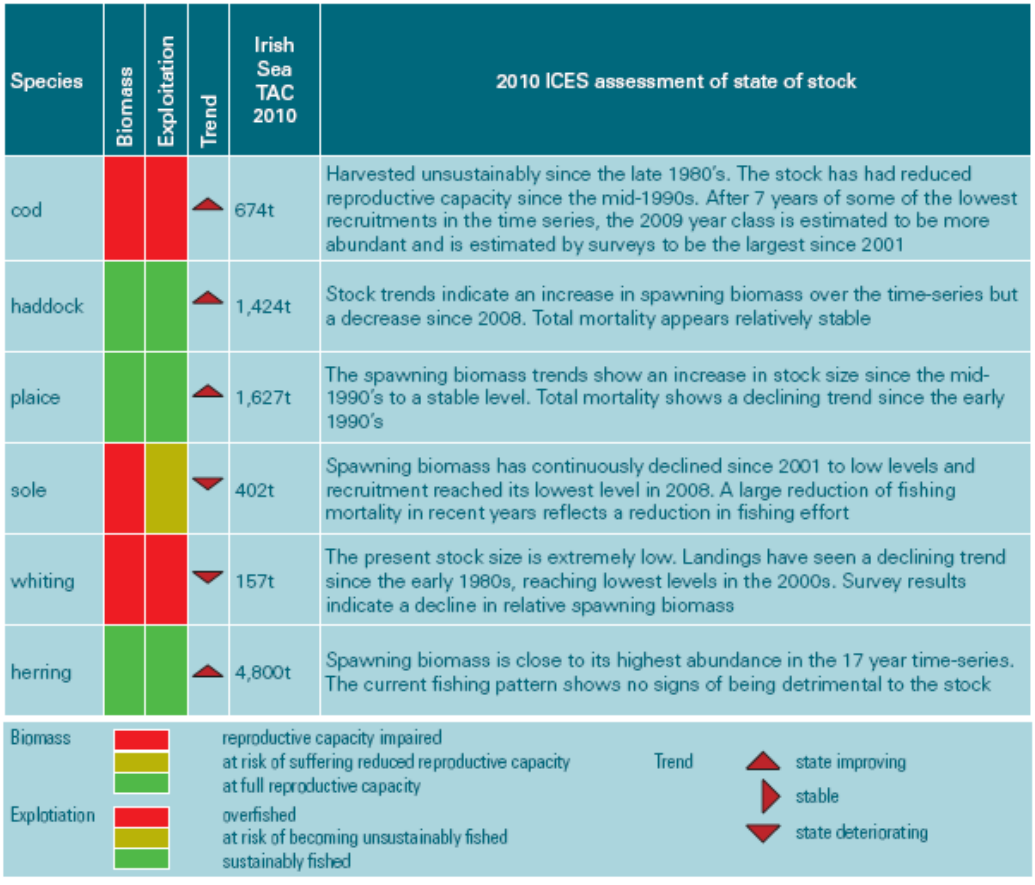


Image 5 : Status of the main commercially exploited fish stocks in the Irish Sea, 2010 (Source: AFBI and NIEA, 2011)

Herring spawns in the autumn and, in the Irish Sea, comprises two separate stocks: Manx and Mourne. The Manx stocks spawn east of the Isle of Man (Clupea website) and so are beyond the boundary of the Plan area. The Mourne herring spawns off the east coast of Northern Ireland/Republic of Ireland, in an area extending approximately from St John's Point (County Down) south to Dunany Point (County Louth). Herring spawning stock biomass are much higher than that for cod, plaice and sole (Image 5). Spawning stock biomass estimates have fluctuated over the period between 2000 and 2007, but a threefold increase occurred between 2006 and 2007, from 16,332 tonnes to 51,819 tonnes (DOE, 2011). This increase was driven by a particularly good recruitment event (fish reaching a certain size or reproductive stage). Spawning stock biomass has continued to increase in recent years (Image 5), so much so that ICES now regards the stock as stable (AFBI and NIEA, 2011).

International scientific research has shown that Atlantic salmon populations are currently under threat. Numbers of salmon returning to many Northern Ireland rivers are too low to be sustainable. The 2007 commercial salmon catch in Northern Ireland was 6,178kg compared with 31,353kg in 1997, an 80% reduction over the ten year period (DOE, 2011). These values do not include salmon caught in the Foyle catchment, which are mainly landed in the Republic of Ireland or salmon caught by recreational rod and line fisheries. The reduction in the numbers of salmon caught post 2001 can mainly be attributed to reduced fishing effort resulting from the Commercial Salmon Fishermen's Voluntary Buy-out Scheme. As the level of commercial fishing has reduced, the average price of wild salmon per kg has increased almost threefold, from £4.27/kg in 1997 to £12/kg in 2007 (DOE, 2011).

Key Issues, Problems and Future Trends

Historically, Ireland's coasts have been rich in marine resources and as such many of the fisheries have been over fished, including oyster beds and herring. This 'fishing down the food web' has occurred all over the Northern Hemisphere in the last 50 years (Pauly et al., 1998) causing population declines of commercially value fish stocks. Today, the Northern Ireland fisheries are relatively diverse with the overall composition of catches dominated by invertebrates. The most economically important fishery in the area is the Nephrops fishery (Thurston et al., 2008). While the volume of Nephrops landed has increased in recent years, the landings of many whitefish and flatfish have declined in the last 35 years.

Whitefish populations have suffered significant declines due to overfishing and over-exploitation. In an effort to revive populations the EU has taken a number of measures, one of which includes the restriction of whitefish fishing in certain areas, including large parts of Northern Ireland territorial waters, at certain times of the year to seek to improve spawning success (Marine Irish Digital Atlas website).

As discussed in Biodiversity, Flora and Fauna Section 5.8, the key issues faced by fish populations within the Plan area are overfishing and habitat loss. Some of the commercially valuable species are being fished at unsustainable levels, especially those which are slow growing and become sexually mature later.

Fisheries are potentially impacted by both environmental and anthropogenic factors, including:

- Climate change effects (warming seas), which may result in the decline of stocks of cold-water species, such as cod, in waters around the UK as the stocks move northwards. However, new opportunities for warmer-water species may emerge as these species extend northwards into UK seas. Existing more southerly stocks such as red mullet, John Dory and bass may also experience improved productivity in years with higher average sea temperatures (UKMMAS, 2010);
- Anthropogenic effects such as permanent structures, dumping at sea, oil and chemical spills, and the effects of the fisheries themselves, which may impact on the habitats where the fish live; and,
- Profitability and political effects.

Fisheries management will continue to focus on bringing down rates of exploitation to Maximum Sustainable Yield (MSY) targets. The majority of scientifically assessed stocks continue to be fished at rates well above the levels expected to provide the highest long-term yield (Defra, 2010), therefore, there is increasing downward pressure on the levels of exploitation allowed. Management measures will need to reduce bycatch and discards, and be more responsive to changing patterns of fish migration and movement.

The reform of the Common Fisheries Policy (CFP which came into force on 1st January 2014) and will be an influencing factor on the management of fisheries within the Plan area. As a result of the reforms, the UK Government is committed to:

- Changing the way fisheries are managed including a more local approach to quota management and publishing a register of fixed quota allocations;
- Working with sea anglers to improve data;
- Preparing a report for Parliament regarding the conduct and operation of the Inshore Fisheries and Conservation Authorities (IFCAs); and,
- Funding research projects and fisheries science partnership.

By bringing fish stocks back to sustainable levels, the new CFP aims to provide EU citizens with a stable, secure and healthy food supply for the long term. It seeks to bring new prosperity to the fishing sector, end dependence on subsidies and create new opportunities for jobs and growth in coastal areas. At the same time, it fosters the industry's accountability for good stewardship of the seas. The certification of sustainable fisheries by the Marine Stewardship Council (MSC) may bring marketing advantages in a climate of increasing public and commercial awareness of sustainability issues, and where there is a desire to source fish and shellfish from environmentally responsible businesses. Currently, there are eight UK fisheries in UK waters with MSC accreditation, including fisheries for Dover sole, herring, mackerel, sardine, queen scallop, mussels and cockles. There are currently no certified fisheries within the Plan area (MCS website).

5.13.3 Aquaculture

The following data sources have been used to characterise aquaculture within the Plan area:

- The Rising Tide – A Review of the Bottom Grown (BG) Mussel Sector on the Island of Ireland (Bottom Grown Mussel Review Group, undated);
- Sustainable Mariculture in Northern Irish Lough Ecosystems (Smile) report (Ferreira et al. 2007);
- Current list of Classified Shellfish Harvesting Areas in Northern Ireland 2012 (Food Standards Agency website);
- List of Northern Ireland authorised finfish and shellfish aquaculture installations (DARDNI website); and
- Charting Progress 2 (Defra, 2010).

Baseline Description

At present there are 50 marine farms covering 57 sites licensed for the cultivation of shellfish. There are also two marine salmon farms with licensed sites in Glenarm Bay and Red Bay each authorised to produce 450 tonnes of salmon. The locations of licensed aquaculture areas in Northern Ireland are shown in Figure 11. Shellfish production in 2013 (excluding Lough Foyle) is included in Table 28. The marine aquaculture sector currently employs 49 full time and 29 part time employees (DARD).

Table 28 : Shellfish production in 2013 (excluding Lough Foyle)

Species	Production (Tonnes)	Value (£)
Mussels Bottom grown	3,227	5,594,000
Mussels (Rope/Trestle grown	97	185,100
Pacific oysters (Market)	11	30,942
Pacific oysters (On-growing)	127	315,585
Other shellfish (scallops, Periwinkles etc)	2	3,335
Total Shellfish	**3,464**	**6,101,962**

The main secondary activity is fish processing, which has about 350 full term employees according to a survey conducted in 2012. When compared to other regions in the UK, Northern Ireland has a very small

number of sea fish processing units totalling 17 in comparison to the 325 in the whole of the UK (Curtis and Barr, 2012).

Key Issues, Problems and Future Trends

Aquaculture continues to be the world's fastest-growing animal-food-producing sector and makes a significant contribution to the production of aquatic food worldwide. World fish consumption also continues to increase driven by a combination of population growth, rising incomes and urbanisation. The UK aquaculture sector has increased dramatically in recent years with an increased demand for the resource as wild fish stocks become increasingly under pressure and unsustainably fished. The economic contribution in the UK from fish and shellfish farming alone increased by 132% from 2000-2006 (Defra, 2010). In addition to the more established finfish species, emerging aquaculture species such as tilapia, barramundi, bass and bream along with the growing organic finfish sector may also increase the size of the UK finfish aquaculture market (Defra, 2008).

The UK is committed to supporting sustainable growth for aquaculture. This support for growth has new impetus at EU level. The Commission is keen to use the opportunities presented by the Common Fisheries Policy (CFP) Reform and the European Maritime and Fisheries Fund (the financial instrument to support CFP implementation) to boost aquaculture growth and has asked Member States to produce Multi-annual National Plans outlining how they intend to foster growth in the aquaculture sector. Opportunities exist, including possible co-location with marine energy installation. Further development will however be dependent on the outcome of competition for available space and reducing potential environmental impacts.
In April 2013, the Northern Ireland Agri-Food Strategy Board published the "Going for Growth Strategy". The Strategy sets challenging targets that reflect the industry's ambition for increased sales, as well as job creation and overall contribution prosperity and contains a number of recommendations aimed at accelerating the growth of fishing and aquaculture.

5.13.4 Ports, Shipping, Navigation, Dredging and Disposal

The following data sources have been used to characterise ports and shipping within the Plan area:

- Maritime Statistics. All UK ports, all freight traffic, by port and direction: 1965 – 2012 (Department for Transport (DfT), 2013);
- Potential Marine Environmental High Risk Areas (MEHRAs) (Maritime and Coastguard Agency (MCA) website);
- Northern Ireland State of the Seas Report (NIEA and AFBI, 2011);
- Northern Ireland Ports Traffic 2011 and 2012 (Northern Ireland Statistics and Research Agency, 2012; 2013) Available from DETI website http://www.detini.gov.uk/deti-stats-index/forms_other_surveys/stats-ports-traffic.htm;
- Belfast Harbour Commissioners website;
- Belfast Harbour Annual Report and Accounts (2013);
- Regional Locational Guidance (RLG) for Offshore Renewable Energy Developments in NI Waters (Department of Enterprise, Trade and Investment (DETI), 2011);
- Belfast Renewable Energy Park (DONG Energy website);
- Ships' routeing information (International Maritime Organisation (IMO) website); and
- Ferry services information (NI Direct website).
- Charting Progress 2 (Defra, 2010);
- The economic impact of the UK Ports Industry (Oxford Economics, 2010);
- Managing the Water Environment in Northern Ireland (Environmental and Heritage Service (EHS), 2000);
- Oceanwise data;
- Northern Ireland Coastal Zone – Indicators of Sustainable Development (DOE, 2011);

- Marine Guidance Note (MGN) 275. Proposed UK Offshore Renewable Energy Installations (OREI) – Guidance on Navigational Safety Issues (Maritime and Coastguard Agency, 2004); and,
- Mapping UK Shipping Density and Routes from Automatic Identification System (AIS) (MMO, 2014).

5.13.5 Ports

Baseline Description

There are several ports in Northern Ireland ranging from large port facilities to numerous smaller ports which are essential for ferry traffic and local trade and supplies (Figure 12).

Northern Ireland has a high dependence on its sea ports, providing gateways for trade with Ireland and Great Britain, as well as mainland Europe and the rest of the world. There are five commercial ports in Northern Ireland. These include the four public trust ports of Belfast, Coleraine, Londonderry and Warrenpoint, and one port in private ownership, Larne. Northern Ireland's commercial ports play a crucial economic role, handling some 95% of Northern Ireland's external trade (AFBINI, 2010). Over 22 million tonnes of cargo were handled through these five ports in 2012 (DfT, 2013), and over the last six years this value has been consistently around this value (Table 29). The total tonnage comprised approximately 15 million tonnes of inward traffic and 8 million tonnes of outward traffic in Northern Ireland (Northern Ireland Statistics and Research Agency, 2013). In addition, the Northern Ireland commercial fishing industry is concentrated at the three fishing ports of Ardglass, Kilkeel and Portavogie, located on the East coast (see Commercial Fisheries Section 5.13.2).

Table 29 : Freight traffic through Northern Ireland's five main ports by direction from 2007 to 2012 (thousand tonnes)

Port	Traffic	Year					
		2007	2008	2009	2010	2011	2012
Belfast	Inward Traffic	9,704	9,143	8,407	8,600	8,614	9,731
	Outward Traffic	3,712	3,897	3,643	4,227	4,947	5,455
	All Traffic	13,416	13,040	12,050	12,827	13,561	15,186
Coleraine	Inward Traffic	20	10	2	1	-	-
	Outward Traffic	54	51	31	40	39	-
	All Traffic	74	61	33	41	39	39
Larne	Inward Traffic	2,890	2,749	2,299	2,419	2,306	1,482
	Outward Traffic	2,574	2,417	1,998	2,194	2,089	1,431
	All Traffic	5,464	5,166	4,297	4,614	4,395	2,913
Londonderry	Inward Traffic	1,836	1,786	1,542	1,696	1,583	1,563
	Outward Traffic	98	54	77	61	157	96
	All Traffic	1,934	1,839	1,619	1,757	1,740	1,659
Warrenpoint	Inward Traffic	1,259	1,305	961	1,337	1,346	1,343
	Outward Traffic	740	813	880	990	1,079	1,087
	All Traffic	1,999	2,119	1,841	2,327	2,425	2,429
Total	**Inward Traffic**	**15,709**	**14,993**	**13,211**	**14,052**	**13,850**	**14,119**
	Outward Traffic	**7,178**	**7,232**	**6,629**	**7,513**	**8,311**	**8,069**
	All Traffic	**22,888**	**22,224**	**19,840**	**21,565**	**22,161**	**22,226**

Source: DfT (2012)

The majority of freight traffic moving through Northern Ireland's ports passes through Belfast. In 2012, over 68% (15.2 million tonnes) of cargo was handled at Belfast, with 13% (2.9 million tonnes) passing through Larne, 11% (2.4 million tonnes) through Warrenpoint, 7% (1.6 million tonnes) through Londonderry and <1% (39 thousand tonnes) through Coleraine (Table 29). In 2012, the majority of total Northern Ireland traffic again came through the Belfast Port (65%), while almost 12% of total traffic came through the Port of Larne. Cargo tonnage handled by the ports is mainly in the form of bulk cargo (liquid and dry bulk cargo that must be loaded individually) and unit loads (freight vehicles and containers).

A report conducted by the Centre for Economics and Business Research in 2007 concluded that 13% of Northern Ireland's workforce is employed by businesses which trade through the Port of Belfast or are based in the Harbour Estate. In 2009, there were 13,700 people employed by ports in Northern Ireland (Oxford

Economics, 2011). These businesses generate £3.8 billion of gross value added (GVA) or £4.2 billion worth of gross domestic product (GDP) equivalent to 15.7% of the Northern Ireland total (NIEA and AFBI, 2011). Furthermore, the UK ports industry enables a whole range of other industries to function, such as fishing and dredging. The activities of industries, which are heavily reliant on the import/export of bulk raw materials are also crucially facilitated by UK ports.

In late 2012, construction finished of a new tailor-made offshore wind installation and pre-assembly facility at Belfast Harbour. DONG Energy took the lease, which was initially used for the construction of the West of Duddon Sands offshore wind farm in the Irish Sea (DONG Energy, 2013). The completion of the DONG Energy facility further enhances Belfast Harbour's ambition to become one of the leading UK Renewables hubs and will complement other Harbour Estate Renewables related activities undertaken by Harland and Wolff, NI Advanced Composites Centre, Ridgeway Renewables and Belfast Metropolitan College amongst others. In addition to the 150 construction related jobs sustained during the building of the facility up to a further 300 jobs have been created to serve the West of Duddon Sands project ranging from welders to electricians to engineers.

Driven in part by its renewable related investments, Belfast Harbour is currently experiencing significant growth with a 16% increase in trade tonnage in 2013 building on an 11% increase in 2012. One area of particular growth has been the cruise ship market with cruise calls increasing from 32 to 45 to 59 over the last three years bringing in over 100,000 visitors per annum.

Shipping – Passenger Routes

Northern Ireland's ports are important for passenger traffic with over 2 million domestic sea passengers (see Table 30) passing through each year (DfT, 2012). In terms of tourist traffic, 484,620 tourist vehicles passed through Northern Ireland ports in 2012. Compared with a figure of 509,534 in 2011, this represents a decrease of 4.9% (Northern Ireland Statistics and Research Agency, 2013).

Major ferry routes link with Cairnryan and Troon (Figure 13). In addition, there has been an increase in the number of cruise ships visiting Belfast in recent years. In 2013, a record 59 cruise ships will bring over 100,000 visitors to the port (Belfast Harbour Commissioners, 2013).

Table 30 : Domestic sea passenger movements (thousands) from GB to Northern Ireland, 2007-2013

Sea Crossing	Year						
	2007	2008	2009	2010	2011	2012	2013
Cairnryan – Larne	646	628	602	611	631	524	501
Cairnryan – Belfast	-	-	-	-	96	1,116	1,150
Fleetwood – Larne	61	58	54	51	-	-	-
Liverpool – Belfast	187	190	187	221	235	207	241
Stranraer – Belfast	1,217	1,104	1,101	1,084	922	-	-
Troon – Larne	231	206	213	225	208	169	180
Other routes	9	9	11	16	20	17	15
Total	**2,351**	**2,194**	**2,167**	**2,207**	**2,113**	**2,033**	**2,086**
Source: DfT (2014)							

Other smaller routes include the year-round Rathlin Island ferry crossing from Ballycastle, as well as fishing, aquaculture and tourist pleasure cruises from Cushendall. Recreational boating is discussed in Section 5.13.5. Regular ferry crossings also exist within Strangford Lough, Lough Foyle and Carlingford Lough (NI Direct website).

Shipping – Commercial Routes

Northern Ireland's waters are a busy shipping area with merchant vessels using distinct routes around the coast. Larger vessels, including tankers and some cargo ships, tend to pass in a north-south direction via the North Channel accessing major ports in and around the Irish Sea. Tankers may also deviate from their north-south transit to make port calls to Lough Foyle and to the Port of Belfast. Cargo vessels have less defined routes through the Plan area; their movements appear to be concentrated on the east coast with east-west routes connecting Larne and Belfast Port to the ports of Scotland, England and the Isle of Man and south-westerly routes to Ireland. High resolution Automatic Identification System (AIS) data is included in Figures 12 and 13 which show that the greatest number of shipping movements is concentrated in the Belfast area.

Shipping – Navigation

The North Channel is a 'recognised sea lane essential to international navigation' and as such development consent cannot be granted where installations (e.g. offshore renewable energy installations) would be likely to cause interference (MCA, 2004).

IMO routeing measures also include a vessel traffic separation scheme (TSS) in the North Channel between Rathlin Island and the Mull of Kintyre. TSSs detail specific routes for traffic to aid navigation of certain ships or ships with certain cargoes. The practice of following predetermined routes for shipping originated in 1898 and was adopted, for reasons of safety, by shipping companies operating passenger ships across the North Atlantic (IMO, 2013). There are no other IMO measures in the Plan area although there is an area noted for the movement of high speed craft (in this case high speed ferries) also within the North Channel area.

Marine Environmental High Risk Areas (MEHRAs) have been identified in areas where there is a perceived risk of pollution from shipping combined with an environment considered sensitive to such pollution. MEHRAs are notified by a Marine Guidance Note to mariners, who will be expected to exercise an even higher degree of care than usual when passing through them. The only MEHRA within the Plan area is Island Magee which is on the northern edge of Belfast Lough with adjacent shipping routes to and from the nearby ports of Belfast and Larne (Figure 13).

Dredging and Disposal

A new marine licensing regime which was introduced in 2011 regulates the deposit of material in the sea within Northern Ireland territorial waters. Dredged material from port and navigation channel excavation and coastal engineering works constitutes the majority of material that is eligible for disposal at sea (EHS, 2000). The majority of sites receive chemically unmodified geological material derived from the adjacent coastline. Contaminated sediments which may be disposed of at sea (derived from routine dredging of existing harbours) are only licensed for disposal if contaminants are unlikely to cause environmental harm (EHS, 2000). The practice of dumping sewage sludge is now prohibited, but the disposal of fish waste can still be licensed if the risk to the environment and other users is considered to be within safe limits. The location of open disposal sites and Beaufort's dyke munitions disposal site are shown relative to the Plan area on Figure 14.

Key Issues, Problems and Future Trends

The UK Government policy for ports was set out in the Interim Report of the ports policy review published in 2007 (DfT, 2007). This report stated that the Government sought to 'encourage sustainable port development to cater for long-term forecast growth in volumes of imports and exports by sea with a competitive and efficient port industry capable of meeting the needs of importers and exporters cost effectively and in a timely manner'. This provides confirmation that the ports industry is supported by Government policy into the future, providing assurance of sustained development.

The main commercial ports in Northern Ireland are Belfast, Larne, Londonderry and Warrenpoint. These ports will need to develop their capacity to ensure that future growth in trade can be handled efficiently. These developments are needed to cater for the operational requirements resulting from changes in shipping technology, including the move to larger container ships.

The increase in offshore renewable activities provides a potential source of income for ports. This is both as a base for industrial processes including manufacture of offshore renewable devices, and as a service provider for the craft needed to install and maintain offshore renewable sites during the construction and operation. Market potential is driven by the location of offshore renewable developments, and the accessibility of ports for the types of craft involved in installation and maintenance activities.

Attracting DONG Energy and Scottish Power Renewables to Belfast Harbour has given the port a strong advantage, enabling it to market prospective development lands within the Harbour area for further offshore renewable energy opportunities.

The increased investment in ports as a result of both future offshore renewable development projects and growth in trade will inevitably lead to increased vessel movements within Northern Irelands inshore and offshore waters and throughout the UK. It will also be important to take account of the potential for offshore energy development to affect shipping routes and for offshore wind turbines to interfere with marine radar and shore based radar systems used by ports.

Shipping volumes bear a direct relationship to the global economic market. As markets react to the changing financial situation, shipping lines respond with services to move goods and people. The most notable variable to affect the volume and intensity of shipping into the future will be the technology and innovations used to design future shipping. Ship design seeks for bigger, faster and more economic transhipment of goods and people.

The introduction of bigger ships places expectations on existing ports to increase the depth of water in entrance channels and alongside berths to accommodate changing ship requirements. This implies that investment is necessary in port infrastructure, both in terms of shore side facilities and access to the ports. Channel widths may need to increase to take account of the wider ship beam, which in addition may lead to the requirement for turning circles to be enlarged to take account of greater vessel length. Although all of these pressures have to be taken into account, probably the most significant factor to challenge traditional ports in the context of their ability to accommodate bigger ships is sea access, and in particular vessel draught.

A list of extant development proposals requiring a marine licence is provided on the DOE website. Those of relevance to this sector include Kilkeel Maintenance Dredge and Modifications to Albert Quay at Belfast Harbour. Northern Ireland Fishery Harbour Authority has applied to renew the dredging disposal licence for Kilkeel Harbour. Belfast Harbour Commissioners (BHC) propose to undertake redevelopment works to the existing Albert Quay Roll-on Roll-off (Ro-Ro) Berth in Belfast Harbour, to facilitate larger vessels and provide new sea routes between Belfast, Heysham and Liverpool.

5.13.6 Recreation and Tourism

The following data sources have been used to characterise recreation and tourism within the Plan area:

- Royal Yachting Association (RYA) coastal atlas of Recreational Boating (RYA website);
- Recreational Cruising Routes, Sailing and Racing Areas within the SEA 6 Area (RYA website);
- UK offshore energy SEA technical reports (DECC, 2009);
- SEA 6 Environmental Report. Strategic Environmental Assessment of Draft Plan for a 24th Seaward Round of Offshore Oil and Gas Licensing (DTI, 2005);
- UK Leisure, Super yacht and Small Commercial Marine Industry. Key Performance Indicators 2010/11 (British Marine Federation, undated);
- The Annual Water Sports & Leisure Participation Survey 2013, Executive Summary. (British Marine Federation, MCA, Lifeboats, RYA, British Canoe Union and MMO, undated);
- Recreational data layers (Marine Irish Digital Atlas website);
- Charting Progress 2 (Defra, 2010);
- Northern Ireland Environmental Statistics Report (DOE, 2013);
- Northern Ireland Coastal Zone – Indicators of Sustainable Development (DOE, 2011);
- Northern Ireland Bathing Water Compliance (1998-2014) (DOE website);
- SEA of Offshore Wind and Marine Renewable Energy in Northern Ireland (DETI, 2009a);
- UK MPS (HM Government et al., 2011);
- Northern Ireland Tourism Board (NITB) website http://www.nitb.com/Destinations.aspx;
- NITB Events Strategic Vision to 2020 (http://nitb.com/BusinessSupport/FundingOpportunities/EventsFunding.aspx)
- Sustainable Development Strategy for Northern Ireland's Inshore Fisheries (AFBI, 2013);
- Trends in Outdoor Recreation (1995-2008) Towards a New Outdoor Recreation Strategy for Northern Ireland (Noble and Ballo, 2009) Study funded by SportNI and NITB;
- Good Beach Guide (MCS website); and,
- Activities Tourism – Sharing Success (NITB, 2011).

Baseline Description

Many different recreation and tourism activities in the UK make use of the marine environment. It is difficult to capture the principal market value obtained from recreation and tourism because some activities, such as swimming, do not result in a marketable good or paid-for service. Although this sector is likely to have a high value of economic activity, uncovering the economic contribution is hampered by the number of activities, their wide distribution and the lack of centrally available statistics. Such issues also make it difficult to fully assess spatial pressures (Defra 2010).

The MPS notes that "the UK Administrations' aim for tourism is to take steps to improve the competitiveness of the tourism industry, recognising the important part it plays in the national economy and to encourage growth within environmental limits. Tourism is one of the top three growth sectors of the UK economy and supports 1.5 million jobs and contributed nearly £90bn to the UK economy in 2009. Seaside tourism makes an important contribution. It supports 21,000 jobs and contributes £3.6bn to the UK economy. A similar picture exists for recreation where, for example, the estimated economic contribution of recreational boating to the UK economy was £1.042bn in 2009/10 and employed nearly 35,000 in this sector."

The recreation and tourism sector is characterised by a diverse array of principal activities. They range from those that interact relatively passively with the marine environment (e.g. whale watching) to those that interact more directly (e.g. recreational fishing). These are supported by an even greater range of ancillary economic activities including construction, manufacturing, and management (Defra, 2010). Secondary activities that benefit from leisure and recreation include accommodation and other hospitality industries. Marine and coastal recreational activities in Northern Ireland include sailing and boating, scuba diving, sea angling, walking, canoeing, surfing, bird watching, and visiting coastal attractions such as castles and archaeological features. The key activities are described in more detail in the following sections.

Water Sports

Participation rates of water sports activities have increased significantly from 2009 to 2011 for those living in Northern Ireland (Annual Water Sports & Leisure Participation Survey, 2011). A UK wide survey found that Northern Ireland residents participate more in water sports (58.83%) than any other region of the UK. Activities with the highest participation rate are canoeing and small sail boat activities.

Yachting is popular in the more sheltered coastal waters, bays and sea loughs, and in addition particular routes are used to traverse the coast, and between islands. There are 25 RYA clubs and seven RYA marinas along the coast of Northern Ireland. The east coast from south of Carlingford Lough round to Ballygalley, including Carlingford Lough, Strangford Lough and Belfast Lough is identified by RYA as a general sailing area.

In the 2011 survey, 21,450 divers were recorded in Northern Ireland (Annual Water Sports & Leisure Participation Survey, 2011). Particular areas of interest include the historic wrecks of HMS Drake, MV Alastor and Girona, and the areas of Portstewart, Portmuck, Causeway coast, Whitehead and Rathlin Island.

The majority of coastal surf shops and outdoor activity operators within the Plan area are located on the north coast in the vicinity of Portrush, or along the coast of Belfast Lough. These centres offer a range of marine related activities including surfing, wind surfing, kayaking and angling. The coast of Northern Ireland receives swell waves from the Atlantic Ocean. The combination of shop/operators and suitable swell has lead to an estimated 9,600 windsurfers, 19,900 surfers and 6,700 kitesurfers being active in Northern Ireland in 2011 (Annual Water Sports & Leisure Participation Survey, 2011). The main surfing areas are situated along the stretch of coast between Magilligan in the west to Ballycastle in the east, with the most popular surfing location around Portrush.

Sea Angling and Inshore Fishing

Sea Angling is a popular activity in Northern Ireland with a 3 year average of 18,513 boat anglers and 15,847 shore anglers recorded in the 2013 Water Sports and Leisure Participation Survey.

In 2007, an Inshore Review was carried out to advise DARD on the management of Northern Ireland inshore fisheries. A draft strategy was produced for consultation in response to this review (AFBI, 2013). Inshore fisheries are a valuable resource, worth an estimated £4.4 million in 2010. However, this sector is facing a number of issues which threaten both its development and sustainability. The best way of achieving effective management is considered to be the setting up of a representative Inshore Fisheries Advisory Group involving those who use the inshore fisheries (AFBI, 2013). This will ensure communication across the sector when discussing issues and appropriate management measures. Through the co-operation of Government, commercial fishermen, recreational fishermen, NGO's and scientists the inshore should remain

a lucrative fishery for those who use it commercially and recreationally, for environmental, cultural or economic reasons.

Recreational Beach Use

In the 2013 Water Sports and Leisure Participation Survey general leisure time at the beach was 37% higher than in 2012, reflecting better summer weather in 2013.

In Northern Ireland there are 23 designated bathing waters (see Figure 15). In 2013, 20 of Northern Ireland's bathing water beaches (87%) passed with excellent water quality and no beaches failed standards. This is an improvement of around 17% from the 2012 results (Figure 15). Only two months of 2014 monitoring data are available for 2014 at the time of writing. These indicate that to date, 21 out of the 23 bathing waters are reaching at least excellent quality (see Table 31).

In addition to the official bathing waters results, the Marine Conservation Society also publishes the Good Beach Guide which is based on the results of the beaches surveyed in 2013. The guide stated that of the 23 beaches sampled, all met the minimum standards, with 15 being assessed as having excellent water quality (http://www.goodbeachguide.co.uk/search-results). Beaches and marinas are also awarded Blue flag status. In 2014, 8 beaches and 2 marinas were awarded Blue Flag status in Northern Ireland (Blue Flag website, Figure 15). An additional 13 beaches have received the Seaside Award.

Table 31 : Northern Ireland Bathing Water Directive Compliance 2010-2014

Bathing Water	2014*	2013	2012	2011	2010
Magilligan (Benone)	E	E	E	E	E
Magilligan (Downhill)	E/G	E	E	E	E
Castlerock	E	G	E	E	G
Portstewart	E	E	E	E	E
Portrush (Mill) West	E	E	E	E	E
Portrush (Curran) East	E	E	E	E	E
Portrush (Whiterocks)	E	E	E	E	E
Portballintrae (Salmon Rock)	E	E	G	E	E
Ballycastle	E/G	G	E	E	E
Waterfoot	E	E	G	E	
Carnlough	E	E	G	E	E
Ballygalley	E	E	G	G	E
Brown's Bay	E	E	E	G	G
Helen's Bay	E	E	E	E	E
Crawfordsburn	E	E	G	E	G
Ballyholme	E	G	G	G	F
Groomsport	E	E	E	E	G
Millisle	E	E	E	E	G
Ballywalter	E	E	E	E	E
Tyrella	E	E	E	E	E
Murlough Co. Down	E	E	E	E	E
Newcastle Co. Down	E	E	F	G	G
Cranfield	E	E	E	E	G

*Results available for May and June 2014.

E – compliance with Guideline standards, Excellent;

Bathing Water	2014*	2013	2012	2011	2010
G – compliance with Mandatory standards, Good; and F – failure to comply with Mandatory standards, Fail.					

Tourism

The Northern Ireland Tourist Board (NITB) has developed tourism and its marketing over the last few years. Tourism performance statistics have also been developed significantly over the last few years and the NITB website includes:

- Annual and quarterly visitor statistics;
- Local authority tourism estimates;
- Visitor attraction surveys;
- Tourism intelligence reports; and,
- A tourism industry barometer.

In 2012, 1.5 million overseas visitors came to Northern Ireland spending £418 million and 2 million domestic visitors spent £195 million. In 2013, the economic impact of tourism to the Northern Ireland economy was 5.2% of GDP, supporting some 43,000 jobs.

The activities tourism market in Northern Ireland is estimated to be worth £55 million in overseas tourist spending (NITB, 2011). In 2009, this equated to approximately 16% of overseas tourist spending in Northern Ireland. Combined with the RoI and domestic market, the whole market is estimated to be worth as much as £90 to £100 million per annum in revenue for Northern Ireland tourist businesses (NITB, 2011)..

The numbers of overseas visitors participating in activities has fallen since 2007, in line with a decline in the wider tourism sector (NITB, 2011). The number of participants fell by 13% between 2007 and 2009, compared to a 9% drop in overall overseas visitor numbers. However, though the overseas tourism market is highly important, the majority of participation in activities comes from domestic tourists and from RoI tourists. The recession has seen consumers less able to afford a holiday, while those that still take one are cutting down on the activities they undertake in order to limit their spending. Walking is the most popular activity, as well as being one of the most resistant to the economic conditions. Some 63% of activities were made up by walking. Furthermore the numbers participating in walking increased by 57% between 2005 and 2009 (NITB, 2011).To reinvigorate the Northern Ireland tourist market, NITB launched "NITB Northern Ireland Home of Great Events – Events Strategic Vision to 2020", which is part of the framework for how events will promote Northern Ireland until 2020. The Northern Ireland Tourism Strategy changed in 2012, with the 'ni2012;our time, our place' programme, where emphasis was placed on high quality event hosting in Northern Ireland. Table 32 details the tourism projections until 2020.

Table 32 : 2012 baseline and 2020 projections

	2012 Baseline	2020 Projection
Number of Visitors per annum	4 million	4.5 million
Visitor spend per annum	£683 million	£1 billion
Numbers employed through tourism	40,000	50,000

As part of the Northern Ireland Home of Great Events – Events Strategic Vision to 2020, Table 33 shows the 2014/2015 events schedule for the coastal LGDs.

Table 33 : NITB funded events 2014/2015

Project Name	Award	Town	LGD
14th Belfast Film Festival	£21,000	Belfast	BELFAST
Walled City Tattoo	£30, 000	Derry	STRABANE
The Great Ulster Pub Week	£15,000	Belfast	BELFAST

Project Name	Award	Town	LGD
Cathedral Quarter Arts Festival	£27,000	Belfast	BELFAST
City of Derry Jazz and Big Band Festival	£15,000	Derry	DERRY
Festival of Fools 2014	£30,000	Belfast	BELFAST
Bread Festival	£18,000	Strangford	DOWN
Garden Show Ireland	£18,000	Antrim	DOWN
Rathlin Sound Maritime Festival	£20,000	Rathlin	MOYLE
Carnivale of Colours 2014	£30,000	Derry	DERRY
Northern Ireland Countryside Festival	£6,000	Moira	DOWN
Bangor Seashore Festival	£18,000	Bangor	NORTH DOWN
Open House Festival 2014	£7,500	Belfast	BELFAST
Music City!	£15,000	Derry	DERRY
F18 World Championship	£6,000	Bangor	NORTH DOWN
Irish Game Fair & Flavour Fine Food Festival	£30,000	Antrim	DOWN
Dalriada Festival	£30,000	Glenarm	LARNE
American D Day Commemoration 2014	£6,000	Kilkeel	NEWRY and MOURNE
Hughes Insurance Foyle Cup	£15,000	Derry	DERRY
Cairncastle Ulster-Scots Festival	£10,750	Cairncastle	LARNE
Open House Bangor 2014	£12,500	Bangor	NORTH DOWN
Tanglewood Music & Arts Festival	£12,000	Newry	NEWRY and MOURNE
Maiden City Festival 2014	£8,750	Derry	DERRY
Festival of Flight	£30,000	Newcastle	DOWN
Tennent's Vital 2014	£24,000	Belfast	BELFAST
Ultimate Strongman	£10,000	Belfast	NORTH DOWN
Belfast Mela 2014	£30,000	Belfast	BELFAST
Ballynahinch Harvest and County Living Festival	£18,000	Ballynahinch	DOWN
The Belfast Tattoo	£30,000	Belfast	BELFAST
On Home Ground - Seamus Heaney Festival	£15,000	Magherafelt	DERRY
NI International Airshow 2014	£21,000	Coleraine	COLERAINE
CultureTECH Festival 2014	£7,200	Derry	DERRY
Made In Belfast Carnival	£6,000	Belfast	BELFAST
Culture Night Belfast	£30,000	Belfast	BELFAST
Disability Pride	£15,000	Belfast	BELFAST
The Sloane Chocolate & Fine Food Festival	£9,000	Killinchy	ARDS
Belfast International Comedy Festival 2014	£14,500	Belfast	BELFAST
Belfast Restaurant Week 2014	£21,000	Belfast	BELFAST
City of Derry International Choral Festival	£15,000	Derry	DERRY
Food and Drink Show NI	£24,000	Belfast	BELFAST
Halloween Carnival	£18,000	Derry	DERRY
Cinemagic	£22,000	Belfast	BELFAST
Out to Lunch Festival	£18,000	Belfast	BELFAST
Festival of Football	£6,000	Belfast	BELFAST
Belfast Children's Festival 2015	£22,600	Belfast	BELFAST
St Patrick's Festival 2015	£30,000	Downpatrick	DOWN
Féile an Earraigh 2015	£30,000	Belfast	BELFAST
The Circuit of Ireland Rally 2014	£150,000	Various	Various
Belfast Welcomes The Giro D'Italia	£70,000	Belfast	BELFAST
Belfast Titanic Maritime Festival	£30,000	Belfast	BELFAST
Foyle Maritime Festival	£250,000	Derry	DERRY
The Northern Ireland Open Challenge	£100,000	Galgorm	BALLYMENA
the MAC International	£44,000	Belfast	BELFAST
International North West 200	£160,000	Coleraine	COLERAINE
August Feile	£130,000	Belfast	BELFAST

Project Name	Award	Town	LGD
Ulster Bank Belfast Festival at Queens	£175,000	Belfast	BELFAST
Ulster Grand Prix	£115,000	Dundrod	LISBURN
Dale Farm Milk Cup	£63,000	Various	Various

For the 2014/2015 events schedule, there are no sponsored events in Newtownabbey or Carrickfergus.

In addition to the events branding for Northern Ireland, there are also 9 key destinations in Northern Ireland, which include three with a coastal/ marine connection. These are:

- Causeway Coast and the Glens;
- Strangford Lough; and,
- Mourne Mountains.

While the Belfast Destination includes the Titanic and maritime heritage, the focus is more on the capital city as a destination. Detailed Destination Plans from 2012/3-2017/8 are available for these areas from the NITB website.

Key Issues, Problems and Future Trends

Whilst marine recreation has experienced recent growth, future growth and stability of the sector is dependent upon the general health of the UK economy (Defra, 2010). A strong economy results in consumers having more disposable income to spend on recreation and tourism activities. As a result of the global economic downturn, it is likely there will be some short-term fluctuations in participation in recreation and tourism activities. The largest growth in activity tourism can be expected to come from soft adventure activities such as walking, cycling and canoeing (NITB, 2011). Within the public domain, there is very little geospatial data relating to the location of these activities, however organisations like walking and canoeing produce electronic guides for trails in and around the Northern Ireland coast.

With infrastructure and technology in place to support the sector, it is expected to continue to grow over the long term. Furthermore, the availability of cheaper sports equipment is likely to continue to have a positive impact on participation levels in a number of sports, including canoeing, surfing and mountain biking (Noble and Ballo, 2009).

Climate change may also play a small part in increasing overall participation numbers. As the frequency of months when conditions are more comfortable for tourism in North-West Europe (MCCIP, 2009) improve, the warmer weather is more likely to attract visitors to coastal locations in Northern Ireland. The net result will be an extension of the tourist season beyond its traditional limits and opening up new destinations. Climate change as a positive influencing factor must be balanced against predictions of increased storminess, and the severity of storms. Provided increased storminess is predominantly in the winter months, this may not be a factor in future recreational boating trends.

The water quality of the Plan area is improving year on year despite the increase in recreational use of the marine and coastal environment in recent years. This increase is expected to continue into the future and, therefore, the importance of continuing high standards in beach water quality will be essential in maintaining the recreational value of the Plan area.

There is little information on future levels of recreational angling activity and countryside sports like wildfowling. Levels of activity are likely to vary in response to trends in the overall economy, changes in fish stocks as a result of improved fisheries management and changes in fish distributions in response to climate change. The nature and direction of these changes remains unclear.

5.13.7 Aviation

The following data sources have been used to characterise aviation within the Plan area:

- National Air Traffic Services (NATS) En Route plc (NERL) operational infrastructure interference maps/data (NATS website);
- UK Aviation Forecasts (DfT, 2011);

- Self assessment maps (NATS);
- Civil Aviation Authority (CAA) safeguarding maps (DECC website);
- CAA Policy and Guidelines on Wind Turbines (CAA, 2012);
- UK Aviation Forecasts (DfT, 2011); and,
- DTI Wind Energy and Aviation Interests - Interim Guidelines (CAA website).

Baseline Description

Air space and some specific aviation related sites are statutorily safeguarded from radar interference in the interests of national security and safe operation of passenger and military aviation by the Ministry of Defence (MoD), Civil Aviation Authority (CAA) and National Air Traffic Services (NATS). In order to make this process easier for developers and anyone planning on carrying out any activity that may interfere with radar, CAA and NATS En Route plc have created safeguarding maps and made them publically available so that any developer, or other activity sector, can clearly see if their particular activity may cause any radar interference.

Safeguarding maps produced for civilian sites indicate areas within which consultation is required before a development takes place. Consultation is required where development is proposed within (CAA, 2012):

- 30km of an aerodrome with a surveillance radar facility;
- 17km of non-radar equipped aerodromes with runways of 1100 m or more;
- 5km of non-radar equipped aerodromes with runways of less than 1100 m;
- 4km of a non-radar equipped unlicensed aerodrome with a runway of more than 800m; and,
- 3km of a non-radar equipped unlicensed aerodrome with a runway of less than 800m.

Similarly NERL has an interest in safeguarding communications, navigation and surveillance (CNS) facilities. Early consultation allows both aerodromes and en-route service providers to assess any impact that proposed developments may have on their CNS systems.

Northern Ireland has three main airports: Belfast City, Belfast International and City of Londonderry. Of the 211 million passengers passing through UK airports in 2011, 6.5 million used the main Northern Ireland airports (DfT, 2013).

Figure 16 shows the location of the airports and the safety zones surrounding them which overlap with the Plan area. These are at Belfast City, Belfast International, the City of Londonderry and Newtownards Airport. The city of Londonderry airport is located on the south bank of Lough Foyle and has a 17km consultation area. Belfast International airport is located on the east coast of the Plan area. Given that it is a larger airport than Derry city and has its own surveillance facility, it has a 30km consultation zone which extends 10km offshore from approximately Larne in the north to Portavogie in the south, including the Lough's of Belfast, Strangford and Larne.

The Plan area is within the range of Search and Rescue (SAR) helicopters, although there are no SAR helicopter bases in Northern Ireland, with the nearest being the naval base HMS Gannet at Prestwick, near Glasgow.

Key Issues, Problems and Future Trends

The number of air passengers using UK airports is forecast to recover from the recent downturn. It is predicted that in Northern Ireland, the number of passengers will rise to 7.9 million in 2020 and 15.5 million by 2050 (DfT, 2013). The new building and expansion of any airports in Northern Ireland may lead to increases in the safety zone areas, and potentially further overlap with the Plan area.

5.13.8 Military Activity

The following data sources have been used to characterise military activity within the Plan area:

- UKHO Practice and Exercise Area (PEXA) charts. Available in both digital and paper formats this data provides information relating to military activity within the Plan area (UKHO website); and,
- Oceanwise data layers for Military Practise Areas (2013).

Baseline Description

Ministry of Defence (MoD) PEXA areas can belong to the Army, Navy or Air Force and are used to practice manoeuvres, test armaments and to conduct any other general exercises. It is not possible to provide detailed information on the nature and extent of military activity throughout the Plan area. Therefore, when developers undertake site selection studies, consultation with the MoD will need be undertaken to obtain more detailed site specific information.

Military practice areas present in the Plan area are shown in Figure 17.

Military activity occurs extensively throughout the Plan area, particularly by the Navy who use the PEXA areas for submarine, general surface fleet and aircraft exercises (Figure 17). There is no ammunition firing in the PEXA areas. There are also no air force training areas within the Plan area.

The UK low flying system (LFS) allows training within the whole of the UK airspace and surrounding seas, to 3nm, from the surface to 2,000 feet above the ground or mean sea level. No designated Tactical Training Areas (TTAs) are present over the sea in the Plan area. There are no Air Surveillance and Control System (ASACS) within 74km of the Plan area.

Two weapons ranges are located in the Plan area, the Magilligan and Ballykinler ranges which are controlled by the Army. Both Magilligan and Ballykinler ranges are byelawed areas, whereby certain civilian activities are restricted. The MoD is currently undertaking a review of the practice and exercise areas under byelaw and is also considering proposing new byelawed areas. No information is yet available on the location of proposed new byelawed sites.

Key Issues, Problems and Future Trends

Depending on the MoD's review of byelawed areas the restrictions in place at the Magilligan and Ballykinler ranges may change. There is no information about the location of submarine scuppering, however information of other marine dumping activities has been included on Figure 14. When offshore developers undertake site selection studies, consultation with the MoD should be undertaken to obtain more detailed up-to-date information.

5.13.9 Coastal Defence

The following data sources have been used to characterise coastal defences within the Plan area:

- National Ecosystem Assessment (NEA): Economic Analysis. Coastal Margin and Marine Habitats (Beaumont et al. 2010);
- Coastal Erosion in MCCIP Annual Report Card 2010-11, (Masselink and Russell, 2010);
- Northern Ireland State of the Seas Report (Northern Ireland Environment Agency (NIEA) and Agri-Food and Biosciences Institute (AFBI), 2011);
- UKCP09 Marine and Coastal Projections Summary (MCCIP, 2009); and,
- Charting Progress 2 (Defra, 2010).

Baseline Description

Coastal defence measures are used to prevent or reduce flood risk and coastal erosion. Defences may involve hard structures such as concrete seawalls or soft engineering such as beach replenishment and managed realignment. Protection of infrastructure by sea defences is widespread in Northern Ireland.

In Northern Ireland, responsibility for dealing with coastal erosion lies with several departments. This means that information on distribution, expenditure and employment is not centrally collected for this sector. Coastal defences that reduce the risk of flooding on extensive areas of farmland, residential or commercial areas are

the responsibility of the Rivers Agency of DARD. The Rivers Agency maintains 26 km of sea defences to avoid the flooding of low-lying coastal lands. Where infrastructure is vulnerable to coastal erosion the relevant authority is responsible for maintaining defences, for example defences that protect roads are the responsibility of the Roads Service. The railway network also impinges on the coast in certain areas and those stretches are managed by Translink (NIEA and AFBI, 2010). Otherwise individual landowners are responsible for their own coastline.

Coastal defence projects often have substantial impacts on the coastal environment, for example from construction, physical footprint, changes in geomorphology and coastal squeeze, as well as other forms of habitat degradation and loss. As such any projects are subject to rigorous assessments i.e. Environmental Impact Assessment (EIA) and regulatory review.

Northern Ireland's coast is protected by both natural and man-made defences. In 2006, 68% (521km) were natural and 32% (243km) were manmade (DOE, 2011). These figures do not total 650km (the total length of the coast) but 764km due to certain parts of the coastline having more than one type of defence e.g. a combination of seawalls and rock armour for maximum protection of a town, or a hard structure placed behind a beach. The most common man-made structures are concrete sea wall which comprises 14% of the coastline followed closely by rock armour which comprises 12%.

Table 34 : Coastal defences on Northern Ireland coastline : Natural and manmade structures

	Structure on Coast	Length of Structure along Coast (km)	Total Length (km)	Percentage of Structure along Coast (%)	Total Percentage (%)
Natural	Natural (low relief)	270	521	35	68
	Natural (sand)	131		17.21	
	Natural (high relief)	119		16	
Manmade	Seawall (concrete)	105	243	14	32
	Rock armour	95		12	
	Seawall (rocky)	20		3	
	Levees	6		<1	
	Revetments	6			
	Rubble	4			
	Groynes	4			
	Wave breaker	2			
	Slipway	1			
	Railway sleepers	1			

Source: DOE (2011)

Coastal erosion is a complex process that has a variety of causes. Coastal erosion is not a generic phenomenon, such as climate change and sea level rise which is occurring all over the world. Instead, coastal erosion is a local process as a result of many pressures acting cumulatively to produce different impacts in different areas. A large proportion of the UK coast is currently suffering from erosion (17% in the UK; 30% in England; 23% in Wales; 20% in Northern Ireland; 12% in Scotland) (Masselink G., and Russell, P. 2010). Table 34 shows the level of coastal erosion and protection along Northern Ireland's coastline. A substantial proportion of the Northern Ireland coastline (almost 100 km) has been altered by coastal defence structures (Table 35). This is particularly prevalent on soft coastlines (NIEA and AFBI, 2010).

Table 35 : Coastal erosion and protection in Northern Ireland

Coast length (km)	Coast length which is eroding (km)	Coast length which is eroding (%)	Coast length with defence works & artificial beaches (km)	Coast length with defence works & artificial beaches (%)
456	89	19.5	90	19.7
Islands with surface area of less than 1km^2 and inland shore (estuaries, loughs etc.) where the mouth is less than 1km wide are not included in the analysis.				
Source: Masselink G., and Russell, P. 2010				

Coastal defence projects can cause negative impacts on geomorphology and the coastal environment. These projects can lead to the covering of geological sections and changes to the natural coastal regime, with consequent impact on other areas of coastline. It would be impractical and undesirable to protect all rock exposures, but the EIA process helps to ensure that the best and most vulnerable of the features are conserved and appropriately managed.

Key Issues, Problems and Future Trends

The need for coastal defences is dependent on the stability of beaches and the impacts of flooding and coastal erosion on human activities along the coast. Climate change, predicted to lead to a rise in sea levels, possible increased storminess and changes to wave conditions (MCCIP, 2009), may alter coastal erosion rates, the incidence and severity of flooding events, and increased steepening of intertidal profiles, resulting in increased demand for coastal defences.

Projections of relative sea level change in the UK, including Northern Ireland, are shown in Image 6. For the UK, the most up to date evidence base for the UK's future climate predictions is provided by the UK Climate Projections 09 (UKCP09) (MCCIP, 2009). The medium scenario for all years predicts that mean sea levels in Northern Ireland could rise by between 9cm and 69cm by 2080 (UKCP09). In the waters around Northern Ireland, the projected trends suggest a decrease in wave height to the North and no significant change in the Irish Sea. These tentative projections are, however, based on maps with a very coarse grain, and considerable uncertainty is reported.

In light of these projections, current spending on coastal defences will need to double by 2080. The use of managed realignment and other forms of soft coastal defence measures are likely to increase (Defra, 2010). Funding for Flood and Coastal Erosion Risk Management (FCERM) to mitigate flood risk and to provide greater coastal resilience to climate change and its anticipated flood impacts in Northern Ireland will therefore become increasingly important.

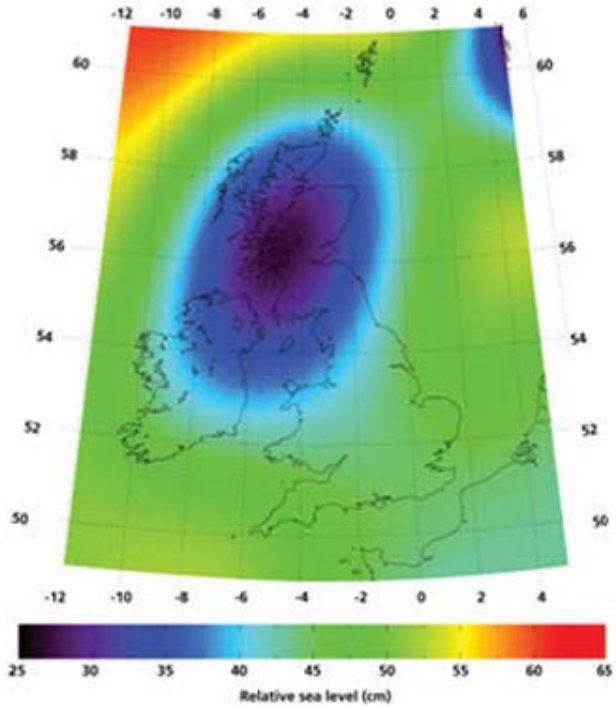


Image 6 : Central estimate of relative sea level change (cm) by 2095 (medium emission scenario) (Source: MCCIP website)

5.13.10 Noise

Anthropogenic noise on land, baseline information sources include:

- Noise Mapping for Northern Ireland (www.noise.ni.gov.uk);
- Belfast Harbour Environmental Report 2013 (www.belfast-harbour.co.uk); and,
- Noise complaint statistics (NISRA website).

Baseline Description

The Environmental Noise Regulations (Northern Ireland) 2006 set out the requirements and responsibilities associated with the production of strategic noise maps and action plans as defined by European Directive 2002/49/EC. Under the Regulations, noise maps and noise action plans must be prepared over a 5 year rolling cycle. Noise mapping has been undertaken for all agglomerations with more than 100,000 inhabitants. As part of the Belfast agglomeration, Belfast Harbour was included because the harbour site contains approximately 117 individual industrial sites. Noise mapping has been produced for areas which surround the Belfast Harbour site pertaining to daytime, evening and night time noise. In 2013, Belfast Harbour did not receive any noise nuisance complaints.

In the terrestrial environment, excessive noise is considered a statutory nuisance. In relation to the activities which the Plan area, it is expected that terrestrial noise will be relevant to how marine activities which interact with ports (either fishing or freight).

Of all the complaints relating to transport in Northern Ireland, originated in the coastal LGDs. Complaints relating to aircraft solely originated within Belfast LGD and all the rail transport complaints originate within the coastal LGDs.

Key Issues, Problems and Future Trends

Data collected on airborne noise as part of noise mapping, is primarily in relation to transport and industry. It does not include information on port noise complaints or contain information on how noise could impact communities.

For the Plan area, noise complaints for industrial and transport processes correlates with marine LGDs which have industrial processes within their environs.

5.13.11 Lighting

Like noise, lighting resulting from marine activities relates primarily to port activities, where in order to fulfil their function, they can generate disturbance which can be considered a nuisance. In relation to lighting, it is proposed the following information sources are used:

- Guidance to District Councils on Part 7 (Statutory Nuisances) of the Clean Neighbourhoods and Environment Act (Northern Ireland) 2011; and,
- Guidance for Fisheries Protection during Development Works (Foyle and Carlingford areas).

Baseline Description

Lighting in both the marine and terrestrial environment poses nuisance to both people and species of conservation interest. Subsection 63(1)(h) of the Clean Neighbourhood and Environment Act (Northern Ireland) 2011 relates to nuisance associated with artificial light, whereby

"Artificial light emitted from premises so as to be prejudicial to health or a nuisance".

This is not the same as light pollution, where artificial light sources interfere with someone's use of their property and/ or might be prejudicial to someone's health. Light pollution could be defined as any form of artificial light which shines outside the area it needs to illuminate, including light that is directed above the horizontal into the night sky creating sky glow or which creates a danger from glare. Within the study area of the Plan, light nuisance complaints can be generated from:

- Domestic security lights;
- Commercial security lights;
- Healthy living and sports facilities;
- Domestic decorative lights;
- Exterior lighting of buildings; and,
- Decorative lighting of landscapes.

To compare this to the activities which will be managed as part of the Plan, it is expected that complaints relating to commercial sources of light will be most relevant. Where a nuisance is reported, investigated and identified as statutory nuisance, an abatement notice is served which can require:

- Prevention or restriction of the occurrence of a nuisance;
- Abatement of a nuisance;
- Prevention or restriction of the recurrence of a nuisance; or,
- Abatement and prevention or restriction of the recurrence of a nuisance.

The impact of lighting from ports may have an ecological element but in the context of the Plan, it is nuisance from lighting at ports which is considered most relevant.

Key Issues, Problems and Future Trends

There are currently no publically available statistics relating to statutory nuisance complaints from lighting relating to port activity, however increased illumination in these areas may result in adverse impacts to neighbouring communities.

5.13.12 Marine Litter

The following data sources have been used to characterise marine litter within the Plan area:

- DOE website http://www.doeni.gov.uk/index/protect_the_environment/natural_environment/marine_and_coast/marine_policy/marine_litter_strategy.htm;
- Northern Ireland State of the Seas Report (NIEA and AFBI, 2011);
- Butterworth, A., Clegg, I., & Bass, C. (2012). Untangled – Marine debris: a global picture of the impact on animal welfare and of animal-focused solutions. London: World Society for the Protection of Animals;
- Marine Survey Northern Ireland 2012/13 (Tidy Northern Ireland, 2013);
- Keep Northern Ireland Beautiful website http://www.keepnorthernirelandbeautiful.org/;
- Marine Conservation Society (MCS) website. Beachwatch Big Weekend http://www.mcsuk.org/what_we_do/Clean+seas+and+beaches/Reports+and+downloads/Reports+and+downloads;
- Oko Institute (2012). Study on land sourced litter in the marine environment. Review of sources and literature. Freiburg, Oko Institute e.V; and,
- Charting Progress 2 (Defra, 2010).

Baseline Description

Marine litter consists of items arising from human activity, deliberately discarded or unintentionally lost, which end up in the sea and on beaches. Typical examples are plastics, wood, metals, glass, rubber, fishing gear, clothing and paper. Semi-solid remains of various oils and other chemicals sometimes occur in the sea and on the shore but these are not defined as litter.

Litter comes from a variety of sources, including direct littering by beach visitors, discarded or lost gear from fishing vessels, illegal dumping by ships and small marine craft, discharges from combined sewer overflows and fly-tipping. Rivers and streams also carry litter into coastal waters, so urban areas can make a significant contribution to marine litter. Subsequently, around 80% of litter recorded on beaches is deemed from land-based sources (Oko Insitute, 2012).

Much of the litter is deposited by incoming tides along the shoreline, whilst sand dunes, groynes, rocky areas and promenades also act as traps, allowing wind-blown litter to accumulate. Litter may be transported over long distances by currents and the wind.

Marine litter is a global problem which poses an increasing threat to human health and safety, ecosystem services and sustainable livelihoods. The Northern Ireland Marine Litter Strategy is a co-ordinated response which aims to address the problem at a local level by reducing the levels of litter entering the sea and removing litter which is already there. The Strategy contains measures designed to change attitudes and behaviour towards littering. This will be done through education, adequate provision of bins, fining offenders and collecting data on the extent of the problem.

Accurate and reliable data is essential to properly manage and assess the levels of litter present in the marine environment. Data is needed to inform policy development and to evaluate progress towards meeting policy and legislative commitments such as achieving good environmental status (GES) under the Marine Strategy Framework Directive (MSFD).

Keep Northern Ireland Beautiful (formerly Tidy Northern Ireland) undertook the first systematic survey of litter on the coastline of Northern Ireland carried out as part of the DOE's response to the requirements of descriptor 10 of the MSFD which relates to marine litter. During the period September 2012 – April 2013 three surveys were carried out on 14 reference beaches around Northern Ireland using the internationally

adopted OSPAR survey methodology for reporting under the MSFD. The average number of pieces of litter observed per kilometre surveyed was 4,033. Beaches adjacent to fishing harbours surveyed had a much higher average of 9,545 items/km, almost four times as much as on the other beaches surveyed.

Keep Northern Ireland Beautiful also works to change behaviour towards litter. They work specifically with LGDs to address beach litter through awards like the Blue Flag scheme.

NIEA carries out surveys of identified bathing beaches throughout the bathing season which runs from 1st June through to the 15th September. The survey is conducted using a rapid scan technique of counting and categorising litter while the bathing water sample is being collected. The evidence from this programme neither shows improvement nor reduction in the quantities of litter on Northern Ireland beaches (NIEA and AFBI, 2011). This programme has been in place since 1999. Over that time, an average of 8,198 items have been recorded annually, 42% of which was packaging (food wrappers, carrier bags, paper and plastic wrapping) and 39% was plastic.

The Marine Conservation Society uses volunteers to undertake an annual survey of beach litter over a single weekend "Beachwatch Big Weekend". In 2013, the number of volunteers that took part in Northern Ireland was 115 and 5,763 items of litter were collected.

In 2009, AFBI and NIEA completed a litter survey during fisheries trawl surveys of the Irish Sea (NIEA and AFBI, 2011). This provides a useful snapshot and demonstrates that the problem with marine litter is not restricted to our coastline.

Key Issues, Problems and Future Trends

Marine litter poses a threat to marine animals and birds (WSPA, 2012). Marine mammals, birds, turtles, sharks and other large fish species are all documented to have ingested or become entangled in human-originated debris that has either been deliberately discarded or lost in the oceans. Plastic bags are often found in the guts of Leatherback turtles *Dermochelys coriacea* washed up on the UK's shores. When dead North Sea Fulmars *Fulmaris glacialis* were examined, 96% were found to have pieces of plastic in their stomachs (NIEA and AFBI, 2011).

Once in the environment, plastic gradually breaks down into ever smaller pieces which persist for many years, so that they will continually build up as time goes by. Added together, all these tiny pieces offer a huge surface area that can absorb chemical substances from the seawater. Marine life may mistake plastic particles for their natural food and in this way, potentially hazardous chemicals enter the marine and ultimately human food chain.

The movement of litter by ocean currents has contributed to the invasion of alien species all over the world (NIEA and AFBI, 2011). The slow movement of currents means animals and plants attached to litter are not subject to temperature shocks as they cross climate zones allowing them to survive and settle outside their natural range. In addition to harming marine life, large items of litter can damage fishing gear and vessels through collisions. Smaller items can block seawater intakes and evaporators resulting in engine failure, costly repairs and in some cases perhaps life-threatening situations.

Marine litter has economic, environmental and aesthetic impacts. What is not yet clear is the full extent of these impacts in the UK (Defra, 2010).

While there is central data regarding marine litter, there is very little information about beach litter, other than the Northern Ireland Litter Survey 2012, which contains transects on beaches.

5.14 Material Assets

5.14.1 Introduction

Material Assets has been split into the headings which encompass existing and proposed infrastructure pressures within the coastal and marine environment. These headings are:

- Cables and Pipelines;
- Terrestrial Transport Network;
- Aggregates;
- Underground Offshore Energy Storage;

- Petroleum Exploration Licensing;
- Offshore Renewable Energy;
- Carbon Capture and Storage
- Compressed Air Energy Storage; and,
- Waste Water Treatment and Discharges.

5.14.2 Cables and Pipelines

The following data sources have been used to characterise the cables and pipelines that occur within the Plan area:

- UK Hydrographic Office (UKHO) digital charted data;
- Kingfisher Cable Awareness Charts (KIS-ORCA);
- UK Digital Energy Atlas Library (UKDEAL) data;
- Subsea Cables UK data;
- Marine Irish Digital Atlas website (MIDA);
- Phoenix Natural Gas Ltd. Licence for the Conveyance of Gas in Northern Ireland (undated); and,
- Charting Progress 2 (Defra, 2010).

Baseline Description

The UK MPS states "Submarine cables are part of the backbone of the world's power, information and international telecommunications infrastructure, and socially and economically crucial to the UK. Submarine telecommunication cables carry more than 95% of the world's international traffic including telephone, internet and data, as well as many services for the UK's local communities, major utilities and industries. The transatlantic cables landing in the UK carry more than 70% of Europe's transatlantic traffic."

The location of submarine telecommunications, electricity interconnectors and oil and gas pipelines within the Plan area are all shown in Figure 18. The main cable systems that occur within the Plan area are detailed in Table 36. A number of telecommunications cables in the Plan area form an integral part of Northern Ireland's communications network, linking Northern Ireland with the USA, the UK and the Isle of Man.

Where the location of these communication links are publically available, they are presented on Figure 18. This direct fibre optic cable link provides Northern Ireland businesses with access to high speed data services with guaranteed pricing, availability and latency until December 2018. The link enables Northern Ireland companies to compete in the international marketplace and enhances the attractiveness of Northern Ireland as an inward investment location.

The Hibernia 'A' telecom cable, connecting Europe and the USA, also passes in and out of the Plan area following the territorial limit. Hibernia Networks, a provider of global communications services, completed phase one of the Project Kelvin cable deployment in 2009, directly connecting Northern Ireland to North America via a short section of cable from the north coast to the Hibernia 'A' system (Hibernia Networks website).

There are two major sub-sea electricity interconnectors in the Plan area, both of which are operated by Northern Ireland Electricity (NIE). The Rathlin interconnector connects Rathlin Island to the main Northern Ireland electricity grid and the Moyle interconnector links Great Britain and Northern Ireland grids across the North Channel.

Table 36 : Main cable systems occurring in the Plan area

Cable	Flow	Operator	Infrastructure Landing Location
Rathlin interconnector	Power	NIE	-
Moyle interconnector	Power	NIE	-

Cable	Flow	Operator	Infrastructure Landing Location
(North & South)			
Scotland – N. Ireland 1	Telecommunications	BT	Port Patrick to Danaghadee
Scotland N. Ireland 2	Telecommunications	BT	Larne to Girvan
Manx – N. Ireland	Telecommunications	BT	Ballyhornan to Peel
Lanis 2	Telecommunications	C & W	N. Ireland to Peel
Lanis 3	Telecommunications	C & W	N. Ireland to Troon
Sirius North	Telecommunications	Virgin Media/ NTL	Ardrossan to Carrickfergus
Hibernia 'A'	Telecommunications	Hibernia Atlantic	-

There are three major gas pipelines within the Plan area. The Scotland to Northern Ireland natural gas transmission Pipeline (SNIP) operated by Premier Transmission Ltd runs from Corsewall Point in Scotland to Larne in Northern Ireland across the North Channel (see Figure 18). Northern Ireland imports all of its gas through this pipeline which also supplies two of Northern Ireland's three power stations– Ballylumford at Larne and Coolkeeragh at Londonderry. Kilroot at Carrickfergus uses coal which is shipped directly to it and also via the Port of Belfast. All three power stations are located at the coast and have a total dispatchable capacity of 2286 MW. All three can also use oil as an alternative fuel which is shipped directly to the power stations.

The other two pipelines cross the offshore Marine Plan area and connect Scotland to Ireland (see Figure 18). There is also a pipeline known as the Belfast pipe-line consisting of three sections, which runs for 26 kilometres from the Pressure Reduction Station at Ballylumford power station to (and including) the Pressure Reduction Station at Torytown, and for 9 kilometres across Belfast Lough from Torytown to (and including) the Knocknagoney Pressure Reduction Station, and for 3 kilometres across Larne Lough from the Pressure Reduction Station at Ballylumford power station to (and including) the Pressure Reduction Station at Curran Point, Larne (Phoenix Natural Gas Ltd., undated) (Figure 18).

Key Issues, Problems and Future Trends

According to Subsea Cables UK, around 95% of international trans-ocean telecommunications traffic is carried by cable and, hence, submarine cables will be vital for the foreseeable future. However, there is little information available on how this sector may change in the future. The further development of more resilient networks requires a greater reliance on a number of submarine cable routes rather than a few, and major domestic and international systems are now being installed. Future developments in telecom cables are likely to focus on upgrading and increasing the capacity of existing cables along existing routes. The extent to which new cables will be laid in Northern Ireland waters is not known.

Future offshore renewable energy projects in Northern Ireland (see Section 5.14.7) off the north and south-east coast and elsewhere in the UK, including large wind farm developments in the Irish Sea, will require subsea cables to connect the offshore electricity generation to the onshore electricity grid. This may necessitate significant upgrades to the electricity grid system, including the development of High Voltage (HV) interconnector cables linking islands to the mainland or Northern Ireland to rest of the UK and will probably result in an increased number of subsea cables in the study area. The ISLES project, for example, is considering options for an offshore grid connecting Northern Ireland, Scotland, Republic of Ireland and Wales.

There is currently one proposed marine power cable development which crosses Northern Ireland's territorial waters (Figure 18). Scottish Power Transmission and National Grid have proposed to build the Western High Voltage Direct Current (HVDC) Link with the aim of bringing renewable energy from Scotland to Wales and England (SP Energy Networks website). As well as being the longest 2,200 megawatt (MW) capacity HVDC cable in the world, it will also be the first subsea link to use a DC voltage level of 600kV. There will be two cables, which for most of the route will be laid in a paired bundle. Where it is not possible to bundle the cables together, the separate cables will be laid up to 50m apart. The cables will be buried approximately one metre below the seabed for the entire length. At crossings with existing cables and pipelines, or where seabed conditions prevent burial of the cable, it will be laid on the seabed and covered by rock armour to protect it from damage and minimise interference with fishing activities. Geotechnical and geophysical survey work on the marine route was completed in 2012. A survey for Unexploded Ordnance (UXO) along

the cable route in the Beaufort Dyke and Liverpool Bay areas was undertaken in 2013 using ROV equipment. The HVDC link is due to be operational by 2016 (Scottish Power website).

Mutual Energy, which operate the Moyle Interconnector, plan to lay 2 new Low Voltage (LV) cables along the general route of the existing combined HV/LV Moyle interconnector cables between Northern Ireland and Scotland. It is anticipated that the new cables will be in place and operational by 2017.

The UK MPS notes "A secure, sustainable and affordable supply of energy is of central importance to the economic and social well being of the UK. The marine environment will make an increasingly major contribution to the provision of the UK's energy supply and distribution. This contribution includes oil and gas sectors which supply the major part of our current needs and a growing contribution from renewable energy and other forms of low carbon energy supply in response to the challenges of tackling climate change and energy security. Contributing to securing the UK's energy objectives, while protecting the environment, will be a priority for marine planning."

5.14.3 Terrestrial Transport Network

The following datasets have been used to characterise the Transport Network in Northern Ireland, this is different baseline characterisation because the transport network links Northern Ireland to the Republic of Ireland and extends beyond the 30km buffer proposed to collect baseline information.

The following data sources have been used to characterise the terrestrial transport network in Northern Ireland:

- Regional Transportation Strategy for Northern Ireland 2002 – 2012;
- Ensuring a Sustainable Transport Future – A New Approach to Regional Transportation; and,
- Northern Ireland Climate Change Risk Assessment (CCRA) (DOE 2012).

Baseline Description

The Regional Transportation Strategy (RTS) for Northern Ireland 2002 – 2012 identified the strategic transportation investment priorities for the next 10 years (until 2015). This was achieved by identifying schemes to address the years of under-investment in roads infrastructure. The strategy identified transport linkages (integrating accessibility between rail and road networks), improvements to public transport (provision of modern trains, buses, cycle routes and bus lanes) and strategic highway improvements.

Within the strategy, environmental priorities of 2002 were stated and the strategic approach to their integration was included. As a result, three further transport plans were produced:

- The Regional Strategic Transport Network Transport Plan;
- The Belfast Metropolitan Transport Plan; and,
- The Sub-Regional Transport Plan.

The Regional Strategic Transport Network Transport Plan is a framework for connecting centres of economic and social activity and the major transport hubs. The Belfast Metropolitan Transport Plan is the local transport plan for the Belfast Metropolitan Area and the Sub-Regional Transport Plan which deals with the transport needs of the whole of Northern Ireland which the exception of the Belfast Metropolitan Area.

Ensuring a Sustainable Transport Future has taken a different approach to future transport planning in Northern Ireland. Rather than identify schemes and developments which would change how traffic flows around Northern Ireland, Ensuring a Sustainable Transport Future has instead strategic aims and associated objectives. The higher aims are:

- Support the growth of the economy;
- Enhance the quality of life for all; and,
- Reduce the environmental impact of transport.

Ensuring a Sustainable Transport Future addresses greenhouse gas reduction from transport, biodiversity protection and a reduction of water, noise and air pollution. This is supposed to be synchronous with the RDS 2035.

A new approach to the long term development of regional transport in Northern Ireland was introduced with the plans in a strategic document 'Ensuring a Sustainable Transport Future - A New Approach to Regional Transportation' the publication sets out how the Department will develop regional transportation beyond 2015 when the current transport plans reach their conclusion.

The New Approach will steer decision making on strategic transportation interventions and link to the Programme for Government and the Regional Development Strategy objectives. The New Approach will be used to make decisions on transportation investment from 2015.

Key Issues, Problems and Future Trends

The Regional Transportation Strategies have both addressed the social and economic implications of underinvestment in transport infrastructure by initially identifying projects to be undertaken and then identifying the funding sources to fund the changes. The strategies have also tried to address the environmental issues which can arise from transport. Though all roads resulting from the strategies have been and will be planned, particularly in relation to how they will impact existing water quality and flooding regimes, roads which are outwith the strategies have not been strategically examined in relation to climate change resilience. The transport network has been identified as vulnerable to climate change within the Northern Ireland Climate Change Risk Assessment (2012).

To illustrate this, in January 2014, a tidal surge in associated with large and powerful waves on the east coast of Northern Ireland, resulted in a 40m section of the A2 Whitechurch Road in Ballywater being undermined. The A20 Portaferry Road was also undermined by erosion. While maintenance work has been undertaken, the impact on other coastal transport infrastructure is still being addressed.

5.14.4 Aggregates

The following data sources have been used to characterise the aggregates within the Plan area:

- Marine Aggregates –Capacity & Portfolio 2013 (The Crown Estates (TCE)), 2014; and,
- The strategic importance of the marine aggregate industry to the UK. BGS, 2007.

Baseline Description

The Crown Estate (TCE) owns the mineral rights to the seabed extending to the edge of the UK continental shelf and issues consents for non-exclusive sampling and licences for commercial aggregate extraction. The planning and consenting process is, however, the responsibility of Government, who through a consultation process determines whether an area can be used for aggregate extraction.

TCE has identified aggregate resources within the Plan area (fine aggregates (fine sands)) however there is no publically available information on the economic suitability of the reserves, because there are no licensed aggregate extraction sites in the Plan area (TEC 2014).

There are also no landings of sand and gravel dredged from the UK Continental Shelf into Northern Ireland (TEC 2014). There has been some interest in marine aggregates within the Plan area in the past and an application was received proposing dredging in Northern Ireland waters (BGS, 2007). However, a decision on this application has not yet been made public.

While there are no licences for extraction, navigation dredging's have been used within the Belfast Harbour Estates for various geotechnical stabilisation works.

Key Issues, Problems and Future Trends

Due to the commercially sensitive nature of aggregates licences, there is no information about those currently being assessed in the public domain. Aggregates at present, are not commercially extracted in Northern Ireland territorial waters but have been imported for use in Northern Ireland (Belfast Harbour). If they become available within the SA cycle, information about them will be included.

5.14.5 Underground Offshore Gas Storage

The following information sources have been used to characterise underground gas storage within the Plan area, these are:

- www.islandmageestorage.com.

Baseline Description

In October 2012, the landward development of a subsea natural gas storage facility was given planning permission by the Northern Ireland Planning Service. The facility is still subject to a marine licence determination, a Water Order consent and a seawater abstraction licence.

Key Issues, Problems and Trends

The location of the Islandmagee Gas Storage facility has been determined by the local geology in the Larne area and is not expected to become a major marine industry within the Northern Ireland coastal area. The proposed gas storage facility consists of seven storage caverns, each approximately 80 metres in diameter and 160 metres in height, created by controlled leaching, or dissolving, of rock salt beneath Larne Lough. The thick salt layer occurs at depths between approximately 1500 and 1750 metres beneath the lough bed. The proposed construction of the storage facility has proved contentious because of the proposal to discharge large volumes of hyper-salinated water (called brine) produced by the leaching process, into the sea off the coast of Islandmagee.

5.14.6 Petroleum Exploration Licensing

The following data sources have been used to characterise the petroleum licensing regime within the Plan area:

- DETI Oil and Gas Licensing in the Internal Waters of Northern Ireland (Belfast and Larne Loughs) SEA scoping report http://www.sealoughs.co.uk/;
- DETI website (http://www.detini.gov.uk);
- DECC website (https://www.gov.uk/government/organisations/department-of-energy-climate-change); and,
- UK Offshore Energy Strategic Environmental Assessment (SEA) 6: Environmental Report (DECC, 2011).

Baseline Description

There are three active onshore petroleum licences which encompass the shoreline in Northern Ireland, these are:

- PL1/10 – Infrastrata plc, Cairn Energy plc, Brigantes Energy Ltd and Terrain Energy Ltd (Central Larne – Lough Neagh Basin Area);
- PL3/10 – Rathlin Energy Limited (Rathlin Basin mainland area); and,
- PL5/10 – Providence Resources UK Ltd (Rathlin Island area).

In addition to licence PL5/10, granted by DETI, Providence Resources UK Ltd has also gained a Frontier Licence (licence no P1885) covering six blocks in the waters surrounding Rathlin Island from the DECC which has licensing powers for the UK offshore/ territorial waters which include Northern Ireland waters (see yellow blocks in Image 7 below).

In the 27th Offshore Licensing Round, DECC awarded a licence covering five blocks in the North Channel to a consortium led by Nautical Petroleum plc (see pink blocks in Image 7). The 28th Offshore Licensing Round was opened in January 2014 and closed in April 2014, 2728 blocks have been offered in total. While

there are no details of the blocks which have been licenced, the areas in blue in Image 7 are those which have been offered as part of the 28th round.

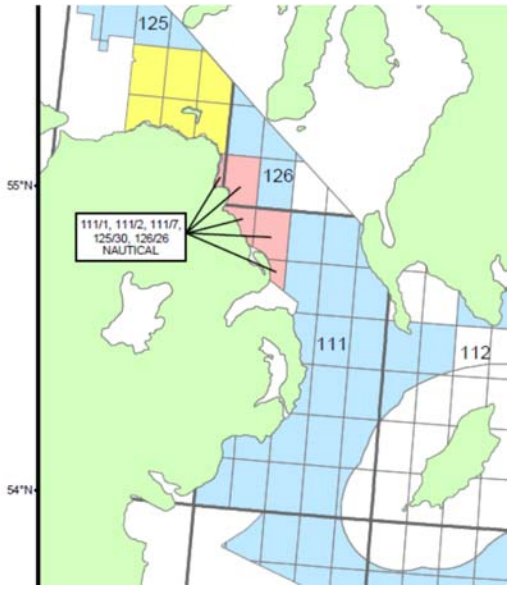


Image 7: Petroleum Licensing Blocks (Source: DETI)

Key Issues, Problems and Future Trends

Within the vicinity of the Northern Ireland coast unlicensed blocks in Quadrants 108,109,111,112,125 and 126 have been made available for licensing and were included in the Offshore Energy SEA 6 (DECC, 2011).

The licensing regime for the internal waters (i.e. Belfast and Larne Loughs) is currently being progressed by DETI and may result in some or all of these waters being made available for petroleum licensing in the future, subject to the outcome of the current SEA of DETI's Plan for Petroleum Licensing in the Internal Waters of Northern Ireland.

Petroleum licensing regimes exist which may lead to oil and gas discoveries, future production and eventual decommissioning in and around the Plan area. It should be noted that, whilst there have been significant oil and gas shows, no commercial discoveries have yet been made in or around Northern Ireland. It is possible that future operations will be restricted to short term exploration and not lead to production facilities and as a result, there will be a limited positive impact to the Northern Ireland economy.

5.14.7 Offshore Renewable Energy

The following data sources have been used to characterise potential offshore renewable energy development within the Plan area:

- SeaGen website http://www.seageneration.co.uk/;
- The Crown Estate website www.thecrownestate.co.uk;
- Offshore Renewable Energy Strategic Action Plan 2012-2020 (DETI, 2012);
- Strategic Environmental Assessment of Offshore Wind and Marine Renewable Energy in NI (SEA) (DETI, 2009) www.offshorenergyni.co.uk;
- Habitats Regulations Assessment of the Offshore Renewable Energy Strategic Action Plan (DETI, 2011). http://www.detini.gov.uk/deti-energy-index/renewable_electricity-2/offshore.htm;
- Regional Locational Guidance (DETI, 2011) http://www.detini.gov.uk/deti-energy-index/renewable_electricity-2/offshore.htm;
- First Flight Wind http://www.firstflightwind.com;
- Tidal Ventures Ltd http://www.tidalventures.com/; and,

- Fairhead Tidal Energy Ltd http://www.fairheadtidal.com/.

Baseline Description

The UK has a legally binding target that 15% of its energy consumption should come from renewable sources by 2020 (EU Renewable Energy Directive, 2009). Northern Ireland's Strategic Energy Framework (SEF) (2010) target of 40% renewable electricity by 2020 will contribute to the UK Member State target. The SEF target is technology neutral and it is expected that offshore renewable will contribute by 2020 and beyond.

In 2009, a Strategic Environmental Assessment (SEA) of the draft Offshore Renewable Energy Strategic Action Plan was completed. The location of potential renewable resources identified in Northern Ireland waters and assessed within the SEA is shown in Figure 19. A Habitats Regulations Assessment (HRA) was also carried out. In light of these assessments, it was concluded that up to 1200MW of installed capacity could be generated by 2020 from offshore wind and tidal energy in Northern Ireland waters without significant adverse effects on the environment or other marine users. The SEA identified two main offshore wind Resource Zones located off the North and the East Coasts which could potentially offer up to 900MW of installed capacity. Other locations were identified as suitable for commercial scale tidal development in the Plan area up to a potential of 300MW of installed capacity. Some smaller sites were considered unsuitable for commercial development but could be considered for test and demonstration purposes. Wave energy has been identified in the north/ west of the area of the Plan but it is limited and is not considered as a commercial scale development opportunity.

The world's first commercial scale grid connected demonstration tidal stream turbine generator was installed at Strangford Lough, Northern Ireland in 2008. The 1.2MW SeaGen tidal energy demonstration project continues to generate renewable electricity and has been subject to an extensive, externally monitored and reported on monitoring regime. Following the completion of the above SEA and HRA, The Crown Estate, as owners of the seabed, opened the first Northern Ireland offshore renewable energy leasing round and, in October 2012, announced development rights for three offshore renewable energy sites which could together deliver up to 800MW of renewable electricity. These are as follows:

- First Flight Wind Limited, which is a joint venture between Dong Energy of Denmark and RES-B9 (NI) Offshore Wind Limited, for a potential offshore wind farm of up to 600MW off County Down;
- Tidal Ventures Limited, which is a joint venture between OpenHydro Group and Bord Gais Energy for a potential 100MW tidal opportunity at Torr Head; and,
- DP Marine Energy Limited with DEME Blue Energy for a further potential 100MW tidal stream energy project off Fair Head.

Key Issues, Problems and Future Trends

The Strategic Energy Framework 2010 has set a target to increase the amount of electricity from renewable sources to 40% by 2020 (DETI, 2010). This target is technology neutral but as set out in the Offshore Renewable Energy Strategic Action Plan 2012-2020, it is expected that the above projects, if successful in gaining the necessary consents and licences, will contribute to this target. These offshore projects will also contribute to carbon reduction, energy security and diversity and local economic benefits and supply chain opportunities for Northern Ireland companies and communities

In July 2014, The Crown Estate announced that it has agreed seabed rights:

- For six new wave and tidal current demonstration zones, which for the first time will enable locally-based organisations to manage and sub-let parts of the seabed to a range of wave and tidal stream developers; and,
- For five new wave and tidal current sites, each with the potential to deliver a project of between 10 and 30 MW.

The locations for the demonstration zones and project sites include one in Northern Ireland: a tidal stream project site in Strangford Lough.

5.14.8 Carbon Capture and Storage

The following data sources have been used to characterise the carbon capture and storage (CCS) within the Plan area:

- Department of Enterprise, Trade and Investment (DETI) press release 17th September 2008;
- DETI press release 12th May 2008;
- European Commission (EC) website;
- DECC website; and,
- UK MPS (HM Government et al., 2011).

Baseline Description

Carbon Capture and Storage (CCS) is a three step process which includes: trapping carbon dioxide as it is emitted from large point sources, compressing it and transporting it (usually via pipelines, although shipping is also a possibility) to a suitable storage site and injecting it safely in deep (at least 800m) offshore geological sites such as saline formations or depleted oil and gas fields (HM Government et al., 2011). The technologies used in CCS are not particularly new or unique. They have been used for many years individually (notably in the oil and chemical sectors) but there are no projects at commercial scale to capture and store carbon dioxide from a power station (DECC website).

CCS is one way of reducing carbon dioxide emissions and mitigate climate change worldwide. This technology also enables the retention of fossil fuels (coal and gas) in the UK's electricity supply mix. Fossil fuels are an important part of the electricity mix (and will remain so for some time to come) because they help to balance the intermittency of wind and the inflexibility of nuclear. To comply with the UK's legally binding carbon reduction commitments virtually all fossil fuel generation will eventually need to be fitted with technology that captures carbon dioxide and permanently stores it deep underground. All new fossil fuel power stations must now be constructed Carbon Capture Ready (CCR). This programme will generate considerable volumes of carbon dioxide to be permanently stored. The UK offshore area is thought to be one of the most promising hub locations in Europe for permanent storage of carbon dioxide.

The expectation is that storage in the UK will take place almost exclusively offshore, which in turn will require the necessary infrastructure (such as pipelines and offshore structures) to be installed to transport carbon dioxide from the mainland and inject it deep below the seabed.

There is a CCS Directive and it is now EU policy to promote CCS technology. As such storage is expected to be included within the framework of the Rotterdam Capture and Storage Demonstration (ROAD) project located at the Port of Rotterdam which was awarded €180 million of funding under the European Energy Programme for Recovery (EEPR).

The Geological Surveys of Northern Ireland (GSNI), Republic of Ireland (GSI) and the British Geological Survey (BGS), have worked with economists and engineers to assess locations where carbon dioxide could be stored safely underground around the UK and the Republic of Ireland using CCS technologies. This work has focussed on a number of areas onshore and offshore around the island of Ireland, including an area offshore of East Antrim (DETI, 2010).

Key Issues, Problems and Future Trends

CCS is an important technology that can reduce the amount of carbon dioxide in the atmosphere and the potential for further acidification of the marine environment. A recent study stated that an appropriately skilled and trained workforce, in addition to that already engaged in the engineering and offshore industries, will be an essential component of the new CCS industry in the UK and estimated that CCS could create 27,000 jobs in the UK by 2020 and increase in the following years (SCCS, 2011). This study also estimated that the UK plc share of the worldwide CCS business is potentially worth over £10 billion per year from around 2025, with the added value in the UK worth between £5-9.5 billion per year (SCCS, 2011).

Leakage from a properly selected storage site is extremely unlikely (HM Government et al., 2011). Once injected into a formation, a number of physical and chemical trapping mechanisms will retain carbon dioxide within the formation. It is possible that leakage of carbon dioxide from the injection process could take place, for example through failure of infrastructure, such as pipelines and wellheads. This could have some localised impact on benthic marine communities and possibly cause minor localised seawater acidification.

However, such impacts are unlikely to be either widespread or long-term, taking into account the dilution and buffering capacity of the oceans.

If it becomes clear that viable sites for CCS are available within the Plan area then it is possible that these sites will be developed given the significant drive that such initiatives are being provided by European and UK policy. In the first instance, however, the most favourable storage locations around Ireland appear to be the depleted gasfields at Morecambe Bay (East Irish Sea) and Kinsale (off County Cork) although the potential of the saline aquifers in the Peel Basin (between the County Down coast and the Isle of Man) and the Portpatrick Basin (adjacent to the Scottish coast) has also been recognised. At this stage, the technical and economic viability of CCS has still to be fully demonstrated at a commercial scale in the UK.

5.14.9 Compressed Air Energy Storage

The following information sources have been used to characterise compressed air energy storage within the Plan area, this is:

- www.gaelectric.ie.

Baseline Description

There is some potential for subsurface energy storage facilities within the thick salt beds beneath the onshore area around Larne Lough and Islandmagee – eg Gaelectric Energy Storage Ltd are currently assessing the viability of creating subsurface caverns for Compressed Air Energy Storage (CAES) in the Carnduff area southwest of Larne. CAES can be used to help balance energy security of supply and demand by storing surplus energy generated from wind or other time-variable energy sources, which can then be made available at times of higher demand. CAES would also involve leaching of salt caverns and the issue of brine disposal would again arise.

Key Issues, Problems and Future Trends

Thick salt beds are also present at depths of over 1000 metres below the seabed in several areas within a few kilometres of the east Antrim coast. It is technically possible that these offshore salt beds could host underground storage caverns although the onshore area around Larne and Larne Lough, where the current projects are proposed, are more viable on both technical and economic grounds.

5.14.10 Waste Water Treatment and Industrial Discharges

The following data sources have been used to characterise the urban waste water treatment and industrial discharges within the Plan area:

- Sensitive areas currently identified in the UK under the Urban Waste Water Treatment Directive (Defra website);
- Managing the Water Environment in Northern Ireland (Environmental and Heritage Service (EHS), 2000);
- Regulation of Water Utility Sector Discharges 2009 (NIEA, undated);
- Waste water treatment in the United Kingdom – 2012. Implementation of the European Union Urban Waste Water Treatment Directive – 91/271/EEC (Defra, 2012); and,
- 2014 Northern Ireland Water Management Facts and Figures (NIEA 2014).

Baseline Description

Table 37 provides a summary of compliance of water utility sector Waste Water Treatment Works (WWTWs) in the Plan area between 2007 and 2012. There has been a positive trend in compliance between 2007 and 2012. In 2007 Northern Ireland Water (NIW) compliance was assessed against numeric standards set for discharges from 244 WWTWs, serving a population equivalent (PE) greater than 249. Numeric compliance was also assessed in 2009 for WWTWs operated under Public Private Partnership (PPP) contracts. The

overall compliance of WWTWs has risen from 84% in 2007 to 93% in 2012. Numeric compliance was also assessed against the requirements of the Urban Waste Water Treatment Regulations (Northern Ireland) 2007 for the 79 WWTWs that qualified under the Regulations in 2012 (Table 37). Overall compliance has consistently improved since 2007 and now stands at 98%.

Table 37 : Summary of compliance of water utility sector WWTWs

	2007	2008	2009	2010	2011	2012
Number of NIW WWTWs serving PEs > 249	244	232	231	237	238	239
% NIW compliance with discharge standards	84%	86%	87%	89%	93%	93%
Number of NIW UWWT Regulation WWTWs (Number of NIW discharges)	80	77	74	79	79	79
% NIW compliance with UWWT	86%	92%	93%	94%	96%	96%
Source: NIEA (undated)						

As a result of consolidation of WWTW by NIW at Glenarm, Ballystrudder, Portballantrea and Whitehead, the number of WWTWs with descriptive consents (Coastal)[10] has reduced from 22 to 18 and the level compliance has increased from 84% in 2007 to 93% in 2012. WWTWs discharging into these areas, with a population equivalent greater than 10 000, are required to have nutrient reduction, or another form of further treatment, in place within seven years of the designation. In Northern Ireland one agglomeration greater than 10,000, Ballycastle that discharges to coastal waters, is currently without secondary treatment. Northern Ireland Water have received planning permission for the upgrade to treatment, the land vesting for the scheme has been completed and the tendering process is being progressed to deliver secondary treatment by 2017/2018 (per comms NIW). In addition to WWTWs discharges, Table 38 shows the trends in annual private and trade discharge consent, where compliance is assessed on a 95-percentile basis (discharge must be within its consent conditions 95% of the time to comply.

Table 38 : Trends in annual private and trade discharge consent compliance (% compliance)

	2006	2007	2008	2009	2010	2011	2012
Private Sewage Compliance	82	77	86	82	88	78	79
Trade Effluent Compliance	87	88	87	88	91	91	90

(Source : 2014 Northern Ireland Water Management Facts and Figures)

Waste water treatment, improvements to treatment and the ongoing maintenance of collection systems and waste water treatment plants and other sewerage infrastructure require significant capital construction and ongoing operational costs. In Northern Ireland, the Northern Ireland Executive sets out its investment priorities for the water and sewerage industry price control period (Defra, 2012). These priorities form the basis of the Water Industry Price Control process which determines the level of funding Northern Ireland Water needs to efficiently maintain and enhance its water and sewerage infrastructure. The economic regulator's final determination then informs public expenditure bids for each period. Table 39 sets out investments in Northern Ireland from 2010 to 2015.

Table 39 : Investments in sewerage services

	Sewerage Infrastructure	Sewerage Non-infrastructure	Total
PC10 (April 2010 – Mar 2013)	£81m	£208m	£289m
PC13 (Apr 2013 – Mar 2015)	£42m	£135m	£177m
Source: NI Water (2014)			

[10] WWTW with population equivalents of 250-10,000 that discharge to coastal water are issued with Descriptive Consent conditions and are assessed as being compliant where the appropriate treatment is in place.

Key Issues, Problems and Future Trends

Surface waters are not only affected by discharges from urban water or industrial treatment plants and combined sewer overflows as point source pollution only. They are also affected by diffuse pollution from surface water drainage, urban run-off from brownfield sites, (former industrial sites that often have contaminated, toxic soils that can also leach pollutants to waters), roads, and run-off from land in rural areas. Addressing the many sources of both point source and diffuse pollution from human activities present a considerable challenge. The Water Framework Directive (WFD) aims to do this by applying a holistic approach. In Northern Ireland, a range of proposals to address point source and diffuse pollution have been set out in the Programme of Measures (POM) of the River Basin Management Plans (RBMPs).

Investment from NIW has resulted in consolidation of the waste water treatment facilities around the coast which is resulting in year on year increases in compliance with water quality standards.

5.15 Cultural Heritage

This section provides an overview of cultural heritage in Northern Ireland inclusive of marine and terrestrial archaeology.

The following data sources have been used to characterise cultural heritage within the Plan area:

- Northern Ireland Historic Environment Record (HER).
- Chapter 13 Maritime Archaeology - State of the Seas Report (NIEA/AFBI 2011)
- National Trust. 2008. Shifting Shores. Living with a Changing Coastline (Northern Ireland).
- Northern Ireland Environment Agency (NIEA). 2012. Our Passion, Our Place: Strategic Priorities 2012-2022.
- Northern Ireland Environment Agency (NIEA). 2013. From Evidence to Opportunity: A Second Assessment of the Sate of Northern Ireland's Environment.

Baseline Description

Northern Ireland's archaeological record spans the last 9,000 years. In the context of the SA, it encompasses cultural heritage assets both with a terrestrial and marine context. Regardless of location, all archaeological remains and their context are protected under the Valletta Convention. The UK MPS (2011) reiterates this position for the marine area.

Section 2.6.6 of the MPS also details how consideration of the historic environment should be incorporated into Marine Plans for the UK administrations and while it identifies the importance of designated sites, it also states:

> *Many heritage assets with archaeological interest in these areas (marine areas) are not currently designated as scheduled monuments or protected wreck sites but are demonstrably of equivalent significance. The absence of designation for such assets does not necessarily indicate lower significance and the marine plan authority should consider them to be of the same policy principles as designated heritage assets based on information and advice from the relevant regulator and advisors.*

In Northern Ireland, protection of cultural heritage assets is facilitated by the Historic Monuments and Archaeological Objects 1995 Order (HMAO) and its powers can be extended to the seabed. Wrecks below the high water mark (HWM) may also be protected under The Protection of Wrecks Act 1973.

Table 40 and Figures 20 and 21 provide an overview of the range and number of cultural heritage assets within 30km of the coast and inclusive of the marine area. This information has been derived from the DOE Historic Environment Record (HER).

Table 40 : Number of Features and Description of Cultural Heritage with 30km of the Coast

Feature	Number	Description
Monuments in State Care	State Care – 71 State Care and Scheduled – 58	Monuments in State Care are historic monuments which are fully maintained by the state. They are among the sites and monuments which are of greatest importance within Northern Ireland. They may be fully owned by the state or

Feature	Number	Description
	State Care with proposed scheduling – 5	within its guardianship.
Scheduled Historic Monuments	1129	Scheduled Historic Monuments are also considered to be of great importance to Northern Ireland. They include megalithic tombs, large and small prehistoric ritual earthworks, occupation sites and defensive earthwork structures. More recent features include complex church sites, stone castles and abbeys from the medieval period.
Listed Buildings	8997	Listed Buildings are defined as buildings of special architectural or historic interest and date principally to the past three hundred years. They include many structures from post boxes, bridges, simple thatched cottages, and large stately homes, to commercial and industrial buildings. The purposed of the listing is to protect the special interest of the building.
Parks, Gardens and Demesnes	112 registered 61 supplementary list	The effect of design over time and of a high quality on an area of land is at the basis of the designation of an historic park, garden or demesne. These may vary considerably in style, age and size, and are typically associated with an historic building of similar heritage value.
Sites and Monuments Record	10,000 On record 13 Descheduled 12 Listed 6 Proposed for scheduling.	Sites and monuments include megalithic tombs, large and small prehistoric ritual earthworks, occupation sites and defensive earthwork structures. Maritime Records are also contained within the SMR. The most significant examples are protected as Scheduled Historic Monuments.
Wrecks	Approx. 300* known shipwrecks	Wreck sites are generally defined as sunken ships and aircraft, and any material associated with such vessels.

*This information was not gathered from available desk based sources but from communications with Marine Division as part of the scoping workshop. The figure in Table 40 represents the number of actual known wrecks rather than the total number of documented casualties.

The surveys which populate the Historic Environment Record (HER) have been undertaken since 1969 and these have largely targeted the terrestrial environment. The surveys required to produce a complimentary record for the marine have been only been undertaken since 1993. As a result, there is still a limited understanding of the nature, location and character of marine heritage assets.

Key Issues, Problems and Future Trends

There are increasing pressures on the historic environment in Northern Ireland relating to its condition and conservation. Terrestrial sites have an established framework of designation, protection and condition assessment. As a result, there are proven mitigation strategies available to record, protect and conserve terrestrial sites. Due to the relatively recent survey period for marine archaeology, information is still emerging about the location of marine cultural heritage sites, the best mechanism to protect them and how the context of their setting reflects wider historical and archaeological changes around Northern Ireland. Marine archaeology is under threat from both natural and human factors. Natural factors include seabed and coastal erosion driven by waves, tides and storms which can result in damage to, or destruction of heritage assets. Although these are natural processes, there is a possibility that future climate change, principally rising sea-levels and intensified storms, will result in increased erosion placing increased numbers of assets at risk (National Trust 2008; McNeary & Westley 2013). Human factors resulting from increased human use of the seabed and coastal zone relate to activities including cable or pipe laying, oil and gas drilling, trawling, aggregates extraction, offshore renewable energy developments.

5.15.1 Marine Archaeology

The following section provides information about wrecks, submerged prehistory and coastal and intertidal archaeology. This information has been gathered from UK wide sources and academic journals.

5.15.2 Wrecks

Information sources from wrecks are as follows:

- UK Hydrographic Ocean Wise Dataset
- Breen, C. & W. Forsythe. 2001. Management and protection of the maritime cultural resource in Ireland. Coastal Management 29:41-51.
- Firth, A. 2014. 'UK Safeguarding of Underwater Cultural Heritage: factual Background', unpublished briefing paper for BA/HFF Steering Committee on Underwater Cultural Heritage.
- Chapter 13 Maritime Archaeology - State of the Seas Report (NIEA/AFBI 2011)

Baseline Description

Wreck sites are generally defined as sunken ships and aircraft, and any material associated with such vessels. This includes vessels ranging from prehistoric logboats to modern metal ships and aircraft. A database of over 2600 historic wrecks has been compiled by the DOE using a range of desk-based sources. However, these data are biased towards records post-dating 1800 AD and wreck locations are frequently inaccurate. Conversely, just over 300 actual wreck remains are currently known to exist either on the seabed or in the intertidal zone.

The two principal asset-based controls for wrecks in Northern Ireland are the Protection of Wrecks Act 1973 and the Historic Monuments and Archaeological Objects Order 1995. Currently there is only one designated historic wreck in Northern Irish waters: La Girona, a Spanish Armada galleass wrecked off Lacada Point, Co. Antrim in 1588. There is a 300m exclusion zone around the wreck, and diving is prohibited without a licence from the DOE. To-date no wrecks have been scheduled under the HMAO Order 1995.

The Protection of Military Remains Act (PMRA) 1986 can be used to control activities on two forms of designated underwater cultural heritage – 'protected areas' and 'controlled sites' – though the purpose is to protect military remains rather than cultural heritage. In addition under the provisions of the Merchant Shipping Act 1995 Northern Ireland (like the rest of the UK) has a statutory system for reporting cultural material that is 'wreck', defined as items which are over 100 years old. The Receiver of Wreck (RoW) administers the law for the Maritime and Coastguard Agency (MCA).

Key Issues, Problems and Future Trends

The majority of Northern Ireland wreck records are documented casualties, that is, their exact position is not known, rather than actual wrecks. It is highly probable that more 'undiscovered' wrecks exist in the waters off Northern Ireland. The DOE is currently more fully integrating the NI Wrecks Database into its HERs. Recent advancements in high resolution seafloor mapping (e.g. the Joint Irish Bathymetric Survey (JIBS) and ongoing INIS project) offer the potential to improve locational information on known wreck positions and identify anomalies which could be unrecorded wrecks. However, there remains a need for dive-truthing exercises to facilitate identification and verification of wrecks and anomalies detected by geophysical survey and to contribute to their ongoing monitoring and conservation.

The majority of wrecks also have no formal protection and a number of marine activities which have the potential to negatively impact upon them continue to go unregulated, e.g., fishing, anchoring and recreational diving (Firth 2014, 16).

5.15.3 Submerged Prehistory

Information on submerged prehistory has been gathered from the following sources:

- Brooks, A., S. Bradley, R. Edwards, G. Milne, B. Horton & I. Shennan. 2008. Postglacial relative sea-level observations from Ireland and their role in glacial rebound modelling. Journal of Quaternary Science 23(2):175-192.
- McErlean, T., R. McConkey & W. Forsythe. 2002. Strangford Lough. An archaeological survey of a maritime cultural landscape. Belfast: Blackstaff Press Ltd.

- Wilson, P., K. Westley, R. Plets & M. Dempster. 2011. Radiocarbon dates from the inter-tidal peat bed at Portrush, County Antrim. Irish Geography 44(2-3):323-329.
- Benjamin, J., C. Bonsall, C. Pickard, & A. Fischer (eds.). 2011. Submerged Prehistory. Oxford: Oxbow.

Baseline Description

Submerged landscapes are tracts of seabed which were exposed by lower-than-present sea-levels at the end of the last Ice Age and therefore available for prehistoric human occupation. Around Northern Ireland, sea-levels during its earliest occupation (c. 9-10,000 years ago) were lowered by 10 to 30m (Brooks et al. 2008) and subsequently rose to near-present levels by 5-7,000 years ago. These changes meant that the landscape once extended out from the modern shoreline by hundreds of metres to tens of kilometres before being drowned. Indications that some of this landscape is preserved come in the form of submerged forests and intertidal peats which are found at a few known locations in Northern Ireland, for instance in Strangford Lough (McErlean et al. 2002) and Portrush (Wilson et al. 2011). Some intertidal areas also contain prehistoric artefacts (stone tools) apparently washed ashore, while verified finds from below low water come from Larne Lough and Lough Foyle.

Key Issues, Problems and Future Trends

Although the potential existence of submerged landscapes has been recognized since the 19th century systematic work has only been ongoing since 2008. This has been stimulated by the availability of new high resolution geophysical data, such as JIBS and the increasing realization that well-preserved prehistoric material can survive inundation (e.g. Benjamin et al. 2011). While it is recognised that there is the potential for submerged landscape preservation around Northern Ireland, until further survey is undertaken the precise location of areas of potential and known sites and landscapes will remain poorly understood. To-date areas of intertidal woodland have been Scheduled under the HMAO Order 1995 in Greyabbey Bay and Ards in Strangford Lough

Offshore development represents both a threat and opportunity to these poorly understood assets and locational information is required to mitigate threats and maximise opportunities.

5.15.4 Coastal and Intertidal Archaeology

The information sources which have been used to describe coastal and intertidal archaeology include:

- McErlean, T., R. McConkey & W. Forsythe. 2002. Strangford Lough. An archaeological survey of a maritime cultural landscape. Belfast: Blackstaff Press Ltd.
- Forsythe, W. & R. McConkey, 2012. Rathlin Island. An archaeological survey of a maritime cultural landscape. Belfast: The Stationary Office.
- McErlean, T. & N. Crothers. 2007. Harnessing the Tides: The Early Medieval Tide Mills at Nendrum Monastery, Strangford Lough. Belfast: The Stationary Office.
- McNeary, R. & K. Westley. 2013. Climate change and Cultural Heritage. Unpublished report prepared for the Northern Ireland Environment Agency: Built Heritage Division. pp. 233.
- McNeary, R. & K. Westley. 2013. 'The Work of the Centre for Maritime Archaeology, University of Ulster: Past and Present' in J. Higgins, A. Conneely and M. Gibbons (eds), Irish Maritime Heritage: Proceedings of the 3rd Galway International Heritage Conference 2013. Galway.

Baseline Description

Detailed surveys for coastal and intertidal archaeology have been completed for Strangford Lough and Rathlin Island (McErlean et al. 2002; Forsythe & McConkey 2012). Evidence from these surveys demonstrates considerable past human usage of the coastal zone. The Strangford survey, recorded 680 sites including the tidal mill at Nendrum monastery, which dates to early 7th Century AD and represents the oldest such structure in the world (McErlean & Crothers 2007). The Rathlin survey meanwhile identified more than 200 new sites which cover an 8000 year time span from the Mesolithic to the modern era.

Key Issues, Problems and Future Trends

In Northern Ireland, the mapping and recording of foreshore and coastal sites has largely been limited to Rathlin Island and Strangford Lough; the record therefore remains incomplete. This is a problem for marine planners need accurate mapping and characterisation of these areas to assist decision-making in relation to development control and sustainable management of the resource.

Coastal and intertidal sites are particularly vulnerable to future climate change in the form of flooding and erosion. They may also be at risk from human action to mitigate these problems, such as construction of fluvial and coastal defences. Given predictions of increased flooding, erosion and storm surges and resultant human mitigation measures, the likelihood is that these sites will be under increasing pressure in the near future (McNeary & Westley 2013, 21).

5.15.5 Terrestrial Cultural Heritage

Information on terrestrial cultural heritage has been gathered from the following source:

- Northern Ireland Environmental Statistics Report (2014)

Baseline Description

In February 2014, there were a total of 1,950 scheduled historic monuments, protected under Article 3 of the Historic Monuments and Archaeological Objects (NI) Order 1995, of these 39 monuments were scheduled during 2012/13. A total of 8,563 listed building have been recorded in 2012/13 but this does not include the multiple buildings which are included as part of some listings.

Where development is required which may alter or disturb the fabric of a scheduled historic monument or its ground surface, scheduled monument consent is required. The trend for consents has matched the economic downturn in Northern Ireland, where number of applications peaked to 68 at the beginning of the economic downturn in 2008/09 and then dropped quite dramatically in the middle of the downturn in 2010/11.

If scheduled structures and listed buildings are considered “at risk” because they are under threat of deterioration and/or demolition because of their condition, they are recorded on the Built Heritage at Risk in Northern Ireland (BHARNI) register. In 2012/13, there were 473 buildings and structures on the BHARNI database and 15 buildings have been removed.

Key Issues, Problems and Future Trends

Within the context of terrestrial cultural heritage, sites of importance are still accidentally discovered resulting in the requirement for recording, protection and conservation within HER and input into development mitigation strategies. Like marine cultural heritage, terrestrial cultural heritage is under threat from development, both in relation to destruction and degradation. While there are mechanisms which exist to protect sites and buildings, they need formal protection before these mechanisms can be utilised.

5.16 Landscape and Seascape

5.16.1 Introduction

The following data sources have been used to characterise landscape and seascape within the Plan area:

- Landscape Character Areas (NIEA);
- World Heritage Sites (Giant’s Causeway) (NIEA) World Heritage Sites (United Nations Educational Scientific and Cultural Organization)http://whc.unesco.org/en/list/369;
- Areas of Outstanding Natural Beauty (AONB) (NIEA); and,
- Northern Ireland Regional Seascape Character Assessment Report (http://www.doeni.gov.uk/niea/niseascapecharacterassessment2014-part_1.pdf) January 2014.

Baseline Description

There are 31 landscape character areas (LCAs) out of a total of 130, which have a coastal element (Figures 22). They are listed as follows:

32 Derry Slopes

33 Lough Foyle Alluvial Plain

35 Magailligan Lowlands

36 Binevenagh

38 Eastern Binevenagh Slopes

54 Coleraine Farmland

57 Causeway Coast and Rathlin Island

69 Newry Basin

73 Kilkeel Coast

74 The Kingdom of Mourne

75 Mourne Mountains

84 Mourne Foothills

85 Newcastle Valleys

86 Tyrella Coastal Dunes

92 Quoile Valley Lowlands

93 Portaferry and North Lecale

94 Strangford Drumlins and Islands

97 Belfast/Lisburn

99 Outer Ards Coast

100 Ards Farmlands and Estates

101 Scrabo

103 Bangor Coastline

114 Three and Six Mile Water Valleys

119 Ballycastle Glens

120 Fair Head

121 Moyle Glens

123 Larne Glens

126 Larne Coast

127 Larne Ridgeland

128 Islandmagee

129 Carrickfergus Shoreline

The Giants Causeway and Causeway Coast is designated as a World Heritage Site by the United National, Educational, Scientific and Cultural Organisation (UNESCO). The site is of international importance because it represents major stages of the Earth's geological development and occupies approximately 230 hectares of land, shore and sea.

Northern Ireland has nine AONBs designated for their distinctive landscape character and high scenic value, with two other potential AONBs identified. Nearly 20% of the total area of Northern Ireland is covered by AONBs equal to almost 300,000 hectares across various parts of the region.

In addition to LCAs, Seascape Character Areas (SCAs) have also been described, and like landscape, the character area is described in terms of its key characteristics, condition and sensitivity to change (Figure 23). They are listed as follows:

1 Foyle Estuary

2 Lough Foyle

3 North Coast Strand and Dunes

4 The Skerrie and Dunluce Castle

5 Causeway Coast

6 Ballycastle Coast

7 Rathlin

8 Torr Head Coast

9 Northern Glens Coast

10 Southern Glens Coast

11 The Gobbins

12 Larne Lough

13 Belfast Lough

14 Belfast Harbour

15 Ards Peninsula

16 Strangford Lough

17 Lecale Coast

18 Dundrum Bay

19 Mourne Coast

20 Carlingford Lough

21 Newry Estuary

22 Atlantic

23 North Channel

24 Irish Sea (South Down)

Of the 24 SCAs, 16 bound AONBs, areas 2 and 3 abut Binevenagh, areas 3, 4,5, 6 and 7 abut the Causeway Coast and Rathlin, areas 8, 9 and 10 abut Antrim Coast and Glens, areas 15, 16 and 17 abut Strangford and Leacale, while areas 19, 20 and 21 abut Mourne. Area 18 (Dundrum Bay) abuts both Strangford and Lecale and Mourne AONBs.

Key Issues, Problems and Future Trends

The landscape and seascapes of Northern Ireland have been described. Although the characterisations exist, only 16 abut AONBs and it is only these areas that would be considered protected areas.

While LCAs/SCAs have been assigned there has not been any systematic work done on programmes of Historic Landscape Characterization (HLC) or Historic Seascape Characterization (HSC) in Northern Ireland. Historic characterization aims to manage change and may prove useful to sustainable historic environment management in the context of spatial planning.

5.17 Ecosystem Services

Ecosystem services are not an SA topic but instead part of the assessment process. There is information available about ecosystem linkages and valuations regarding the economic importance of natural environments.

The following data sources have been using to characterise ecosystem linkages and ecosystem valuation in Northern Ireland:

- UK National Ecosystem Assessment (NEA) (http://uknea.unep-wcmc.org/);
- UK National Ecosystem Assessment Northern Ireland Summary (NIEL 2011);
- SIMBIOSYS:Sectorial Impacts on Biodiversity and Ecosystem Services (EPA 2012);
- Strategic review of sectorial impacts on coastal marine ecosystems in Ireland (SIMBIOSYS, 2010); and,
- The environmental economy of Northern Ireland (Northern Ireland Green NGOs Group/EHS (now NIEA) 2007).

Baseline Description

Both the UK and Irish governments have undertaken research into how the ecosystems within each jurisdiction interact and the implications of these interactions for the provision of ecosystem services. The following bullet points are implications for policy stated within the Coastal Margins chapter of the UK NEA reports:

The Coastal Margin habitats are of high economic and cultural value to the UK, yet they often fall into the policy no-man's land between marine and terrestrial interests.

There remain major knowledge gaps for Coastal Margins, including basic data such as extent and trends. This needs to be addressed by unified and strategic data gathering across the UK to detect change in coastal sediments and habitats in order to inform adaptation strategies.

Coastal Margins face major threats in the coming decades, particularly from sea-level rise and climate change, as well as pollution and continuing development pressures. These threats are exacerbated by the linear nature of the habitat, with pressures on every edge and very little safe, core habitat, except on the largest sites. Threats from sea level rise will be most acute on coasts where habitats are constrained by artificial sea defences.

Coastal Margins need to be managed holistically, maintaining natural dynamics where possible and acknowledging the interdependence with other habitats, including the marine environment.

Within the marine chapter of the UK NEA report, it is recognised that in addition to the data gaps pertaining to marine ecosystems which exist, there are also increased requirements for planning and the exploitation of synergies between potentially conflicting uses.

As part of the UK NEA, a Northern Ireland specific summary was also produced, it identified the policy requirements for implementation in the Northern Ireland context and identified the importance of ecosystem services to climate change adaptation and that ecosystem management should not recognise national boundaries (where by the island of Ireland should be considered as a whole for ecosystem management).

The SIMBIOSYS project identified how coastal ecosystems were impacted by sectorial activities. In the Republic of Ireland context, it identified the main pressures on these ecosystems were exerted by fisheries, aquaculture and construction, with lesser influences from shipping, leisure, tourism and energy sectors.

Key Issues, Problems and Future Trends

The consideration of ecosystem services is fundamental to holistic policy development and the policies within the Plan will be subject to an ecosystem services assessment.

6 Scoping Questions

This chapter contains a list of key questions which relate to this Scoping Report. They are provided to assist the structure of scoping responses from statutory consultees, the Project Steering Group and other stakeholders. These questions also formed the main areas for discussion at the scoping workshop.

Please note that comments are also welcome on any other aspects of the Scoping Report.

Introduction

Q1a: Do you agree with the main objectives and deliverables of the SA?

Q1b: If not, please suggest alternative or additional objectives and deliverables.

Relationship with other Relevant Plans, Programmes and Strategies

Q2a: Do you consider that all appropriate or relevant policies, plans and programmes have been noted?

Q2b: If not, please highlight any omissions.

SA Approach and Method

Q3a: Do you agree with the overall approach and method for the SA set out in Chapter 4?

Q3b: Do you agree with the assessment method (Part 1: Policy Assessment, Part 2: Cumulative Assessment, including ecosystems services assessment) that will be applied to the assessment of environmental effects (Stage B)?

Baseline

Q4a: Do you agree with the baseline data sources?

Q4b: Please provide relevant data from other additional datasets that informs the description of the baseline environment of relevance to this SA.

Q4c: Do you agree the range of baseline data presented is robust enough to allow for a thorough assessment of cumulative effects arising from the Plan?

Q4b: Please suggest any updates/amendments to the baseline description as necessary.

Consultations

Q5a: Do you agree with the approach to the SA consultation?

Q5b: Do you agree with the duration of the SA consultation?

Appendix A – Legislation, Plans and Programmes

Appendix A

The following tables should be read in conjunction with chapters 3 and 5 of the Marine Plan for Northern Ireland - Sustainability Appraisal Scoping Report.

Table A: Key Relevant Marine Plan SA Obligations and Regulatory Instruments relating to SA Topics

SA Topic	Level	Title	Summary of Objectives	Implications
Biodiversity, flora and fauna.	International	UN Convention on Biological Diversity (1992)	Maintenance and enhancement of biodiversity	Plan will need to Prevent the decline and encourage the enhancement of biodiversity.
Biodiversity, flora and fauna	International	The Ramsar Convention The Convention of Wetland of International Importance (1971 and amendments)	Protection and conservation of wetlands, particularly those of importance to waterfowl as waterfowl Habitat.	Plan will need to ensure that Ramsar sites are protected and given appropriate consideration.
Biodiversity, flora and fauna	International	Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)	Conservation of wild flora and fauna	Plan will need to consider protected habitats and species
Biodiversity, flora and fauna	International	Bonn Convention on the Conservation of Migratory Species and Wild Animals (1979)	Conservation of species and wildlife on a global scale	Consideration of the plan on migratory species
Biodiversity, flora and fauna	EU	The EU Biodiversity Strategy Communication on a European Community Biodiversity Strategy.	Reduce biodiversity loss and maintain and enhance current levels of biodiversity.	Plan will need to consider the enhancement of biodiversity.
Biodiversity, flora and fauna	EU	Directive 79/409/EEC Conservation of Wild Birds	Sets out the protection of birds and the designation of Special Protection Areas (SPAs) in accordance with Article 4 of the Directive	The Plan needs to consider the importance of SPAs and that any policy

SA Topic	Level	Title	Summary of Objectives	Implications
				will not adversely affect them.
Biodiversity, flora and fauna	EU	Directive 92/43/EEC Conservation of Natural Habitats and of Wild Fauna and Flora(Habitats Directive)	Sets out the framework for the establishment of Special Areas of Conservation (SACs) for sites hosting habitats listed in Annex I and habitats of species listed under Annex II of the directive.	The Plan needs to consider the importance of SACs and that any policy will not adversely affect them.
Biodiversity, flora and fauna	UK	Offshore Marine Conservation (Natural Habitats etc.) Regulations (S.I. 2007/184)	To ensure that activities in marine areas are carried out in a manner that is consistent with Council Directive 92/43/EEC (the “Habitats Directive”) and Council Directive 79/409/EEC (the “Wild Birds Directive”).	The Plan will ensure all proposed activities are undertaken with cognisance of the Habitats and Wild Birds Directives.
Biodiversity, flora and fauna	Northern Ireland	Flora Protection Order 1999	To protect listed flora and their habitats from alteration, damage or interference in any way.	The plan will assess impacts and flora.
Biodiversity, Flora and Fauna	Northern Ireland	Wildlife and Natural Environment Act (Northern Ireland) 2011	To protect wildlife (both Flora and Fauna) and the control of activities which may impact adversely on the conservation of Wildlife. All government departments are also required to enhance biodiversity through their function.	The plan will need to assess impacts on biodiversity and where possible recommend policy to enhance biodiversity.
Biodiversity, flora and fauna	Northern Ireland	The Wildlife (NI) Order 1985 and amendments.	Makes it an offence to intentionally kill, injure, or take any wild bird or their eggs or nests.	Impact on wild birds will need to be considered as part of the plan.

SA Topic	Level	Title	Summary of Objectives	Implications
Biodiversity, flora and fauna	Northern Ireland	The Wildlife Act 1976. The Wildlife (Amendment) act 2000.	To protect wildlife (both Flora and Fauna) and the control of activities which may impact adversely on the conservation of Wildlife	The plan will need to assess impacts on biodiversity
Water and Soils	EU	Water Framework Directive (2000/60/EC) incorporating measures under the: The Bathing Water Directive (76/160/EEC); The Birds Directive (79/409/EEC)(1); The Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC); The Major Accidents (Seveso) Directive (96/82/EC)(2); The Environmental Impact Assessment Directive (85/337/EEC)(3); The Sewage Sludge Directive (86/278/EEC)(4); The Urban Waste-water Treatment Directive (91/271/EEC); The Plant Protection Products Directive (91/414/EEC); The Habitats Directive (92/43/EEC)(5); The Integrated Pollution Prevention Control Directive (96/61/EC).	Protection and enhancement of the aquatic environment across Europe.	Any activities which are subject to a licensing by the appropriate authority within one nautical mile of the coast will be compliant with the requirements of the Directive.
Water and Soils	EU	The Nitrates Directive (91/676/EEC);	Aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices.	The Plan should be cognisant that Northern Ireland has been designated a

SA Topic	Level	Title	Summary of Objectives	Implications
				nitrate vulnerable zone.
Water and Soils	Northern Ireland	The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003	The implementation of the Water Framework Directive in Northern Ireland.	Impacts on the water environment will be considered by the plan. If impacts could affect legal obligations under the Water Framework Directive, this will be highlighted.
Water and Soils	Northern Ireland	The Water (NI) Order 1999	To promote the conservation of the water resources To promote the cleanliness of surface and ground water Establishes powers to make regulations for the control of water abstraction. Requires consent for any discharges to the aquatic environment during construction and operational activities.	Impacts on water quality will be assessed by the plan
Water and Soils	Northern Ireland	Abstraction and Impoundment (Licensing) Regulations (Northern Ireland) 2006	Implements requirements under both the Water Framework and Habitats Directives, to establish a water resource management, assessment and licensing regime.	The plan should be cognisant of existing and proposed abstraction and impoundment regimes.
Air	International	World Health Organisation (WHO) Air Quality Guidelines (1999) and Guidelines for Europe (1987)	Seek the elimination or minimisation of certain airborne pollutants from protection of human health.	Plan will need to consider the reduction in the amount of airborne pollutants that are

SA Topic	Level	Title	Summary of Objectives	Implications
				produced.
Air	International	Montreal Protocol (UN September 1987)	Sets out the protection of the ozone layer and the phasing out of ozone depleting substances.	The plan will need to Consider the contribution of the plan to ozone depleting substances
Air	International	Geneva Convention on Long-Range Transboundary Air Pollution 1979	Controls and reduces environmental damage caused by transboundary air pollution.	Consider implications of the plan on transboundary air pollution.
Air	International	The Stockholm Convention (2001)	Global treaty to protect human health and the environment from persistent organic pollutants (POPs)	Plan will need to consider AQMAs.
Air	EU	The Air Quality Framework Directive Directive on Air Quality Assessment and Management (Framework Directive) (1996/62/EC)	Prevention and reduction of airborne pollutants for the protection of human health and the environment.	Consider implications of the plan on air pollution.
Air	EU	Directive on National Emission Ceilings for Certain Atmospheric Pollutants (2001/81/EC)	Limitation of national emissions of certain airborne pollutants for the protection of human health and the environment.	Consider implications of the plan on air pollution
Air	EU	Directive 2008/50/EC of the European Parliament and of the Council	Ambient air quality and cleaner air for Europe New air quality and includes objectives for PM2.5 (fine particles) including the limit value and exposure related objectives – exposure concentration obligation and exposure reduction target.	Plan will need to consider the reduction in the amount of airborne pollutants that are produced.
Air	UK	Environment Act 1995 Part IV Local Air	Requires Local Authorities to review and assess Local Air Quality.	Consider

SA Topic	Level	Title	Summary of Objectives	Implications
		Quality Management		implications of the plan on air pollution. The plan will consider AQMAs.
Air	UK	Air Quality Standards Regulations (Northern Ireland) 2003 SR2003/342 and Air Quality (Amendment) Regulations (Northern Ireland) 2003 SR2003/543	Requires the local authority to designate an Air Quality Management Area (AQMA).	
Air	UK	Air Quality (Ozone) Regulations (Northern Ireland) (2003)	Local Authorities are required to carry out a Review and Assessment of their local air quality to see whether they will meet the Government's targets for key pollutants	
Climate Factors	International	UN Kyoto Protocol The United Nations Framework Convention on Climate Change (UNFCCC) Integrated Energy and Climate change package 2007 Directive 2001/81/EC	Alleviate the impacts of climate change and reduce global emissions of Green House Gases.	Consider implications of the plan in terms of its objective to contribute towards climate change mitigation and adaptation and its impacts on greenhouse gas emissions.
Climate Factors	EU	Second European Climate Change Programme (ECCP II) 2005.	Develop the necessary elements of a strategy to implement the Kyoto protocol.	
Climate Factors	UK	Climate Change Act 2008	Address and adapting to climate change	
Climate Factors	UK	Energy Act 2008 and amendments 2011	Sets out UK Government's long term goal to reduce carbon emissions by 60% by 2050 with significant progress being made by 2020	
Socio Demographics	EU	Directive 2002/49/EC (the Environmental Noise Directive)	Avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise	The plan will assess impact of noise on individuals
Socio Demographics	Northern Ireland	Environmental Noise Regulations (Northern Ireland) 2006,	Requires Authorities to deliver their obligations under the Environmental Noise Directive	Noise complaints and the enforcement

SA Topic	Level	Title	Summary of Objectives	Implications
				of noise control legislation is a matter for environmental health departments of district councils – advice will be obtained during consultation
Uses and Activities	EU	Common Fisheries Policy (CFP) 2014	The reform of the CFP gives new political impetus and leadership to the sustainable development of EU aquaculture by helping to make it more competitive; ensure sustainable growth and improve the sector's image and governance.	Consideration of the Plan to allow the objectives of the directive to be met.
Uses and Activities	EU	Blue Growth	A long term strategy to support sustainable growth in the marine and maritime sectors.	Consideration of the Plan to allow the objectives of the directive to be met.
Uses and Activities	EU	Europe's Seaports 2030	The European Commission's has identified 319 key European seaports which are essential for the efficient functioning of the internal market and the European economy. The Commission's port review focuses on these 319 ports as a basis for a highly functioning European ports network managing 96% of goods and 93% of passengers which transit through the EU ports.	Consideration of the plan to facilitate ongoing improvements to the European ports network for good and passengers.
Uses and Activities	EU	Blue Belt, a Single Transport Area for Shipping (June 2013)	Provides a roadmap for simplifying the procedure for intra-EU shipping	Consideration of the plan to facilitate ongoing improvements to the European ports network for good

SA Topic	Level	Title	Summary of Objectives	Implications
				and passengers.
Uses and Activities	Northern Ireland	Fisheries Regulations 2014	These Regulations came into force on 1 March 2014 and apply to Northern Ireland only. They revoke and replace with amendments the Fisheries Regulations (Northern Ireland) SR 2003/525 to remove references to commercial salmon netting and licensing and to introduce mandatory catch and release for salmon angling except on designated waters.	The plan will need to consider angling licences
Material Assets	EU	Clean Power Transport Directive (March 2014)	Include provisions which require all core ports to provide Liquified Natural Gas refuelling points and shoreside electricity (unless not economically viable) by 2025.	Consideration of the Plan to allow the objectives of the convention to be met.
Material Assets	EU	The EU Renewables Directive	Mandates levels of renewable energy use within the European Union.	The plan will have to be cognisant of all measures to meet the requirements of the Directive.
Material Assets	UK	Offshore Wind Energy: Action needed to deliver on the Energy Policy Objectives for 2020 and beyond'	Aims at promoting the development of maritime and offshore wind energy in the European Union.	The plan will have to be cognisant of all measures to meet the requirements of the energy policy objectives.
Cultural Heritage	International	World Heritage Convention 1972	Requires the UK to integrate the protection of cultural heritage into comprehensive planning programmes.	Plan will need to ensure that archaeological sites
Cultural Heritage	EU	European Convention on Protection of the Archaeological Heritage (Revised), Valletta,	The convention includes provisions for the identification and protection of archaeological heritage, conservation and control of	

SA Topic	Level	Title	Summary of Objectives	Implications
		1992	excavations.	and objects are protected and given appropriate consideration.
Cultural Heritage	Northern Ireland	Historic Monuments and Archaeological Objects (NI) Order 1995	Provides for the protection of all archaeological sites and objects.	
Cultural Heritage	Northern Ireland	Protection of Wrecks Act 1973	Regulates specific designated assets. Where an asset is designated, specified activities may not take place unless they are licensed; the licence will often include conditions that must also be met.	Plan will need to ensure that archaeological sites and objects are protected and given appropriate consideration.
Cultural Heritage	Northern Ireland	Protection of Military Remains Act 1986	Provides incidental protection of aircraft or ships (in military service) in UK waters since 1914. It also covers vessels of a foreign state.	Plan will need to ensure that archaeological sites and objects are protected and given appropriate consideration.
Cultural Heritage	Northern Ireland	Merchant Shipping Act 1995	Finders of 'wreck' (inc. flotsam, jetsam, lagan and derelict) including archaeological material, must declare finds to the Receiver of Wreck. Does not apply to submerged landscapes/non-shipwreck related remains	Requires that the archaeological environment is given appropriate consideration which will need to be achieved through the objective of to promote the preservation and enjoyment of marine related heritage assets.
Landscape	EU	European Landscape Convention	Applies to the entire territory of the Parties and covers natural, rural, urban and peri-urban areas. It concerns all landscapes, from	Plan will need to ensure that

SA Topic	Level	Title	Summary of Objectives	Implications
and Seascape			outstanding to “everyday” or degraded landscapes. Aims to protect, manage and plan of all landscapes and raising awareness of the value of a living landscape.	landscapes are given appropriate consideration.
Landscape and Seascape	EU	Pan-European Biological and Landscape Diversity Strategy.	The Action Plan specifies projects and actions on developing a European Landscape Map, identifying landscape assessment criteria, analysing future trends and opportunities and initiating awareness campaigns as well as policy debates.	Plan will need to ensure that landscapes are given appropriate consideration.
Landscape and Seascape	Northern Irelands	Northern Irelands Landscape Charter	A charter which requires signatories to share the responsibility of management and enhancement of the quality of Northern Ireland places: natural, rural, urban and peri-urban whether on land, inland water or the coast and whether outstanding or degraded, which collectively constitute the landscape.	Plan will need to ensure that landscapes are given appropriate consideration.

Table B: Key Relevant Marine Plan Obligations and Regulatory Instruments relating to the marine and terrestrial environments which are overarching, outside the SA Topics.

Marine/Terrestrial/ General	Level	Title	Summary of Objectives	Implications
Marine	International	The United Nations Convention on the Law of the Sea (1982)	The legal framework relating to the marine environment.	The Plan must be cognisant of the convention.
Marine	International	International Convention on Civil Liability for Oil Pollution Damage (CLC), 1969	Adopted to ensure that adequate compensation is available to persons who suffer oil pollution damage resulting from maritime causalities involving oil-carrying ships.	The Plan must be cognisant of the conventions, protocols , policies and directives.
Marine	International	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (LC), 1972 (and the 1996 London Protocol)	Prohibits the dumping of certain hazardous materials. It also requires a permit prior to dumping a number of other identified materials and a general permit for other wastes or matter.	
Marine	International	International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), 1990	Parties to the OPRC are required to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries.	
Marine	International	Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS Protocol)	Follows the principles of the OPRC. Aims to establish national systems for preparedness and response and to provide a global framework for international co operations in combating major incidents or threats of marine pollution.	
Marine	International	International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS), 2001	The Convention prohibits the use of harmful organotins in anti-fouling paints used on ships and establishes a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems.	
Marine	International	International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004	All ships in international traffic are required to manage their ballast water and sediments to a certain standard, according to a ship-specific ballast water management plan. All ships will also have to	

Marine/Terrestrial/ General	Level	Title	Summary of Objectives	Implications
			carry a ballast water record book and an international ballast water management certificate. The ballast water management standards will be phased in over a period of time.	
Marine	EU	Integrated Maritime Policy	Aims to provide a more coherent approach to maritime issues, with increased coordination between different policy areas. This policy incorporates the Marine Spatial Planning and Integrated Coastal Management Directive.	
Marine	EU	Marine Spatial Planning and Integrated Coastal Management Directive	In draft, the proposed Directive will require Member States to establish and implement Maritime Spatial Plans for their marine areas according to a set of minimum common requirements.	
Marine	EU	Marine Pollution Convention, MARPOL, 73/78 (the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978) relating thereto and by the Protocol of 1997	Regulations to prevent/minimise oil pollution from accidents/routine operations.	
Marine	EU	The Marine Strategy Framework Directive	Enable sustainable use of marine goods and services and to ensure the marine environment is safeguarded for the use of future generations. Establishes a comprehensive framework within which member States are required to develop and implement cost effective measures, necessary to achieve or maintain 'good environmental status' in the marine environment. Good Environmental Status must be achieved by 2020 at the latest.	Consideration of the plan preventing good environmental status being achieved.
Marine	UK	The Marine Works (Environmental Impact Assessment) Regulations 2007	Puts into practice the EIA Directive in relation to marine licences.	This legislation is part of the driving legislation for the Plan.
Marine	UK	The Marine and Coastal Access Act	Promote the sustainable management of marine activities and	

Marine/Terrestrial/ General	Level	Title	Summary of Objectives	Implications
		2009	increased protection and conservation of marine and coastal natural heritage	
Marine	UK	UK Marine Policy Statement 2011	The UK Marine Policy Statement is a jointly agreed policy document across all of the devolved administrations which provide the framework for preparing marine plans and taking decisions affecting the marine environment. It applies to all UK waters and sets out the general environmental, social and economic considerations that need to be taken into account in marine planning. This will contribute to the sustainable development in the UK marine area.	This policy statement is part of the raft of legislation which will inform the plan from a strategic perspective.
Marine	Northern Ireland	Marine Act (NI) 2013	The Marine Act sets out a new framework for Northern Ireland's seas based on: a system of marine planning that will balance conservation, energy and resource needs; improved management for marine nature conservation and the streamlining of marine licensing for some electricity projects. The Marine Act applies to the Northern Ireland inshore region – this is the territorial sea out to twelve nautical miles. This area includes all the tidal rivers and sea loughs (including Lough Foyle and Carlingford Lough).	This Act makes the production of a Marine Plan for Northern Ireland, a legal requirement.
Terrestrial and Marine	EU	Directive 2008/98/EC of the European Parliament and of the Council	Establishes a legal framework for the treatment of waste within the Community. It aims at protecting the environment and human health through the prevention of the harmful effects of waste generation and waste management	The plan will need to consider pollution prevention measures
Terrestrial	EU	Directive 2006/12/EC of the European Parliament and of the Council	Framework for coordinating waste management in the Member States in order to limit the generation of waste and to optimise the organisation of waste treatment and disposal	Requires prohibition of the abandonment, dumping or uncontrolled disposal of waste, and promotes waste prevention, recycling and

Marine/Terrestrial/ General	Level	Title	Summary of Objectives	Implications
				processing for re-use
Terrestrial	EU	Directive 2008/1/EC of the European Parliament and of the Council	Requires industrial and agricultural activities with a high pollution potential to have a permit.	The plan will need to consider pollution prevention measures
Terrestrial	Northern Ireland	The Amenity Lands (NI) Act 1965	First legislation for designating areas because of the importance of their flora, fauna, geological or physiographical or other features; very largely repealed by later Orders.	The plan must be cognisant of Northern Ireland specific land use designations.
Terrestrial	Northern Ireland	The Nature Conservation and Amenity Lands Order 1985 (NCALCO)	Allows the designation of National Parks, Areas of Special Scientific Interest (ASSIs), Areas of Outstanding Natural Beauty (AONBs) and nature Reserves	
Terrestrial	Northern Ireland	The Environment (Northern Ireland) Order 2002	Amends the ASSI section of the NCALCO 1985	
Terrestrial	Northern Ireland	Environmentally Sensitive Areas Designation Order (Northern Ireland) 2005	Provides agricultural management measure within designated natural beauty areas, to conserve flora and fauna and geological and physiographical features of those areas; and to protect buildings and other objects or archaeological, architectural or historic interest in those areas.	Plan will need to ensure consideration and protection of designated sites and heritage within Northern Ireland.
Terrestrial	Northern Ireland	Control Of Pollution (Oil Storage) Regulations (NI) 2010.	Will set minimum design standards for new and existing above ground oil storage facilities, providing a legal requirement for the standards to be met.	Plan should be cognisant of the regulations.
General	International	Aarhus Convention	Right for everyone to see public information that is held by public authorities Right for everybody to participate in environmental decision making	Plan will achieve this through the consultation process
General	International	UN Conference on the Human Environment, Stockholm 1972	Sustainable development principles ' the Rio Principles'	The Plan has been devised to integrate

Marine/Terrestrial/ General	Level	Title	Summary of Objectives	Implications
General	International	The UN Conference on Environment and Development (UNCED, Earth Summit) Rio de Janerio, Brazil 1992	Promotes social and economic development in a way that will not be detrimental to environmental protection	sustainable development into its making.
General	International	The World Summit on Sustainable Development (WSSD), Johannesburg, September 2002 – Commitments arising from Johannesburg Summit	Adoption of the Johannesburg Plan of Implementation setting out steps in a quantifiable time with targets and goals	
General	International	The UN Millennium Declaration (2000) and Millennium Development Goals	Goal seven is for Environmental Sustainability	
General	International	The Convention on EIA in Transboundary Context 1991 (Espoo Convention)	Facilitation of transparent and wider consultation for projects which will have or potentially have cross-boundary effects	The Plan must be cognisant of transboundry issues.
General	EU	Directive 2014/52/EU, which amends 85/337/EEC, as amended by 97/11/EC, 2003/35/EC and 2011/92/EU. (EIA Directive)	Sets requirements for Environmental Impact Assessment (EIA)	The Plan policies may facilitate projects which require EIA.
General	EU	Directive 2001/42/EC (SEA Directive)	Sets the requirements for Strategic Environmental Assessment (SEA)	The Plan may produce more local marine plans which require SEA.

Table C: Relevant Plans and Programmes

Relevant Plans and Programmes	Summary of Objectives	Implications
DoE, Draft Strategy for Marine Protected Areas in the Northern Ireland Inshore Region, 2013	Sets out how use Marine Protected Areas as one of the tools available to help protect and improve ecosystems in the Northern Ireland inshore region (i.e. within 12 nautical miles) and fulfill international and national legal obligations.	The plan will need to be consistent with the Marine Protected Areas.
DoE, Northern Ireland Marine Litter Strategy, 2013	Addresses the problem of marine litter.	The plan will need to consider reducing the levels of additional litter entering the marine environment; and the removal of litter which is currently present on the coast.
Northern Ireland Economic Strategy, 1st Annual Monitoring Report and Comprehensive Action Plan	Goal of the Strategy which is facilitated by the Action Plan is to improve competitiveness in the Northern Ireland economy.	The plan will need to consider the environmental, social and economic implications of the commitments and actions resulting from the Strategy.
Offshore Renewable Electricity Action Plan 2012-2020	Presents the vision for the delivery of offshore renewable energy in Northern Ireland waters. It contains actions to facilitate the opportunities and also address the challenges of offshore development.	The plan will need to be consistent with the requirements of the Offshore Renewable Electricity Action Plan.
Onshore Renewable Electricity Action Plan 2013-2020.	The aim of the Action Plan is to maximise the amount of renewable electricity generated from onshore renewable sources in order to enhance diversity and security of supply, reduce carbon emissions, contribute to the 40% renewable electricity target by 2020 and beyond and develop business and employment opportunities for Northern Ireland companies	The plan will need to be consistent with the requirements of the Onshore Renewable Electricity Action Plan.
UK Biodiversity Action Plan (1996)	To enhance biodiversity conservation in response to the Rio convention.	The plan will assess the impacts on biodiversity
Northern Ireland Biodiversity Strategy 2002 (including NI Species and Habitat Action Plans and Departmental Biodiversity Implementation Plans)	To enhance biodiversity at the Northern Irish level	

Relevant Plans and Programmes	Summary of Objectives	Implications
UK Post-2010 Biodiversity Framework (2012)	The Environment Departments of all four governments in the UK work together through the Four Countries Biodiversity Group. Together they have agreed, and Ministers have signed, a framework of priorities for UK-level work for the Convention on Biological Diversity. Published on 17 July 2012, the 'UK Post-2010 Biodiversity Framework' covers the period from 2011 to 2020.	
River Basin Management Plans and associated documents (including 'Mechanisms For Action' and 'Register Of Plans And Programmes') : North Eastern River Basin Management Plan North Western River Basin Management Plan Neagh Bann River Basin Management	Implements the Water Framework Directive for the island of Ireland. Geographic boundaries for plan are determined by river basin catchments.	The plan will need to be consistent with the River Basin Managements Plans, including objectives and targets.
EHS/NIEA's 'Policy For Setting And Delivering Water Quality Targets'	Summarises the development of water quality targets for Northern Ireland's waters and outlines the role of the inter-agency Water Quality Management Committee in helping to achieve those targets. It sets out the current position on setting water quality targets, on measuring achievement of targets and on the development of partnerships to co-ordinate environmental protection and improvement.	The plan will consider water quality impacts
UK Air Quality Strategy for England, Scotland, Wales and Northern Ireland	Strategic Framework for Air Quality Objectives for key air pollutants.	Consider implications of the plan on air pollution and AQMAs.
Northern Ireland Regional Seascape Character Assessment	Twenty-four different regional seascape character areas have been identified round the coast of Northern Ireland	The plan will need to assess the impacts on these seascape character areas
The Northern Ireland Waste Management Strategy 2006-2020, 'Towards Resource Management'	Sets out waste management practices until 2020	The plan will need to consider recycling and recovery

Relevant Plans and Programmes	Summary of Objectives	Implications
Shaping Our Future - Regional Development Strategy for Northern Ireland 2035, DRD	Sets out a strategic and long-term perspective on the future development of Northern Ireland up to the year 2035. It addresses a range of economic, social, environmental and community issues which are relevant to delivering the objectives of achieving sustainable development and social cohesion in Northern Ireland.	The plan will need to contribute to environmental protection and sustainable development.
Climate Change Risk Assessment (CCRA) for Northern Ireland	The CCRA reviewed the evidence for more than 700 potential climate change impacts on the UK economy, society and environment. Over 100 of these impacts across 11 sectors were taken forward for more detailed analysis at UK-wide scale, having been selected on the basis of likelihood, potential consequences and how urgently adaptation action may be needed to address them. A list of the most important impacts for Northern Ireland was subsequently developed through a process of consultation with stakeholders. This took into account the impacts considered to be the most important for the UK as a whole, together with particular features and issues relevant to Northern Ireland	Implications of the plan in terms of its objective to contribute towards climate change mitigation and adaptation and its impacts on greenhouse gas emissions.
Northern Ireland Climate Change Adaption Programme 2014	The Adaptation Programme contains the Government's response to the risks and opportunities identified in the Climate Change Risk Assessment (CCRA) for Northern Ireland, which was produced in January 2012, as part of the overall UK CCRA. The Adaptation Programme covers the period 2014-2019. It provides the strategic objectives in relation to adaptation to climate change, the proposals and policies by which each department will meet these objectives, and the timescales associated with the proposals and policies identified.	
Ensuring a Sustainable Transport Future: a New Approach to Regional Transportation	Sets out how the Department will develop regional transportation beyond 2015 when the current transport plans reach their conclusion	The plan will need to address transportation and sustainable

Relevant Plans and Programmes	Summary of Objectives	Implications
Regional Transportation Strategy 2002-12	Identifies strategic transportation investment priorities and considers potential funding sources and affordability of planned initiatives over the 10 year period 2002 - 2012. The Delivery of the RTS is being progressed through three transport plans; the Regional Strategic Transport Network Transport Plan, the Belfast Metropolitan Transport Plan and the Sub-Regional Transport Plan	development.
(Draft)A Strategic Planning Policy Statement for Northern Ireland (DoE, February 2014)	This draft SPPS consolidates 20 separate policy publications into one document, and brings forward new strategic policy relating to town centres and retailing. It sets out the core planning principles to underpin delivery of the reformed two-tier planning system from April 2015 including promoting sustainable development, well being and shared space. In this sense it is an essential, key element of the broader planning and local government reform programme that will assist in the transfer of planning to councils in 2015. It will set the direction for new councils to bring forward detailed operational policies within future local development plans	As a result of the proposed local reform of the planning system, the transfer of the majority of planning functions to the new 11 councils is due to take place in April 2015 and these area plans may become redundant. The draft SPPS was published for consultation on the 4 February 2014. It was accompanied by: Strategic Environmental Assessment Environmental Report, Section 75 Equality of Opportunity Screening Analysis Form, Draft Regulatory Impact Assessment The consultation closed on 29 April 2014. The Department is currently considering the responses received to the consultation

Relevant Plans and Programmes	Summary of Objectives	Implications
A Planning Strategy for Rural Northern Ireland (DoE, 1993);	Sets out on a topic by topic basis the factors that the Department takes into account when considering development proposals. It covers all the towns, villages and countryside of Northern Ireland outside the Belfast urban area, and the adjacent towns of Carrickfergus, Bangor, and Londonderry It establishes the objectives and the policies for land use and development appropriate to the particular circumstances of Northern Ireland and which need to be considered on a scale wider than the individual District Council Area.	The plan will need to address environmental protection and sustainable development. Impacts on environmental designations set out in the strategy will be assessed by the plan.
PPS 1 - General Principles (DoE, March 1998)	Sets out the general principles that the Department observes in formulating planning policies, making development plans and exercising control of development	The plan will need to consider the key themes of sustainable development, mixed use, quality development and design that underlie this PPS.
PPS 2 – Natural Heritage (DoE, July 2013)	Sustainable development and to conserving and where possible enhancing and restoring our natural heritage.	The Plan will ensure for the protection of the environment in Northern Ireland through its objectives of promoting the preservation and enjoyment of marine related heritage features.
PPS 4: Planning and Economic Development (DoE November 2010)	This PPS sets out the Department's planning policies for economic development uses and indicates how growth associated with such uses can be accommodated and promoted in development plans. It seeks to facilitate and accommodate economic growth in ways compatible with social and environmental objectives and sustainable development.	The plan will consider economic development through its objective of promoting the marine resource, its recreational value and the wider social, economic and environmental benefits to all.
PPS 6 - Planning, Archaeology and Built Heritage (DoE, March 1999) and PPS 6 (Addendum): Areas of Townscape Character (DoE, 2005)	Sets out the Department's planning policies for the protection and conservation of archaeological remains and features of the built heritage**.**	Impacts on archaeological sites will be assed b the plan and given appropriate consideration.

Relevant Plans and Programmes	Summary of Objectives	Implications
PPS 8 -Open Space, Sport and Outdoor Recreation (DoE, 2004)	Sets out the Department's planning policies for the protection of open space, in association with residential development and the use of land for sport and outdoor recreation.	The plan will promote the sustainable development of productive activities, which support employment at all skill levels, while fully considering the requirements of other marine interests.
PPS 11- Planning and Waste Management (DOE, 2002)	Sets out the Department's planning policies for the development of waste management facilities.	The plan will need to consider recycling.
PPS 13 – Transportation and Land Use (DRD, February 2005);	This PPS has been prepared to assist in the implementation of the Regional Development Strategy to guide the integration of transportation and land use.	The plan will need to consider integration of land use and transportation.
PPS 15- Planning Policy and Flood Risk (DOE, June 2006	Sets out the Department's planning policies to minimise flood risk to people, property and the environment.	Requires prevention of future development that may be at risk from flooding or that may increase the risk of flooding elsewhere.
PPS 16 – Tourism (DOE, June 2013)	PPS 16 'Tourism' sets out the Department's planning policy for tourism development, including the main forms of tourist accommodation and tourist amenities. In addition the PPS provides policy for the safeguarding of tourism assets from development likely to adversely impact upon the tourism value of the environmental asset.	The plan will need to consider the impacts on tourism assets.
PPS 18– Renewable Energy (August , 2009);	Sets out the planning policy for development that generates energy from renewable resources.	The plan will need to consider renewable energy sources.
PPS 18 Renewable Energy Best Practice Guidance (August 2009);	This guide provides background information on the various renewable energy technologies that may come forward in Northern Ireland and is designed to contribute to the development management process.	
Draft Supplementary Planning Guidance to accompany PPS 18 - Renewable Energy (DOE February 2008);	This SPG reports the findings of landscape sensitivity and capacity analysis carried out in respect of the 130 Landscape Character Areas identified in the Northern Ireland Landscape Character Assessment 2000, and contains advice to assist in identifying appropriate locations for wind energy development.	

Relevant Plans and Programmes	Summary of Objectives	Implications
PPS 21- Sustainable Development in the Countryside (DOE, 2010);	Sets out Planning Policies for Development in the Countryside.	The plan will need to consider the conservation of the landscape and natural resources of the rural area .
PPS 23 – Enabling development (DOE, April 2014)	PPS23 provides a policy for assessing enabling development i.e. development that would not normally be acceptable, but can be justified where there are overriding public benefits to be gained from the development scheme overall.	Allows for enabling developments that are contrary to planning policy and contains safeguards to ensure the approved development will not harm the heritage value of the significant place or its setting.

Table D: Council Areas and Area Plans

Area Plans	Summary of Objectives	Implications
Antrim, Ballymena & Larne Area Plan 2016 Issues Paper (DOE 2002)	Contains policy provision for Antrim Borough, Ballymena Borough and Larne Borough Council Areas	As a result of the proposed local reform of the planning system, the transfer of the majority of planning functions to the new 11 councils is due to take place in April 2015. Many of these plans have reached their notional end date. The new councils may want to promptly prepare area plans which will supersede these plans.
Ards & Down Area Plan 2015 (DOE 2009)	Contains policy provision for Ards Borough and Down District Council Areas	
Bangor Town Centre Local Plan (DOE 1995)	Contains policy provision for Bangor Town Centre	
Belfast Harbour Local Plan 1990-2005 (DOE 1991)	Contains policy provision for Belfast Lough and its foreshores encompassing land east of the Belfast to Larne railway line and west of the Sydenham By-Pass and the Belfast to Bangor road within the Belfast City Council area	
Belfast Metropolitan Area Plan 2015 (DOE 2004)	Contains policy provision for Belfast City, Carrickfergus Borough, Castlereagh Borough, Lisburn City, Newtownabbey Borough and North Down Borough Council Areas	
Belfast Urban Area Plan 2001 (DOE 1989)	Contains policy provision for Antrim Borough Council, Ards Borough Council, Belfast City Council, Carrickfergus Borough Council, Castlereagh Borough Council, Down District Council, Lisburn Borough Council, Newtownabbey Borough Council and North Down Borough Council	
Coleraine Borough Houses in Multiple Occupation Subject Plan 2016 Issues Paper (DOE 2006)	Contains policy provision for Coleraine Borough Council	
Down Area Plan 1982-1997 (DOE 1986)	Contains policy provision for Down District Council Area	
Downpatrick Town Centre Local Plan (DOE May 1992)	Contains policy provision for Downpatrick Town Centre	
Lagan Valley Regional Park Local Plan 2005 (1995)	Contains policy provision for Lagan Valley which lies within Belfast City, Castlereagh Borough and Lisburn Borough Council Areas.	

Area Plans	Summary of Objectives	Implications
Larne Area Plan 2010 (1998)	Contains policy provision for Larne Borough Council	
Limavady District Hamlet Subject Plan 1989-1999 (1990)	Contains policy provision for the hamlets of Limavady District Council	
Limavady Local Plan (South East Lands) 1989-1999 (1990)	Contains policy provision for the south east lands in the town of Limavady	
Newry & Mourne Area Plan 1984-1999 (1988)	Contains policy provision for Newry & Mourne District Council area (also includes Rathfriland area)	
Newry & Mourne Rural Area Subject Plan 1986-1999 (1990)	Contains policy provision for the rural part of Newry & Mourne District Council area	
Newtownabbey Area Plan 2005 Adopted Mar 1993	Contains policy provision for Newtownabbey Borough Council Area	
North Down & Ards Area Plan 1984-1995 (1989)	Contains policy provision for North Down and Ards Borough Council Areas	
North East Area Plan 1987-2002 (1990)	Contains policy provision for Coleraine Borough, Ballymoney District and Moyle District Council Areas	
Strabane Area Plan 1986-2001 (1991)	Contains policy provision for Strabane District Council Area	
Limavady Area Plan 1984 - 1999	Contains policy provision for South Eastern Foyle Area	
Draft Northern Area Plan 2016	Contains policy provision for Eastern Foyle Area	
Derry Area Plan 2011	Contains policy provision for the Derry Area	
Banbridge and Newry and Mourne Area Plan 2015	Contains policy provision for Newry and Mourne Area	

Table E: Key Transboundary (Republic of Ireland) Plans and Programmes

Relevant Plans and Programmes	Summary of Objectives	Implications
River Basin Management Plans and associated documents (including 'Mechanisms For Action' and 'Register Of Plans And Programmes') : North Eastern River Basin Management Plan North Western River Basin Management Plan Neagh Bann River Basin Management	Implements the Water Framework Directive for the island of Ireland. Geographic boundaries for plan are determined by river basin catchments.	The plan will need to be consistent with the River Basin Managements Plans, including objectives and targets.
National Reform Programme	The Republic of Ireland response to the European 2020 Strategy to produce a "smart, sustainable and inclusive economy". The Irish national targets relate to employment, research and development, climate change, education and poverty.	While not a specifically environmental or land use plan, the National Reform Programmes targets regarding climate change relating to renewables would have to be taken cognisance of in the Plan.
Donegal County Development Plan 2006-2012	Sets out planning policy for County Donegal	Impacts on environmental designations set out in the development plan will be assessed by the plan.
Louth County Development Plan 2009-2015	Sets out planning policy for County Louth	

Appendix B - Alternatives

Date: 07th March 2014

Marine Plan Team
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Dear Stakeholder

Consideration of Alternative Approaches to the Marine Plan for Northern Ireland

Following the DOE marine day on 7 November 2013, the Marine Plan Team have been considering the feedback received on the Plan Vision and Objectives. The discussions on the day raised awareness of the next stage - namely consideration of the approach to be taken when preparing the Marine Plan for Northern Ireland. The various options put forward have been explored and the attached paper outlines the team's consideration of these.

The team is keen to receive your views and comments on the recommended approach outlined in the attached paper. We are, of course, aware of the demands on your time, and therefore we are happy to receive your comments via e-mail or in writing.

However, should you prefer to discuss the paper with us the team will be happy to organise a half day workshop to facilitate discussion and we have set aside the morning of Wednesday 26 March for this. In order to finalise the arrangements for the workshop, if required, a response **by 13th March** would be appreciated.

Should you prefer to forward your comments to the addresses above via e-mail or in writing then please do so by **21st March**.

Yours sincerely,

Marine Plan Team

Consideration of Alternative Approaches to the Marine Plan for Northern Ireland

March 2014

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Consideration of Alternative Approaches to the Marine Plan for Northern Ireland

1. The development of a Marine Plan for NI is a requirement of both the Marine and Coastal Access Act (2009) and the Marine Act (NI) 2013. The legislation outlines, in Schedule 6 and Schedule 1 respectively, the process for preparing and adopting a Marine Plan which includes a Sustainability Appraisal (SA).
2. An SA considers the economic, social and environmental impacts of an emerging plan. The aim in undertaking an SA is to identify a plan's likely significant adverse effects and take steps to avoid and/or mitigate these as well as identify opportunities to maximise the plan's sustainability.
3. The SA process incorporates the requirements of the SEA Directive and aims to ensure that sustainable development is at the heart of the plan-making process.

In liaison with stakeholders the following Vision for a Marine Plan for NI was produced:

'A healthy marine area which is managed sustainably for the economic, environmental and social prosperity of present and future generations'

4. To achieve the Vision a set of nine objectives were also drawn up.
5. As part of the SEA process the next stage in the plan preparation involves the consideration of alternative approaches aimed at enabling it to meet its objectives. This is an iterative process with the alternatives being revised as part of the SEA to enhance positive

effects and minimise negative ones. Marine planning is an important tool to facilitate the sustainable management of our marine area. It is based on a balanced consideration of economic, social and environmental factors.

6. The first Marine Plan for NI together with the Marine Policy Statement (MPS) will set the direction for the new plan-led system for NI's marine area. It will help to inform and guide relevant authorisation and enforcement decisions in our inshore and offshore marine waters. Together, they will provide for greater coherence in policy and a forward looking, proactive and spatial planning approach to the management of our marine resources and the activities and interactions that take place within it.
7. Given that the Department is producing the first Marine Plan for NI, early discussions indicated a majority of those with an interest in the marine area were in favour of this first plan being focussed at a strategic level. This was viewed as the optimum approach to enable the management of our marine area to be established.
8. In addition, it presents the opportunity to incorporate specific spatial elements where they are known such as renewable energy zones, designated environmental protected areas. This was raised as a helpful factor for encouraging sustainable development and investment.
9. A strategic approach would, therefore, help to ensure that the first Marine Plan for NI:

    - achieves its objectives;
    - improves the management of its marine area;
    - plays its part in contributing towards the achievement of sustainable development;

- fulfils NI's requirements under UK and EU legislation and our obligations under international law;
- contributes to the delivery of the high level UK objectives;
- is based on an ecosystem approach;
- makes effective use of existing best available data provided by consultees, stakeholders, regulators and relevant experts; and
- is a single point of reference for all those with an interest in the marine area.

10. It is recommended, therefore, that the Marine Plan should be developed at a strategic level with generic direction and policy relevant across all parts of the marine area. This would not preclude the Plan from providing clarity and policy direction for more localised marine plans, if considered necessary in the future

11. The next step in the consideration of alternatives is to consider appropriate direction for the Plan. The SEA Directive outlines that reasonable alternatives should be considered and to fulfil this requirement the team analysed stakeholder feedback which produced three main directions:

- to produce a Plan that provides additional determining weight to economic considerations, where appropriate, in the decision-making process;
- to produce a Plan that provides additional determining weight to environmental considerations, where appropriate, in the decision-making process; and
- to produce a Plan that provides a balanced consideration of the social, economic and environmental aspects in the decision-making process.

12. When considering the directions the team looked at what additional measures the Plan would bring over and above those already required under respective Departments' policies and legislation. As you are aware responsibility for the marine area is spread across a number of Government Departments and Agencies however, it is recognised that cooperation among the various authorities is an integral part to achieving sustainable management of the marine area. The DOE as Marine Plan Authority is responsible for preparing a Marine Plan and the legislation outlines the consultative nature of that process.

13. The authorities responsible for the decisions affecting the marine area will in effect implement the Marine Plan through their decision making. Therefore, the Plan should not interfere in that process but should help guide and inform decision-making. The first 2 directions are, therefore, considered to be contrary to that purpose.

14. The third alternative however, is considered to meet that purpose and align with the MPS whereby the Plan can encourage and promote a balanced consideration to ensure that sustainable development is at the heart of the decision-making process.

15. Marine plans are intended to guide:
    - marine users to the most suitable locations for different activities;
    - the use of marine resources to ensure sustainable levels;
    - all marine users to ensure everyone with an interest has an opportunity to contribute;
    - a holistic approach to decision making; and
    - consideration of the benefits and impacts of all the current and future activities that occur in our marine area.

16. It is the team's view that the Plan should not be driven by any predetermined bias thereby allowing the users of the document to attach the relative weight to any environmental, economic or social considerations as deemed appropriate in the exercise of their functions. The Plan should highlight the social, economic or environmental factors, which are of particular importance and require careful consideration.

17. This approach would help to achieve the Plan's objectives. It also moves away from a sectoral approach to a more coordinated one based on sustainable development in alignment with the requirements of the MPS.

18. The Department has stressed the contributory role the plan will have in relation to marine management. It has made clear that the policy and legislative responsibility of marine functions and activities will remain with the relevant Departments and that the Marine Plan will reflect those responsibilities.

19. Accordingly it is viewed that the third direction provides the best method for ensuring that a balanced consideration of the social, economic and environmental aspects are an integral part of the decision-making process.

20. Overall, the Marine Plan aims to provide a strategic and integrated planning approach to Northern Ireland's inshore and offshore areas, its resources, and the activities and interactions that take place within it. The Marine Plan also aims to strike the balance between supporting economic development within the marine area while protecting environmental assets and promoting social inclusion & prosperity.

21. It is, therefore, deemed reasonable and realistic to develop a strategic plan with spatial elements included, where appropriate and

to take a balanced approach to guide the users of the document to consider the relative weight of any environmental, economic or social considerations in the exercise of their functions.

Appendix C - Relationships

Appendix C

Relationship between SA topic sub headings with regard to existing conditions and future trends

This table illustrates how the key issues and future trends which have been identified in Chapter 5 of the SA scoping report are associated with other SA sub headings. The E represents an existing link (given green emphasis) and the F represents a future trend (given purple emphasis). This illustration is a visual representation of the relationships identified as part of the baseline data gathering. As the assessment progresses, it is expected further relationships will be identified.

	Protected Sites International, European and National Conservation Sites)	Benthic and Intertidal Ecology	Plankton	Fish and Shellfish	Marine Mammals	Marine Reptiles	Birds	Marine Noise	Bathymetry and Hydrography (including circulation and tides)	Geology, Geomorphology and Sediment Processes (including coastal and marine processes)	Sediment and Water Quality	Air	Climate Factors	General Demography	Deprivation	Life Expectancy and Median Age of Death	Neighbourhood Renewal	Education	Housing	Northern Ireland Economy	Coastal Communities Fund	Commercial Fisheries	Aquaculture	Ports, Shipping, Navigation, Dredging and Disposal	Recreation and Tourism	Aviation	Military Activity	Coastal Defences	Noise	Lighting	Marine Litter	Cables and Pipelines	Terrestrial Transport Network	Aggregates	Underground Offshore Energy Storage	Petroleum Exploration Licensing	Offshore Renewable Energy	Carbon Capture and Storage	Compressed Air Energy Storage	Waste Water Treatment and Industrial Discharges	Cultural Heritage	Wrecks	Submerged Prehistory	Coastal and Intertidal Archaeology	Terrestrial Cultural Heritage	Landscape and Seascape
Protected Sites (International, European and National Conservation Sites)												E	E									E	E	E	E			E																		
Benthic and Intertidal Ecology											F											E	E	E			E	E				E			F			F			E					
Plankton										E	E												E	F																						
Fish and Shellfish	E	E	E							E	E											E	E										F			F									
Marine Mammals	E	E		E								E										E		E															E					
Marine Reptiles													F									E		E					E															
Birds	E	E		E									E								E	E	E		E	F									F									
Marine Noise													E									E	E	E										F			F							
Bathymetry and Hydrography (including circulation and tides)													F									E		E				E				E		E			E							
Geology, Geomorphology and Sediment Processes (including coastal and marine processes)																								E									F			F					F		
Sediment and Water Quality									E	E			F																							F									
Air																								F																				
Climate Factors																								F								F				F		F					
General Demography															E	E																												
Deprivation														E		E	E	E	E	E																								

	Protected Sites International, European and National Conservation Sites)	Benthic and Intertidal Ecology	Plankton	Fish and Shellfish	Marine Mammals	Marine Reptiles	Birds	Marine Noise	Bathymetry and Hydrography (including circulation and tides)	Geology, Geomorphology and Sediment Processes (including coastal and marine processes)	Sediment and Water Quality	Air	Climate Factors	General Demography	Deprivation	Life Expectancy and Median Age of Death	Neighbourhood Renewal	Education	Housing	Northern Ireland Economy	Coastal Communities Fund	Commercial Fisheries	Aquaculture	Ports, Shipping, Navigation, Dredging and Disposal	Recreation and Tourism	Aviation	Military Activity	Coastal Defences	Noise	Lighting	Marine Litter	Cables and Pipelines	Terrestrial Transport Network	Aggregates	Underground Offshore Energy Storage	Petroleum Exploration Licensing	Offshore Renewable Energy	Carbon Capture and Storage	Compressed Air Energy Storage	Waste Water Treatment and Industrial Discharges	Cultural Heritage	Wrecks	Submerged Prehistory	Coastal and Intertidal Archaeology	Terrestrial Cultural Heritage	Landscape and Seascape
Life Expectancy and Median Age of Death															E																															
Neighbourhood Renewal															E	E		E	E																											
Education														E																																
Housing															E		E																													
Northern Ireland Economy														E	E			E								E											E								F
Coastal Communities Fund																				F					F																				
Commercial Fisheries	E	E											F										F	F			F																		
Aquaculture		E											F																										F						
Ports, shipping, navigation, dredging and disposal									F		F									F																				F						
Recreation and Tourism				F			F					F	F							F					F																				
Aviation	F																									F										F										
Military Activity																											F											F								
Coastal Defences													E													E																				
Noise																								F		F										E										
Lighting																								F																						
Marine Litter		E		E	E	E	E		F	F										F		E																							F
Cables and Pipelines													E							E						F									F		F								
Terrestrial Transport Network													E															F																	
Aggregates																								E/F																						
Underground Offshore Energy Storage		F						F																																					
Petroleum Exploration Licensing																				F																										
Offshore Renewable Energy													F							F																										
Carbon Capture and Storage		F																		F																F									
Compressed Air Energy Storage																				F																										
Waste Water Treatment and	E																																												

Landscape and Seascape	Terrestrial Cultural Heritage	Coastal and Intertidal Archaeology	Submerged Prehistory	Wrecks	Cultural Heritage	Discharges	Industrial	
								Protected Sites International, European and National Conservation Sites)
				F				Benthic and Intertidal Ecology
								Plankton
								Fish and Shellfish
								Marine Mammals
								Marine Reptiles
								Birds
								Marine Noise
				F	E			Bathymetry and Hydrography (including circulation and tides)
		E						Geology, Geomorphology and Sediment Processes (including coastal and marine processes)
								Sediment and Water Quality
								Air
		E			E			Climate Factors
								General Demography
								Deprivation
								Life Expectancy and Median Age of Death
								Neighbourhood Renewal
								Education
								Housing
								Northern Ireland Economy
								Coastal Communities Fund
				F	F			Commercial Fisheries
								Aquaculture
								Ports, Shipping, Navigation, Dredging and Disposal
				E	F			Recreation and Tourism
								Aviation
								Military Activity
		E						Coastal Defences
								Noise
								Lighting
								Marine Litter
					F			Cables and Pipelines
	E							Terrestrial Transport Network
					F			Aggregates
								Underground Offshore Energy Storage
					F			Petroleum Exploration Licensing
			F		F			Offshore Renewable Energy
								Carbon Capture and Storage
								Compressed Air Energy Storage
								Waste Water Treatment and Industrial Discharges
F								Cultural Heritage
								Wrecks
								Submerged Prehistory
								Coastal and Intertidal Archaeology
F								Terrestrial Cultural Heritage
		F			F			Landscape and Seascape

Appendix D - Figures

Figure List

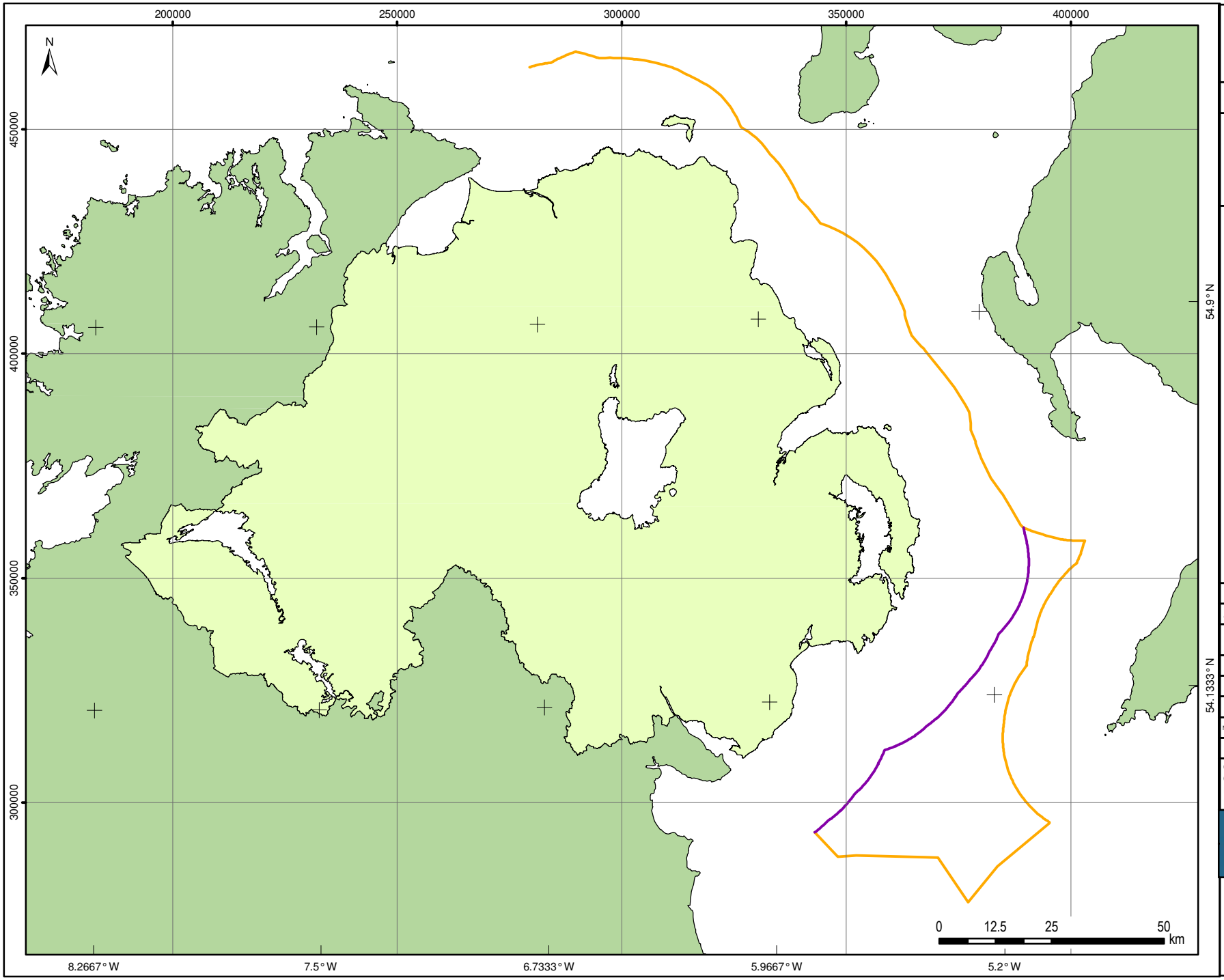

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Figure 1

Northern Ireland Marine Plan Extent

- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
Aug 14	GB	A4	1
Coordinate System		TM75 - Irish Grid	
Projection		Transverse Mercator	
Scale		1:1,150,000	
QA		MM	
NIMarinePlan_Fig1_MarinePlanExtent.mxd			
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marine environmental research

AECOM

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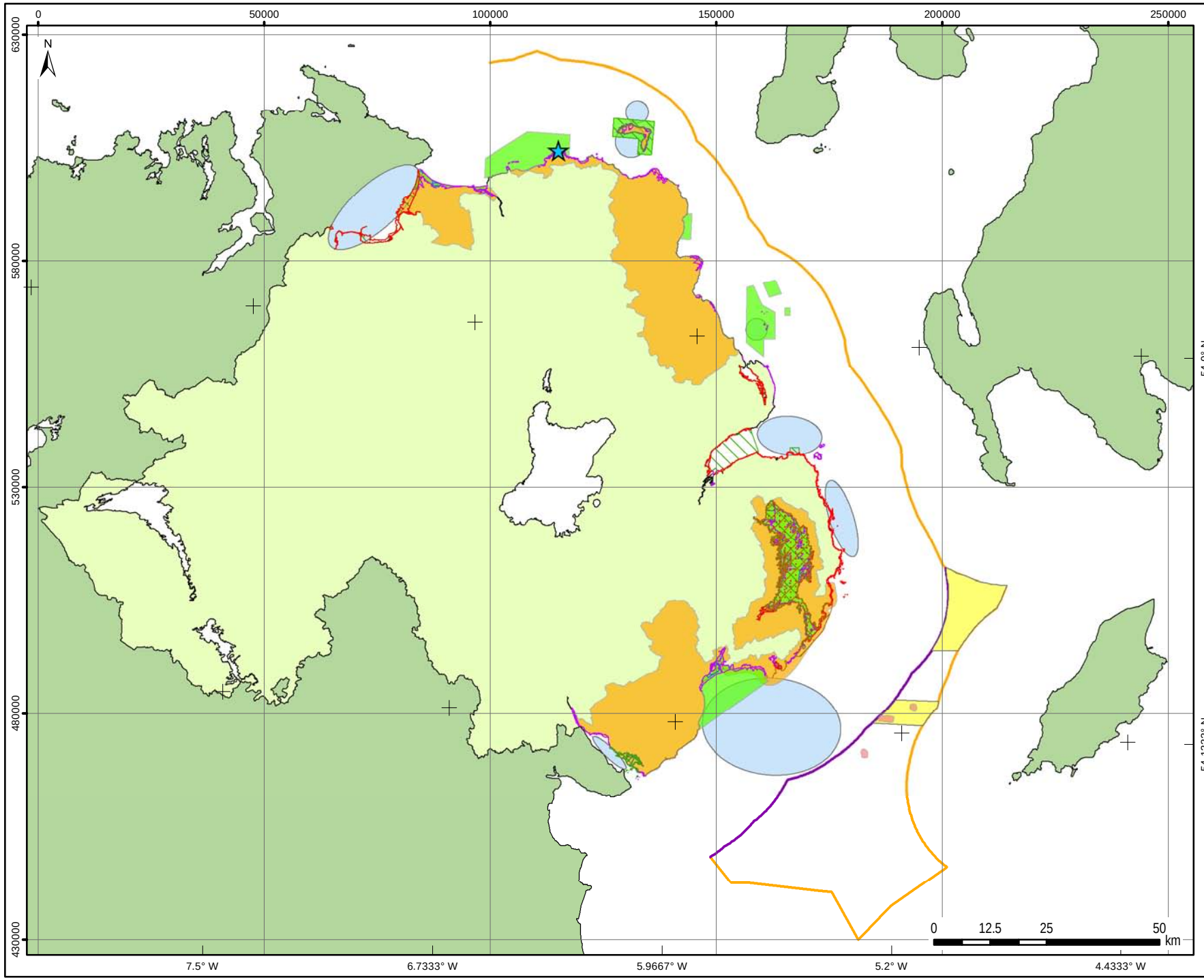

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Figure 2

National, European and International Designated Sites

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- World Heritage Site
- Ramsar
- SPA
- SAC
- AONB
- SCI
- National Nature Reserve
- Area of Special Scientific Interest
- MCZ
- rMCZ
- MCZ Area of Search

Date	By	Size	Version
Aug 14	TAP	A4	1
Coordinate System		British National Grid	
Projection		Transverse Mercator	
Scale		1:1,140,000	
QA		FMM	
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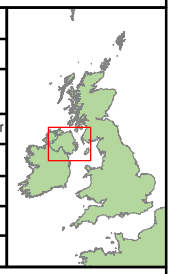

Data Sources: CMRC, 2012; DOENI, 2013; JNCC, 2011; JNCC, 2013; Irish Sea Conservation Zones, 2014. © Crown copyright. All rights reserved. Northern Ireland Environment Agency, 2014.

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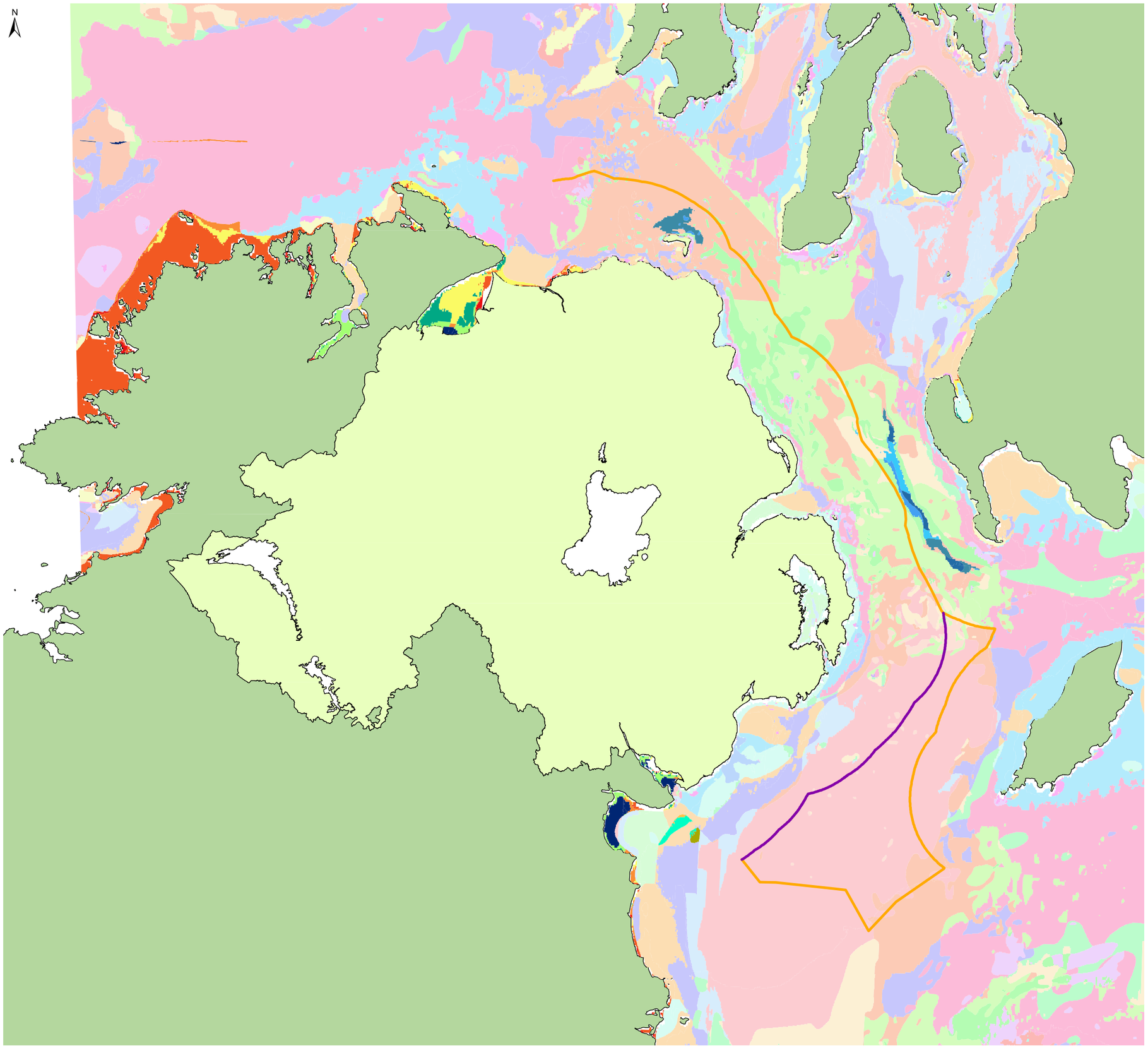

NI Inshore/Offshore Waters Boundary
Adjacent Waters Boundary

EUseamap Habitats

- A3.1: Atlantic and Mediterranean high energy infralittoral rock
- A3.2: Atlantic and Mediterranean moderate energy infralittoral rock
- A3.31: Silted kelp on low energy infralittoral rock with full salinity
- A4.11: Very tide-swept faunal communities on circalittoral rock or A4.13: Mixed faunal turf communities on circalittoral rock
- A4.12: Sponge communities on deep circalittoral rock
- A4.27: Faunal communities on deep moderate energy circalittoral rock
- A4.2: Atlantic and Mediterranean moderate energy circalittoral rock
- A4.31: Brachiopod and ascidian communities on circalittoral rock
- A4.33: Faunal communities on deep low energy circalittoral rock
- A5.13: Infralittoral coarse sediment
- A5.14: Circalittoral coarse sediment
- A5.15: Deep circalittoral coarse sediment
- A5.23: Infralittoral fine sand or A5.24: Infralittoral muddy sand
- A5.25: Circalittoral fine sand or A5.26: Circalittoral muddy sand
- A5.27: Deep circalittoral sand
- A5.33: Infralittoral sandy mud or A5.34: Infralittoral fine mud
- A5.35: Circalittoral sandy mud or A5.36: Circalittoral fine mud
- A5.37: Deep circalittoral mud
- A5.43: Infralittoral mixed sediments
- A5.44: Circalittoral mixed sediments
- A5.45: Deep circalittoral mixed sediments
- Deep circalittoral seabed
- Upper slope coarse sediment
- Upper slope mixed sediment
- Upper slope mud to sandy mud
- Upper slope rock or reef
- Upper slope sand to muddy sand
- High energy circalittoral seabed
- High energy infralittoral seabed
- Moderate energy circalittoral seabed
- Moderate energy infralittoral mixed hard sediments
- Moderate energy infralittoral seabed
- Low energy circalittoral mixed hard sediments
- Low energy circalittoral seabed
- Low energy infralittoral mixed hard sediments
- Low energy infralittoral seabed

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0 5 10 20 km

Date	By	Size	Version
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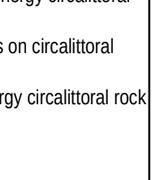

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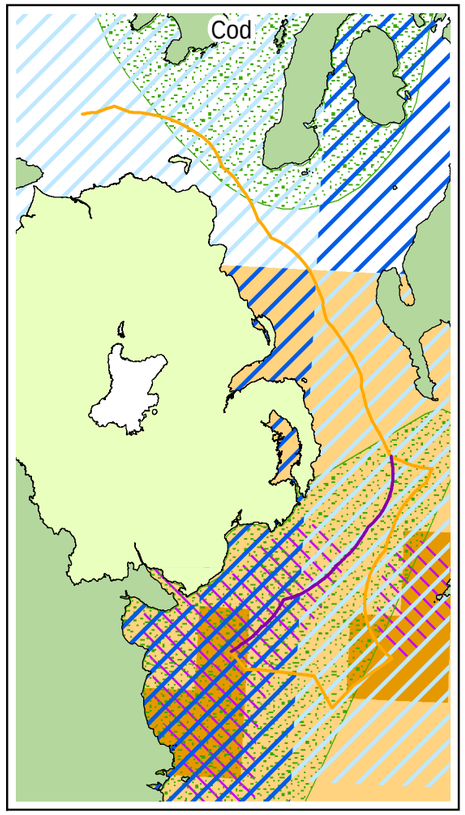
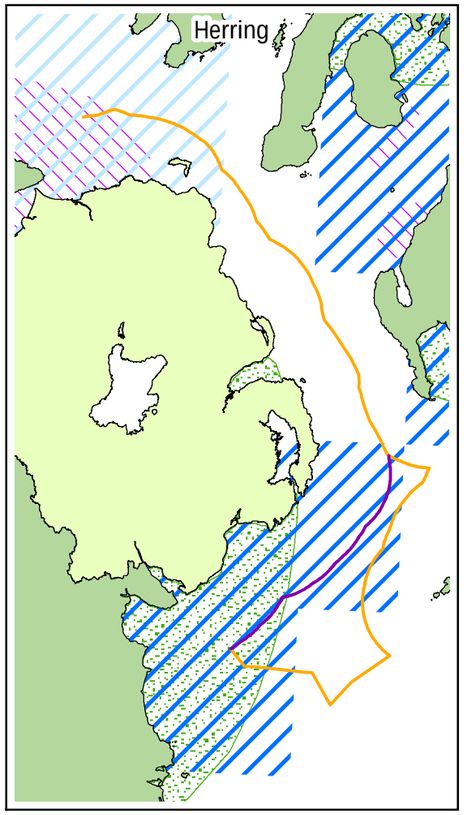
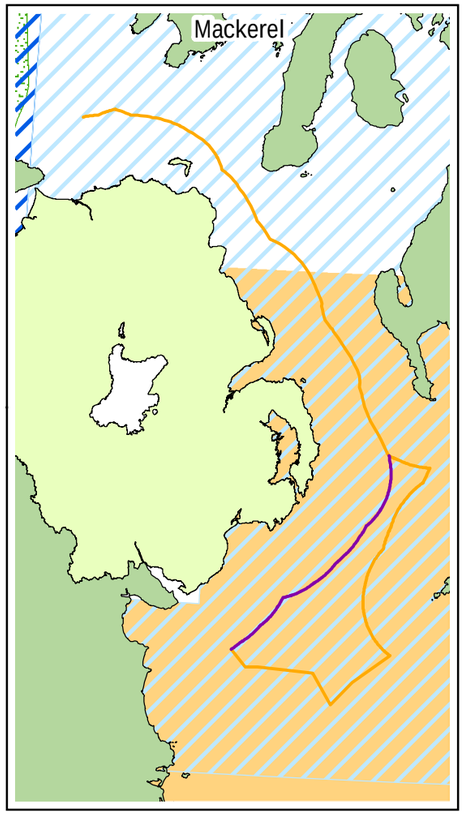
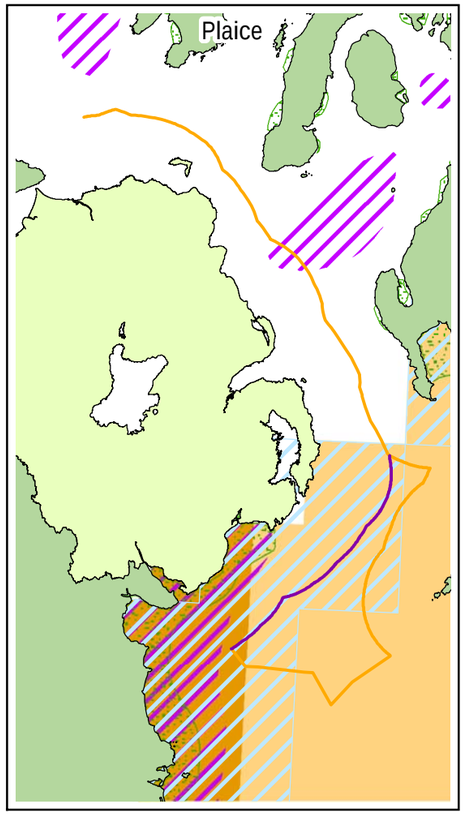
Marine Habitats (EUSeaMap 2012)

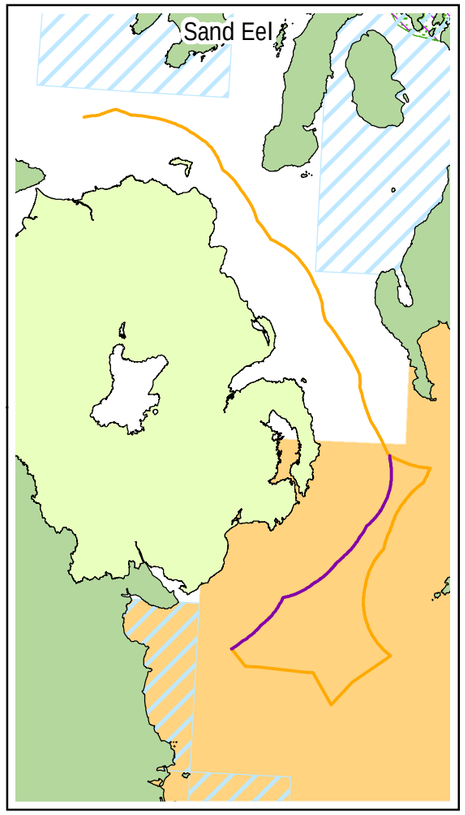
Figure 3

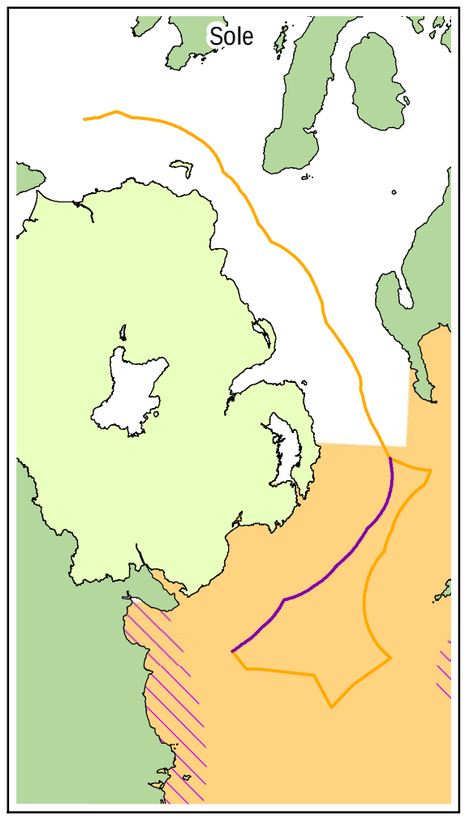


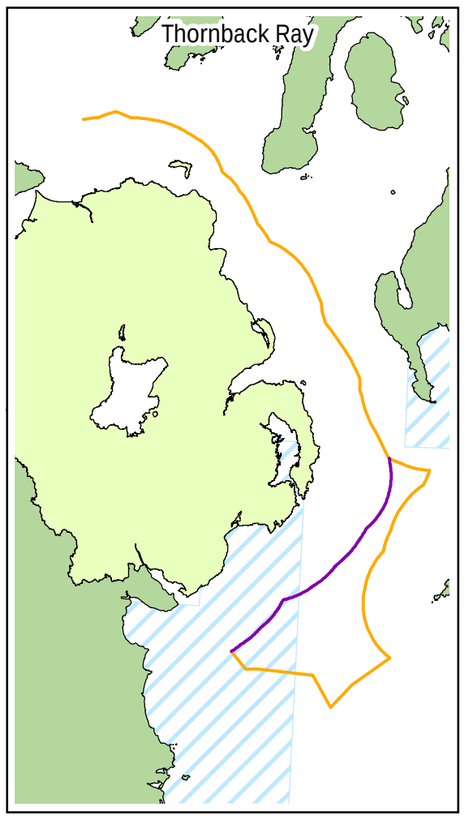


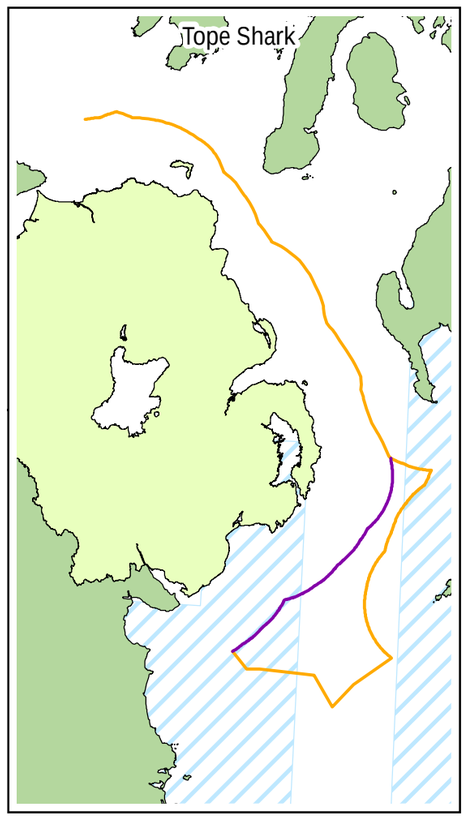


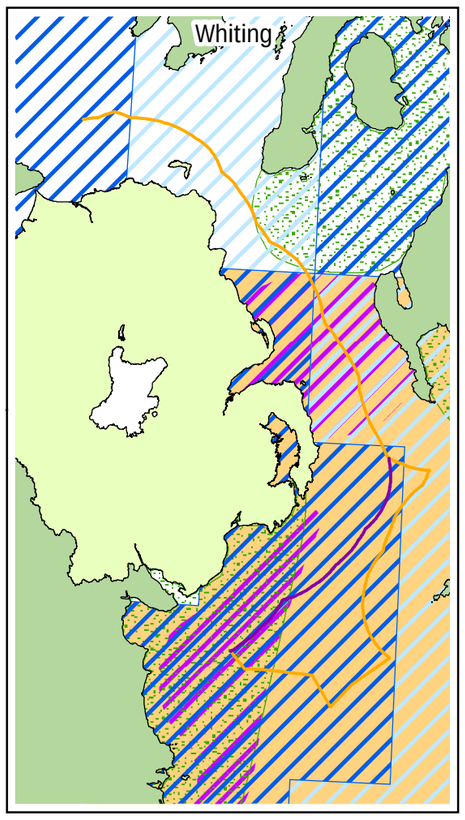












NI Inshore/Offshore Waters Boundary

Adjacent Waters Boundary

Fishing Sensitivity Areas

Nursery Grounds

Spawning Grounds

Nursery Grounds

High Intensity

Low Intensity

Spawning Grounds

High Intensity

Low Intensity

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Date	By	Size	Version
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Projection		OSGB 1936	
Scale		1:2,000,000	
QA		FMM	
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Produced by ABPmer			

Data Sources: Coull *et al.*, 1998; Ellis *et al.*, 2012.
NOT TO BE USED FOR NAVIGATION

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N

0 10 20 40 km

Spawning and Nursery Areas in the NI Marine Plan Region

Figure 4

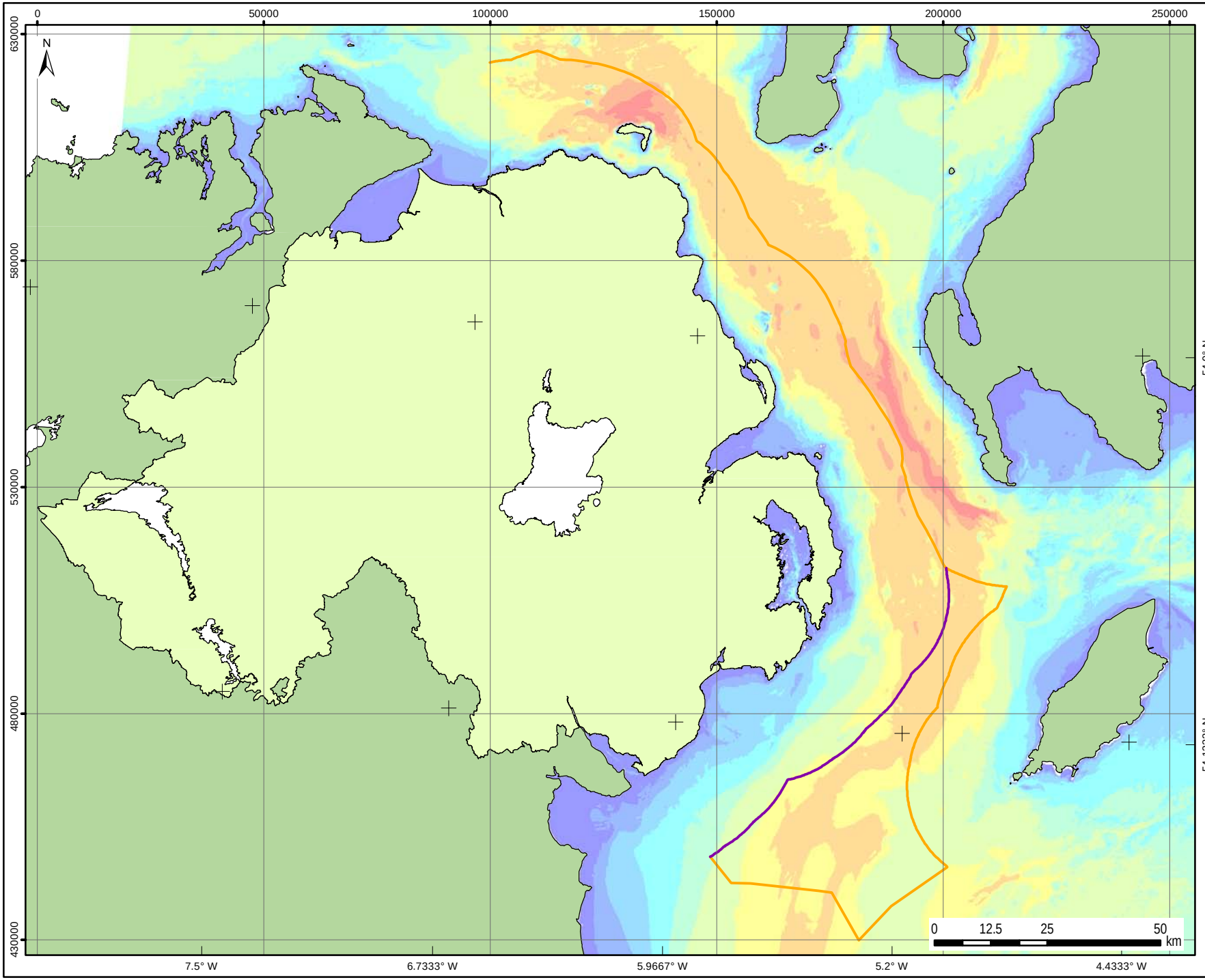

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Figure 5

Bathymetry

NI Inshore/Offshore Waters Boundary

Adjacent Waters Boundary

Bathymetry (mCD)

- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 -75
- 75 - 100
- 100 - 150
- 150 - 200
- > 200

Date	By	Size	Version
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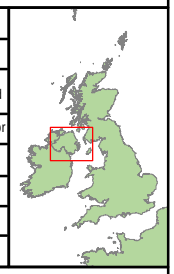

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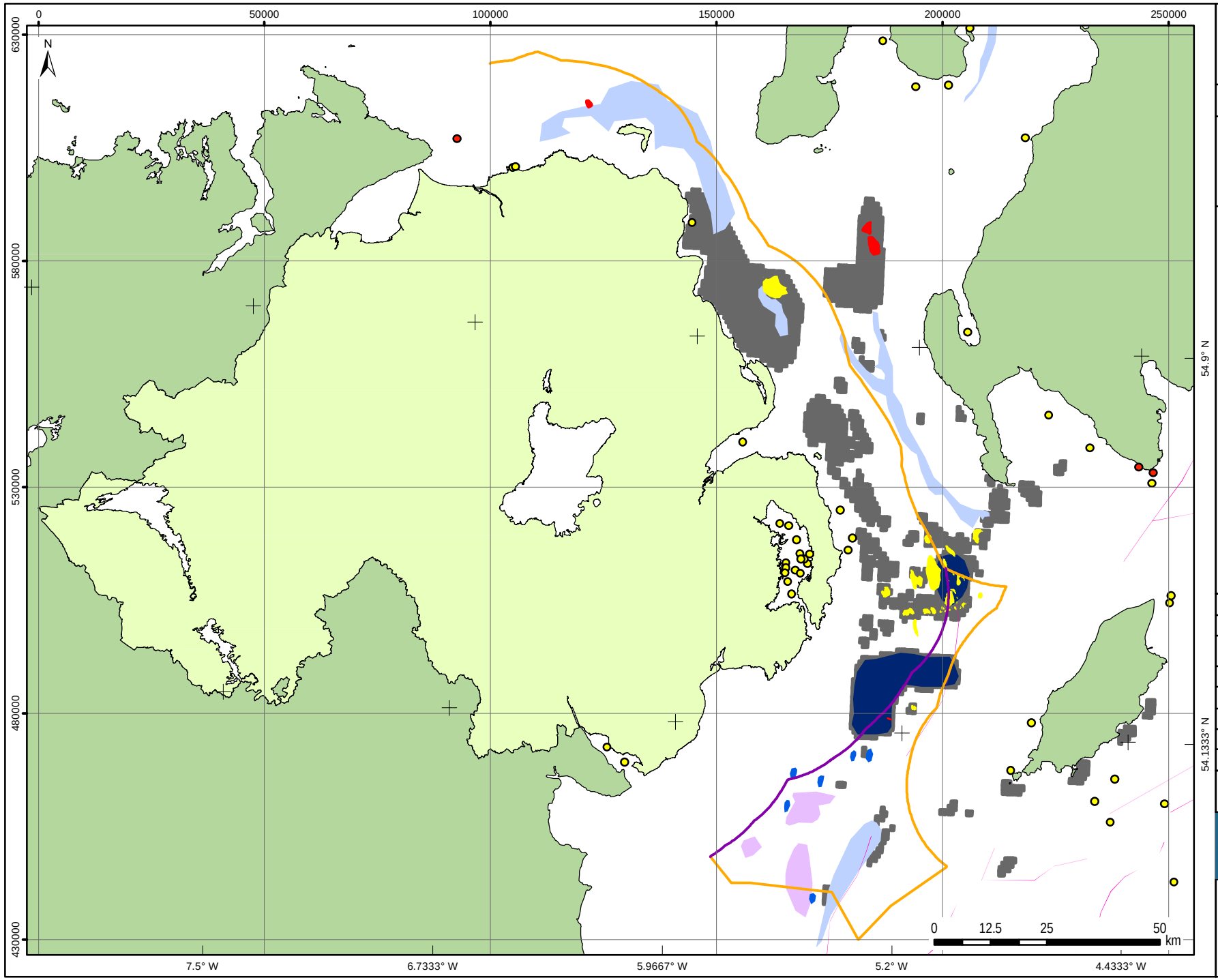

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Figure 6

Geological Process (Static) Bedforms

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- Tunnel Valley
- Irish Sea Mounds
- Seabed Mound or Pinnacle
- Glaciated Channel/Trough
- Roche Moutonnee Field
- Tidal Scoured
- Pockmarks
- Rock Outcrop

Bioherm Features

- Modiolus Bed
- Sabellaria Reef

Date	By	Size	Version
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Projection		Transverse Mercator	
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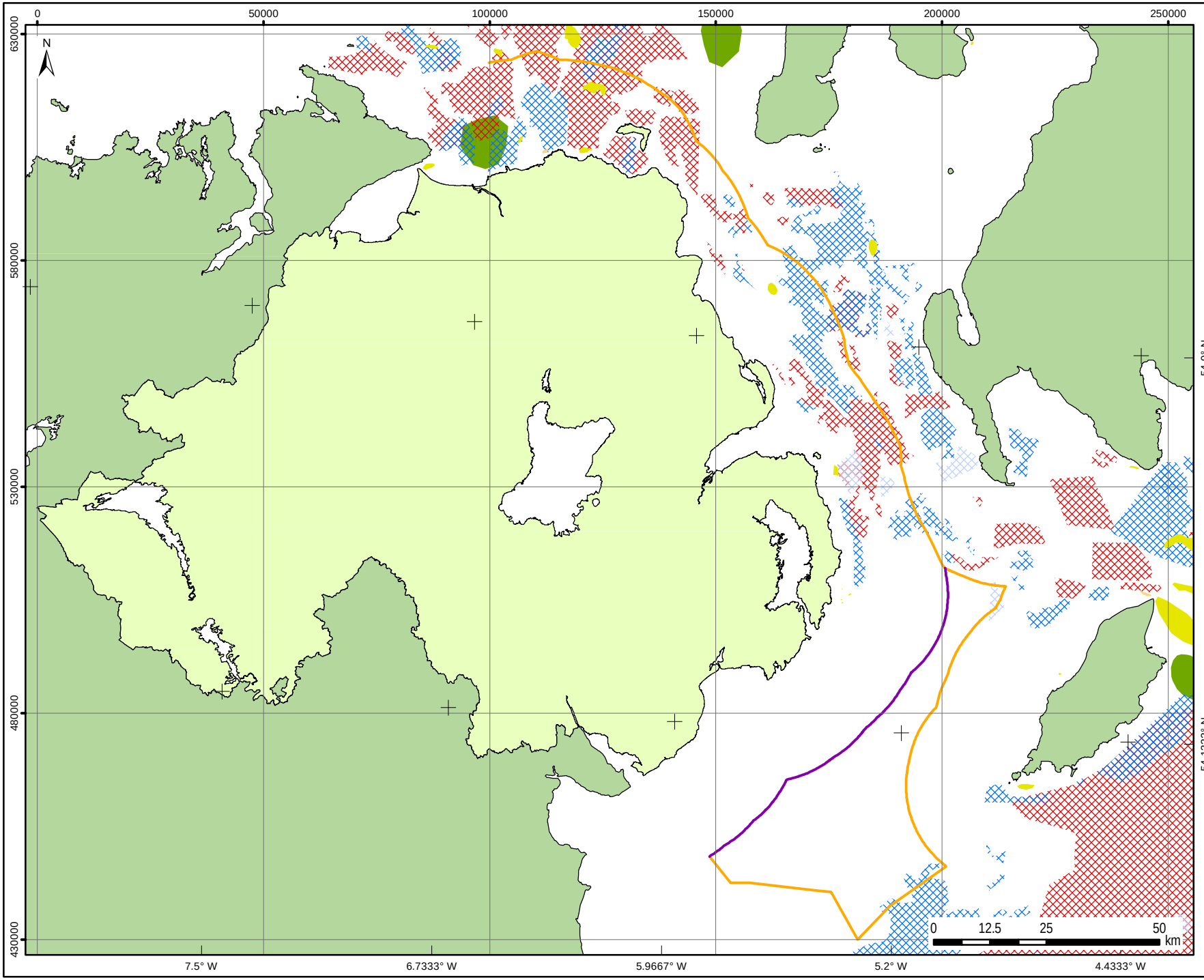

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Figure 7

Marine Process (mobile) Bedforms

NI Inshore/Offshore Waters Boundary

Adjacent Waters Boundary

Tidal Bank Features

Gravel Bank

Sand Bank

Transverse Bedform Features

Gravel Wave Field

Sand Wave Field

Longitudinal Bedform Features

Sand Ribbon Field

Other Bedform Features

Sharp Edged Sand Patches

Date	By	Size	Version
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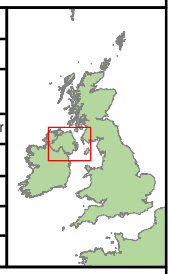

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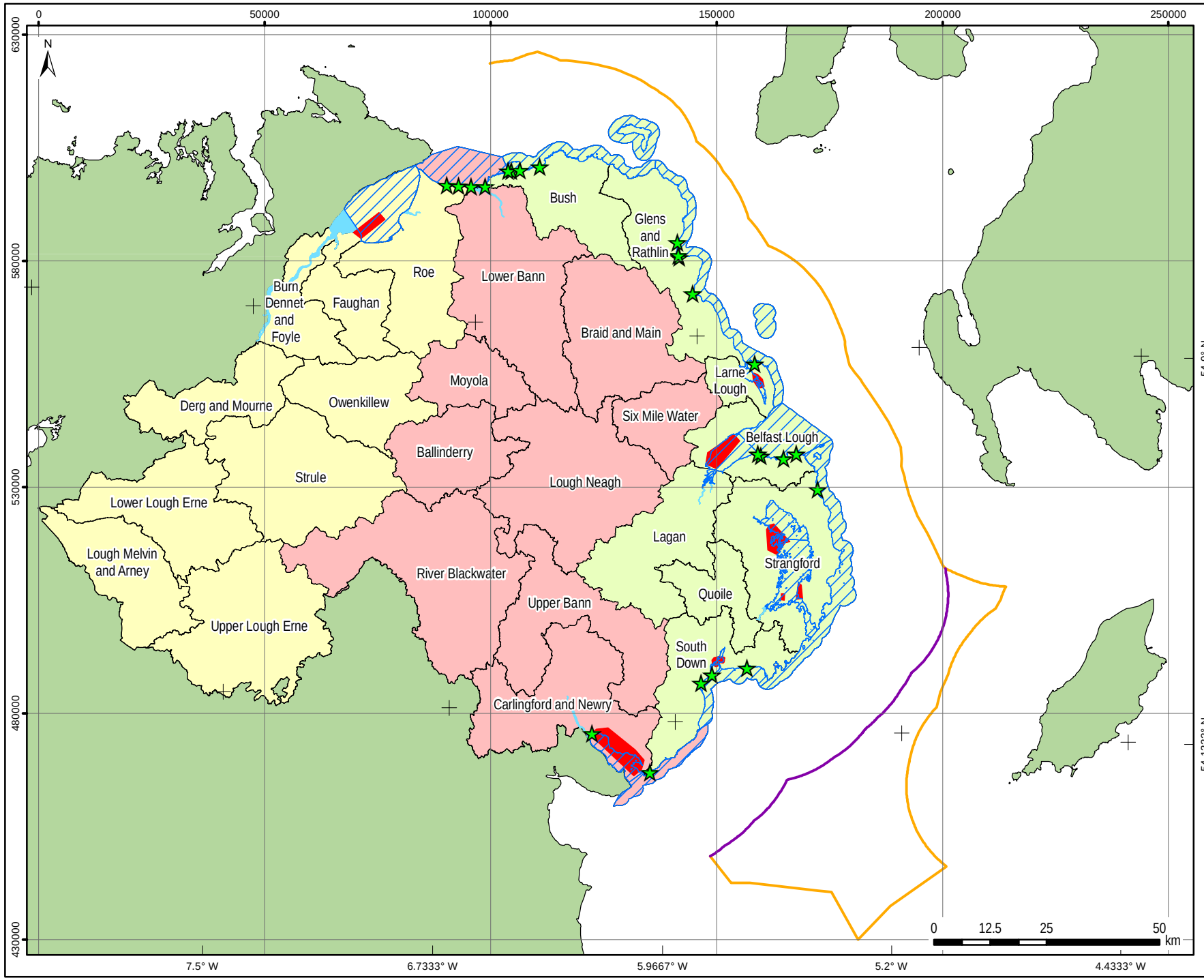

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Figure 8

Water Quality

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- Bathing Waters Directive
- Designated Shellfish Waters
- Transitional Waterbodies
- Coastal Waterbodies

River Basin Management Plans

- Neagh Bann
- North West
- North East

Date	By	Size	Version
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Projection		Transverse Mercator	
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Northern Ireland Region

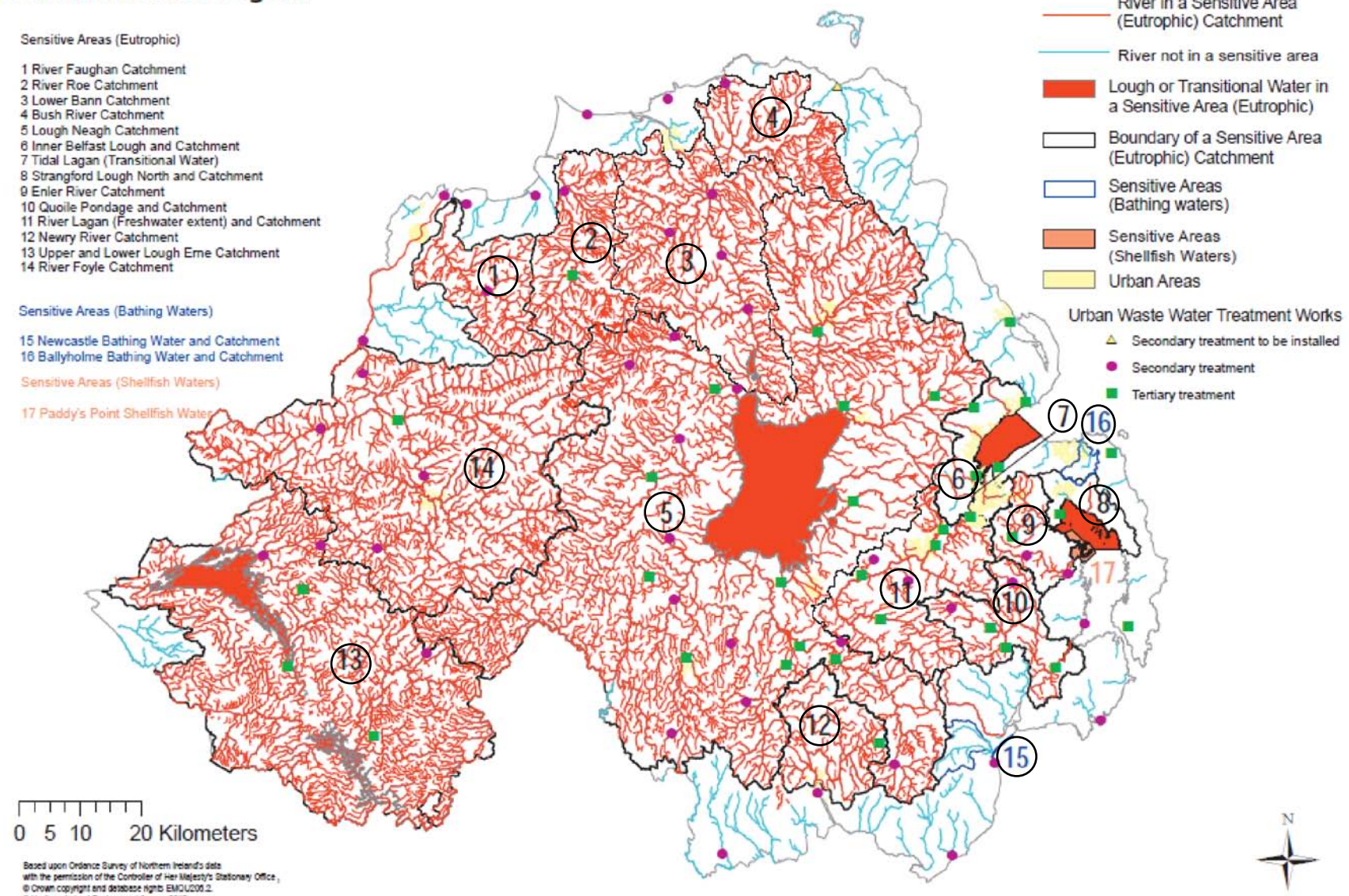

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Figure 9

Urban Waste Water Treatment Directive Sensitive Areas

Taken from:
Waste Water Treatment in the United Kingdom - 2012.
Implementation of the Waste Water Treatment Directive - 91/271/EEC
Defra 2012
Product Code PB13811
Figure 11, Page 31

Date	By	Size	Version
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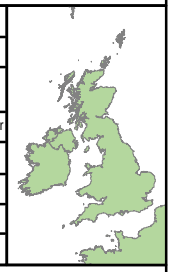

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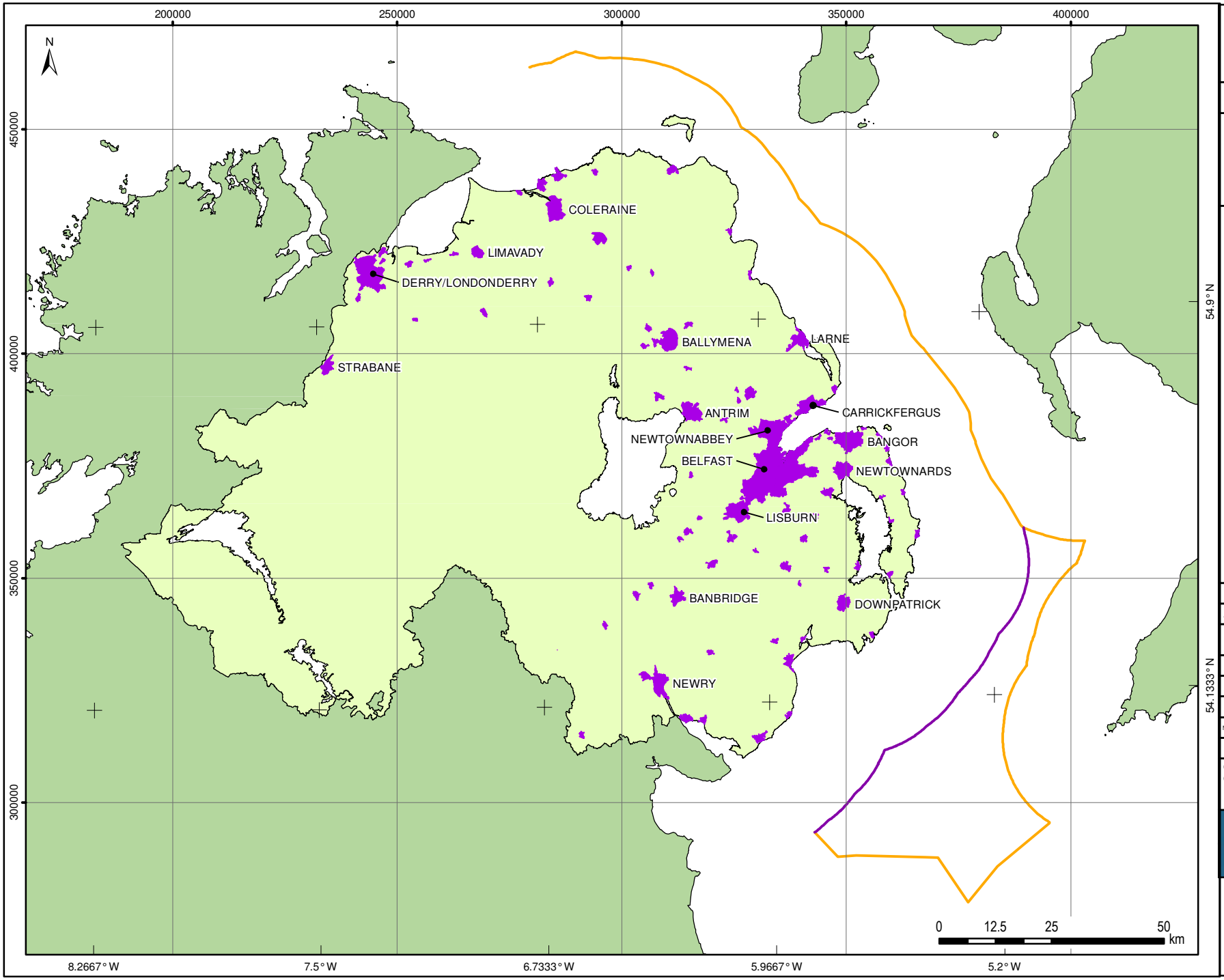

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Figure 10

Settlement Development Limits Within the 30km Landward Buffer

- Settlement Development Limit (Cities, Towns and Villages)
- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Settlement Development Limit data provided by Northern Ireland Statistics and Research Agency (NISRA) and copyright of DoE Planning Service, 2014.

Date	By	Size	Version
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Produced by AECOM			

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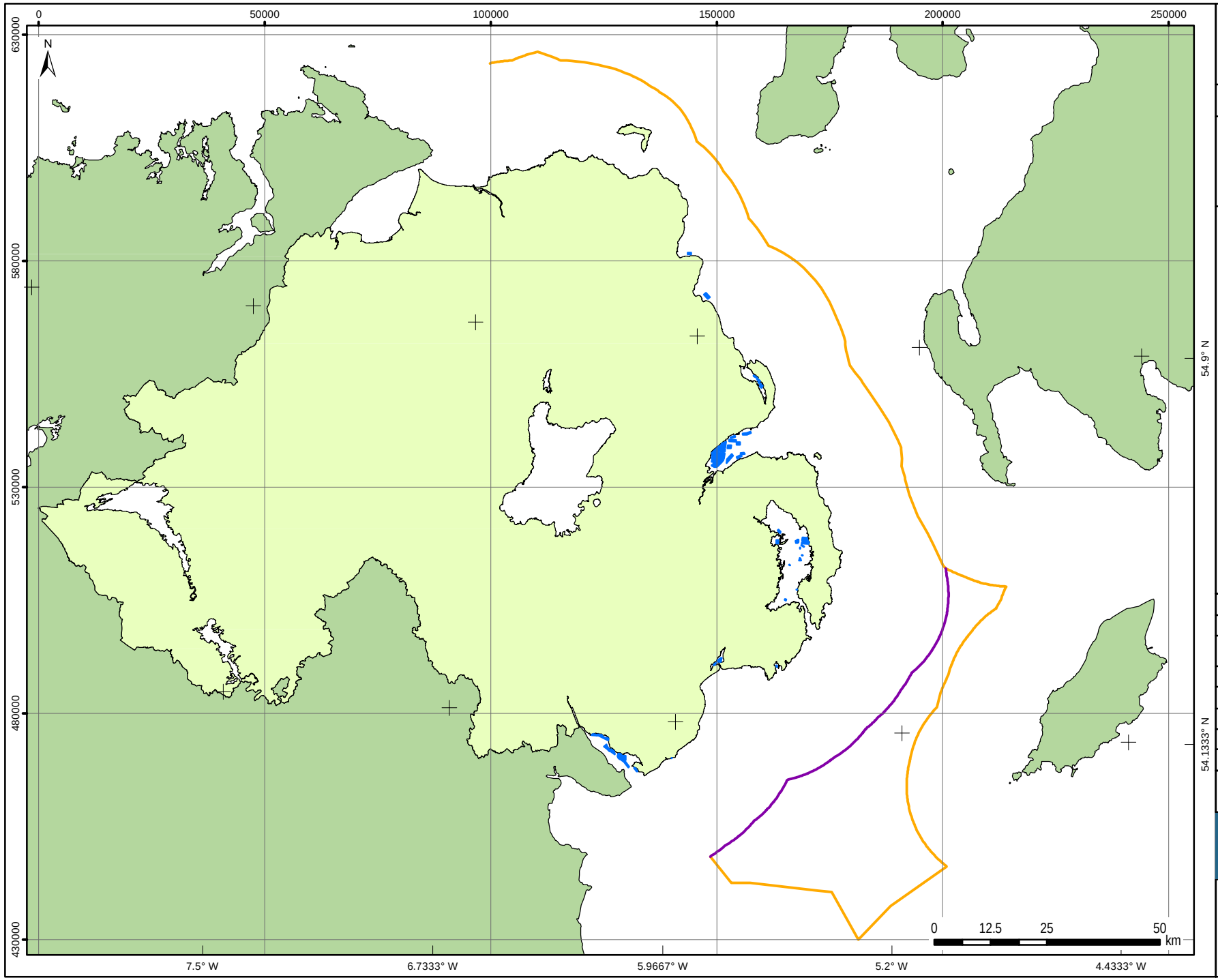

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Figure 11

Licensed Aquaculture Areas

NI Inshore/Offshore Waters Boundary

Adjacent Waters Boundary

Licensed Aquaculture Area

Date	By	Size	Version
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Projection		Transverse Mercator	
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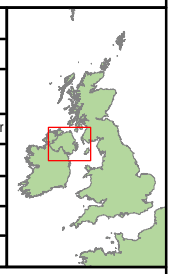

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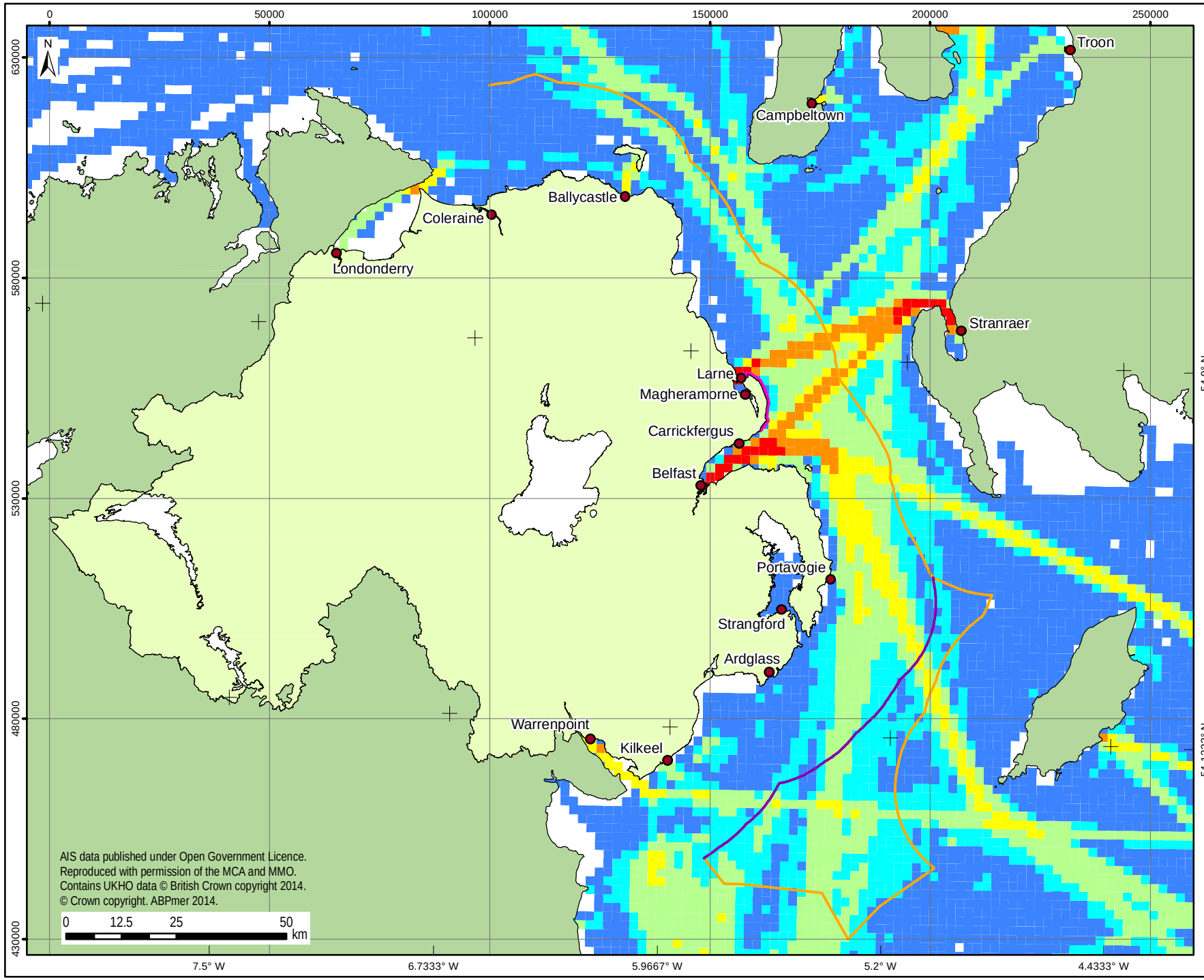

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Figure 12

Shipping Density Grid

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- Marine Environmental High Risk Areas
- Key Ports

Vessel Movements Density Grid
Average Weekly Density (2012)

- < 0.1
- 0.1 to 5.0
- 5.1 to 10.0
- 10.1 to 25.0
- 25.1 to 50.0
- 50.1 to 100.0
- > 100

2km weekly average density grid created from 42 days of AIS-A and AIS-B data in 2012 (MMO, 2014)

Date	By	Size	Version
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Coordinate System		British National Grid	
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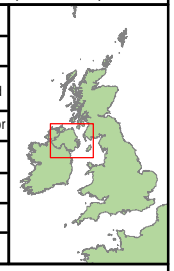

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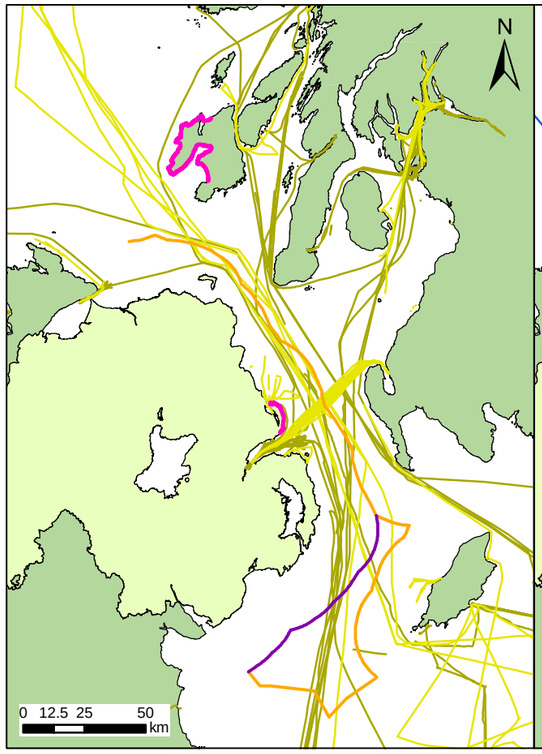
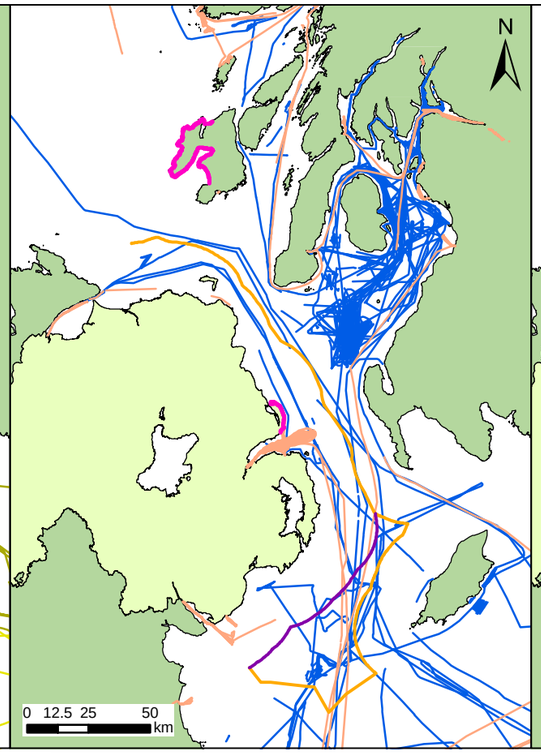
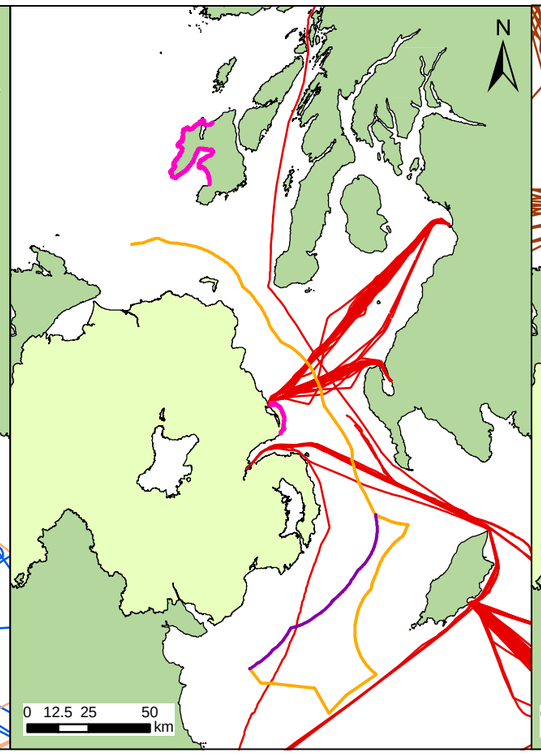


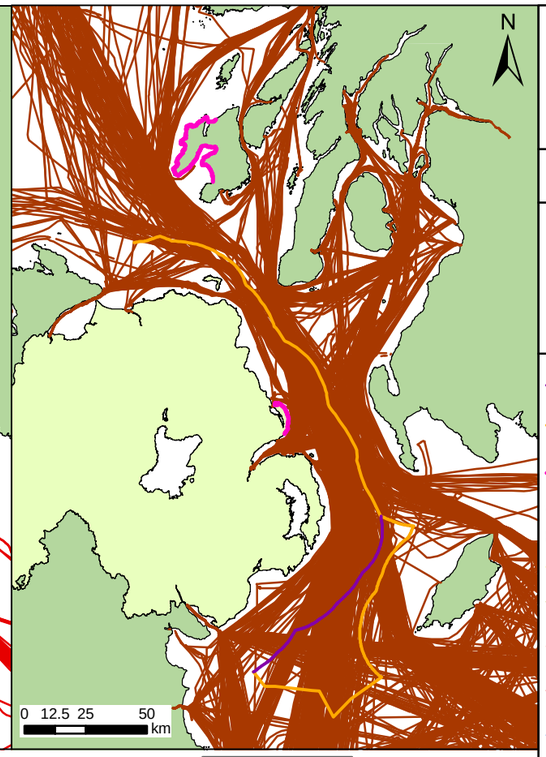
Non-Port Service Craft (1)
Port Service Craft (2)



Vessels engaged in Dredging or Underwater Operations (including diving) (3)
Military or Law Enforcement Vessels (5)

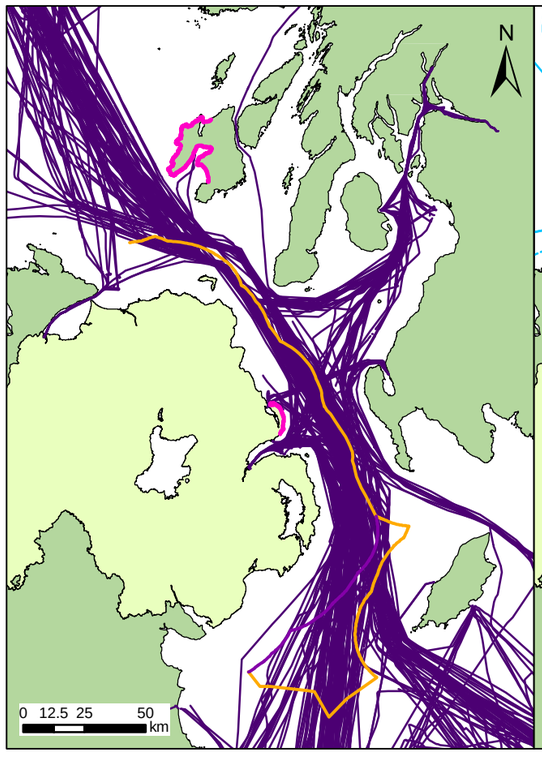


High Speed Craft (4)

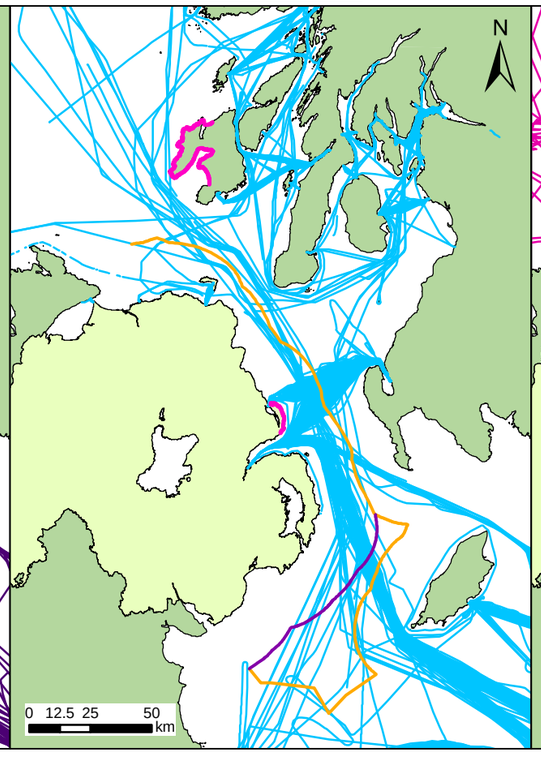


Cargo Vessels (7)

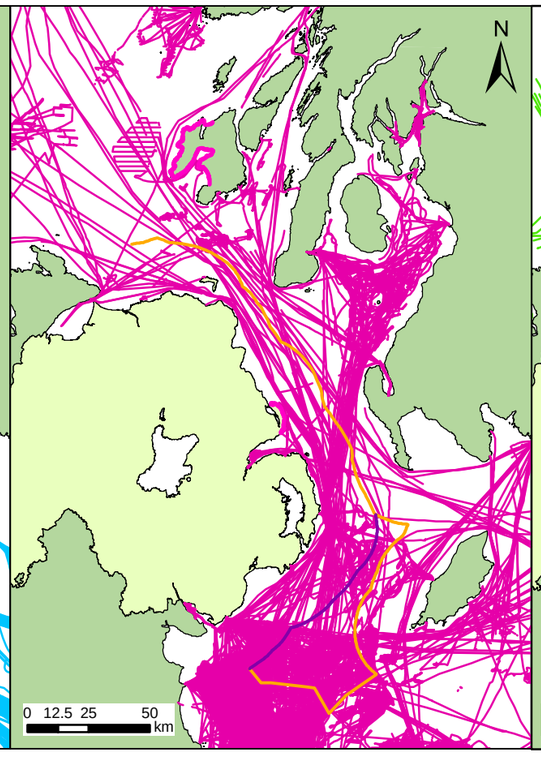
Tankers (8)



Passenger Vessels (6)



Fishing Vessels (9)



Recreational Vessels (10)

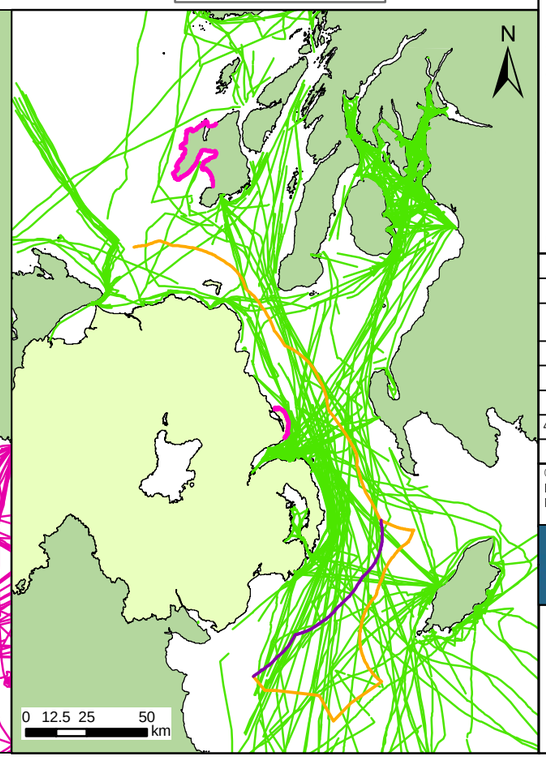


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Figure 13

Shipping Transit Lines

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- Marine Environmental High Risk Areas

Vessel Transits by Ship Type Group (2012)

- Non-Port Service Craft (1)
- Port Service Craft (2)
- Dredging or underwater operations (incl. diving) (3)
- High Speed Craft (4)
- Military or Law Enforcement Vessels (5)
- Passenger Vessels (6)
- Cargo (7)
- Tankers (8)
- Fishing Vessels (9)
- Recreational Vessels (10)

Composite plot of 42 days of of AIS-A and AIS-B data in 2012 for the following periods: 3rd to 9th Jan and1st to 7th Mar, May, Jul, Sep, Nov 2012 (MMO, 2014)

Date	By	Size	Version
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Projection		Transverse Mercator	
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QA		FMM	
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Produced by ABPmer			

Data Sources: MMO, 2014, Defra, 2007.
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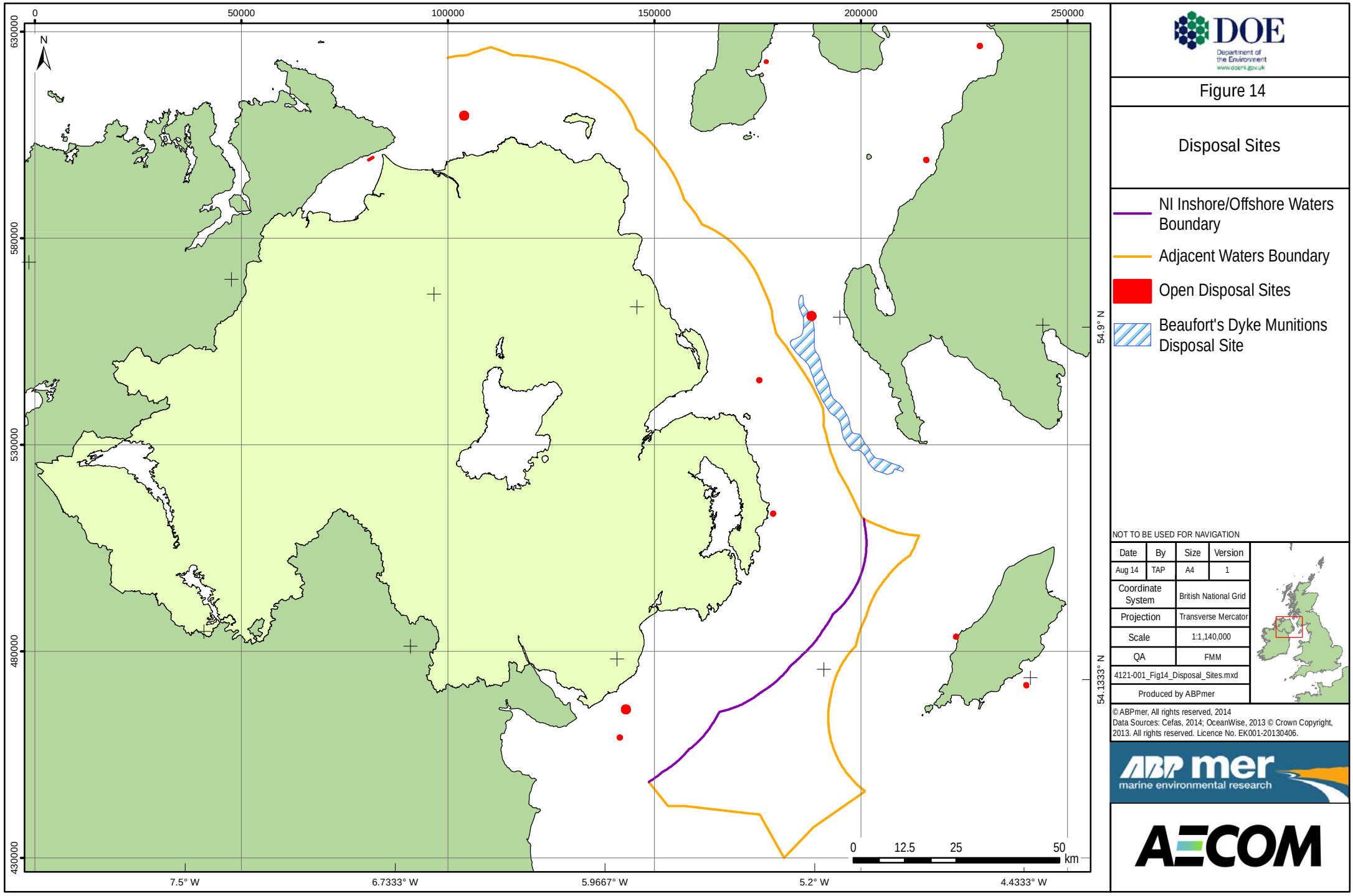

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Figure 14

Disposal Sites

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- Open Disposal Sites
- Beaufort's Dyke Munitions Disposal Site

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Date	By	Size	Version
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Projection		Transverse Mercator	
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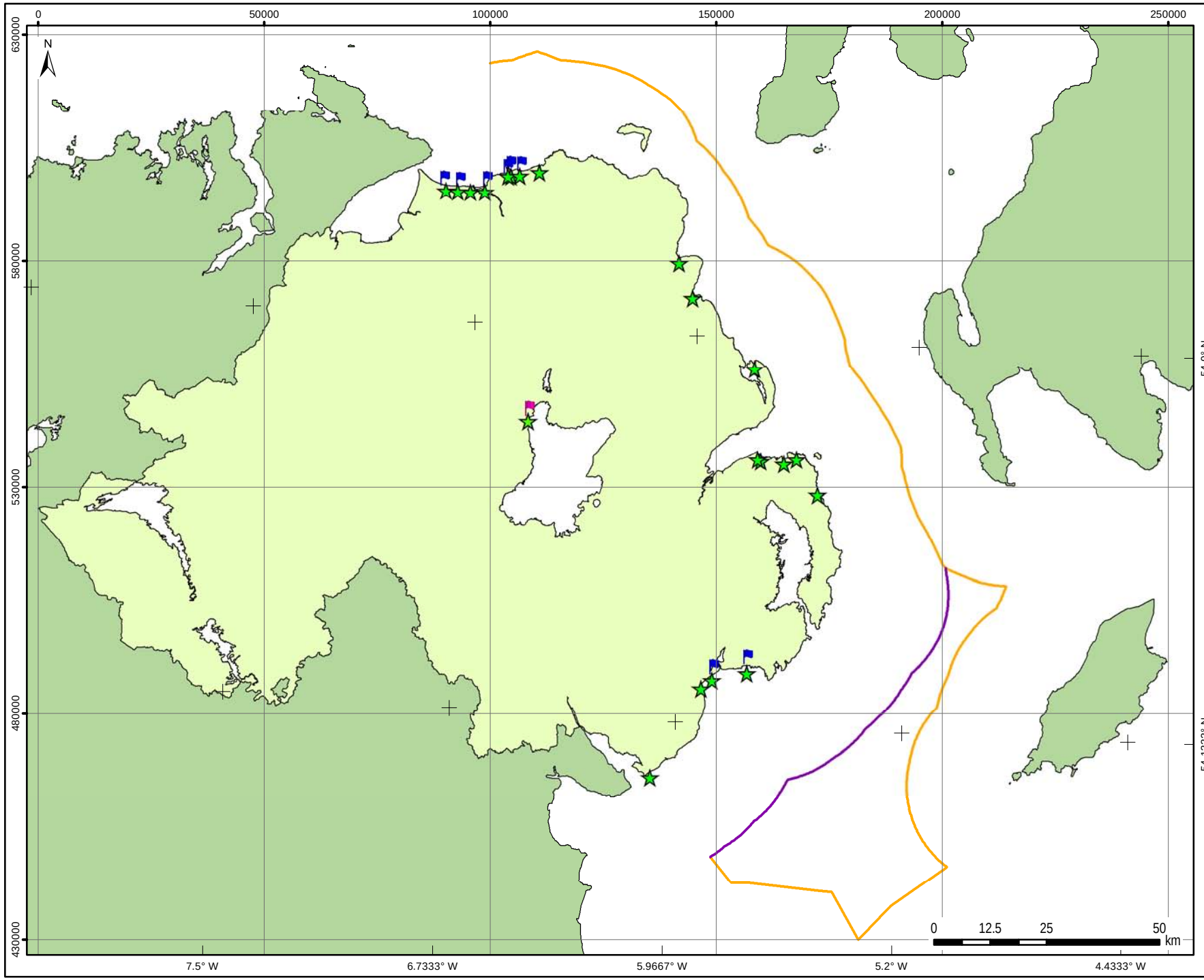

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Figure 15

Bathing Water Directive Waters, Blue Flag Beaches & Blue Flag Marinas

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- Bathing Waters Directive
- Blue Flag Beaches
- Blue Flag Marinas

Date	By	Size	Version
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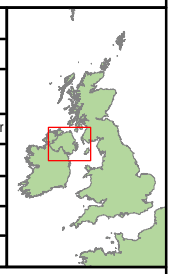

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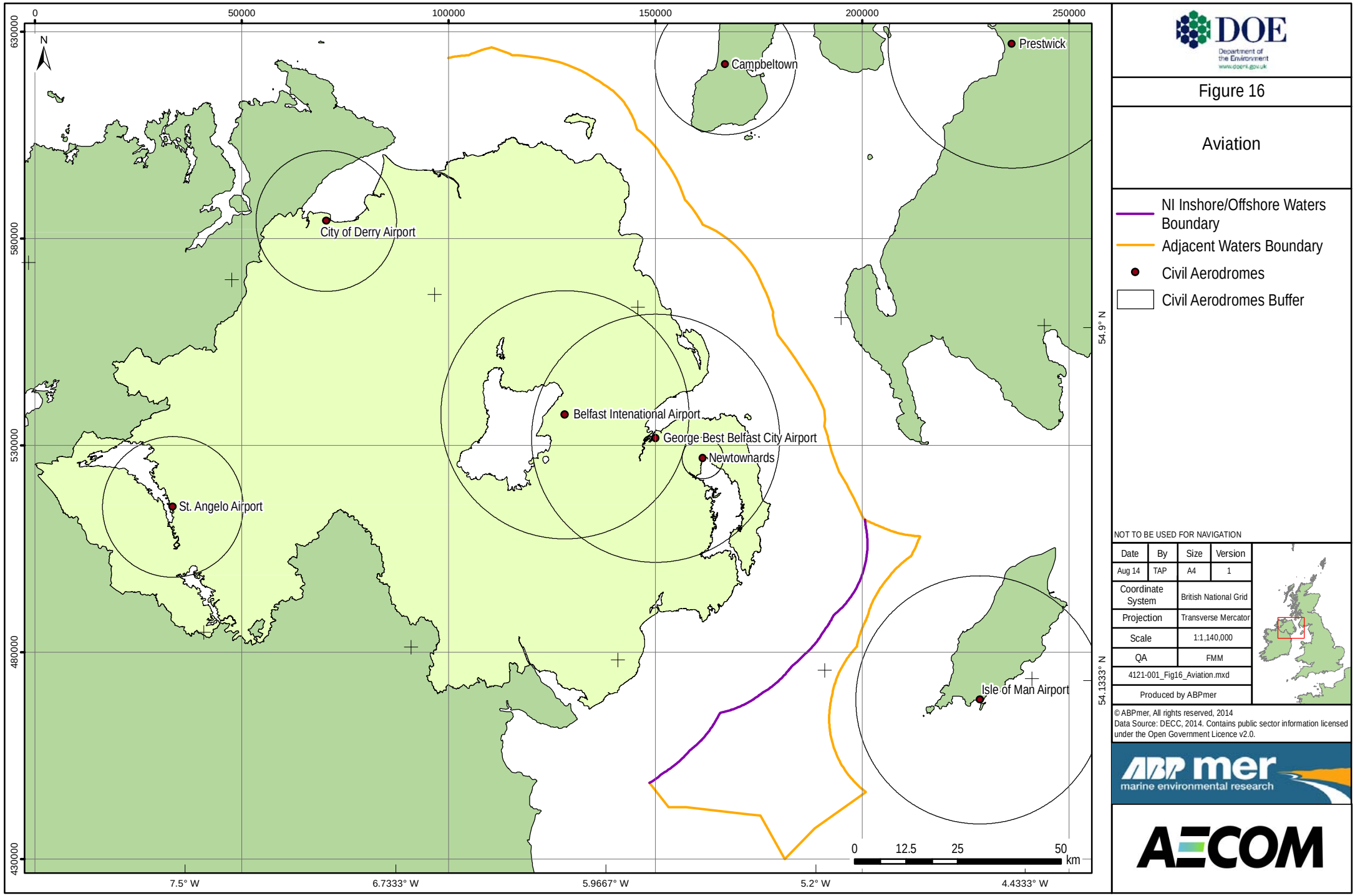

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Figure 16

Aviation

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- Civil Aerodromes
- Civil Aerodromes Buffer

NOT TO BE USED FOR NAVIGATION

Date	By	Size	Version
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Coordinate System		British National Grid	
Projection		Transverse Mercator	
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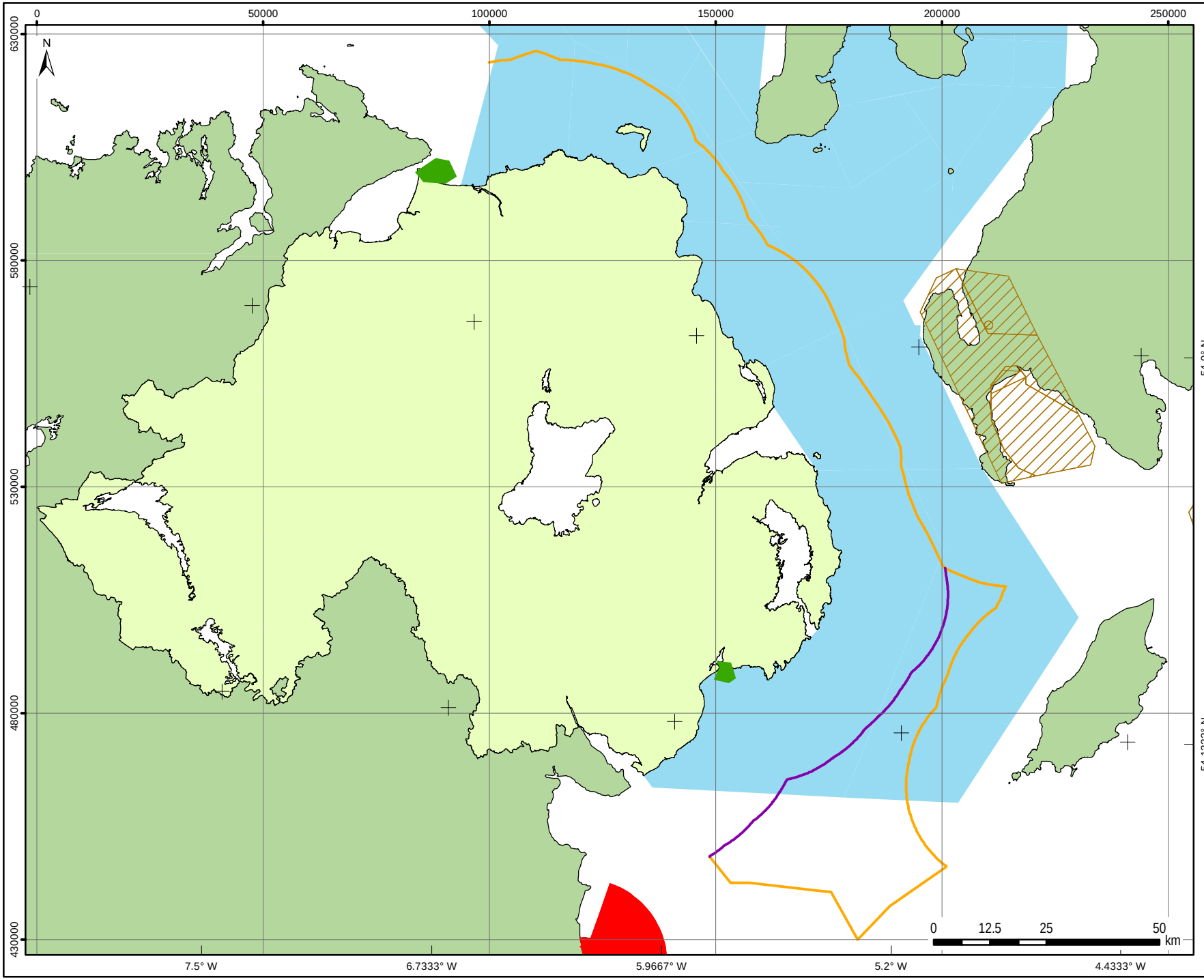

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Figure 17

Military Practice Areas

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- Military Practice Area: Army
- Military Practice Area: MOD
- Military Practice Area: Navy
- Firing Practice Area

Date	By	Size	Version
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Projection		Transverse Mercator	
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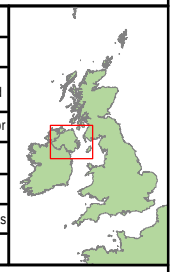

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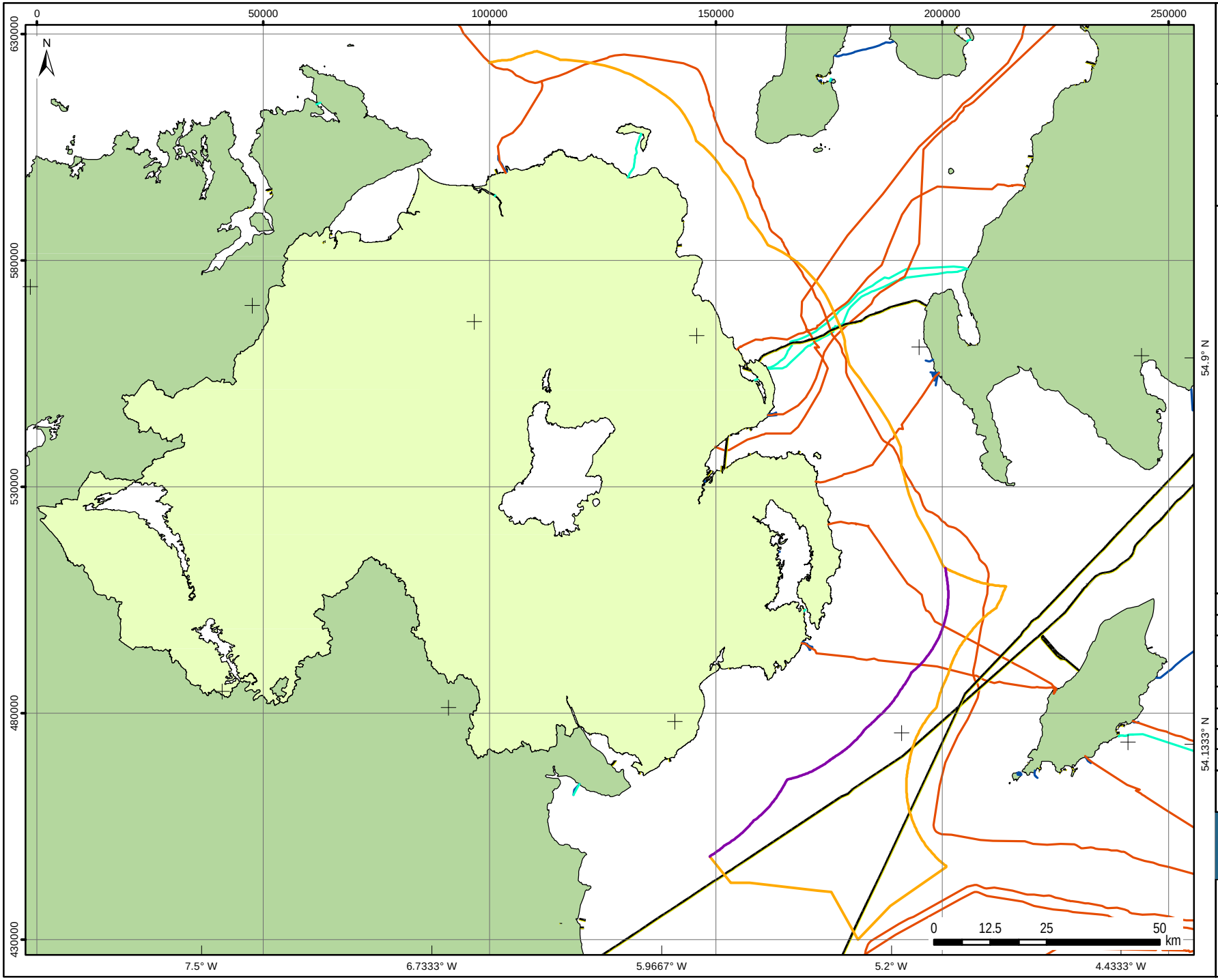

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Figure 18

Cables and Pipelines

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- Submarine Cable, Power Line
- Submarine Cable, Telephone
- Submarine Cable, Undefined
- Gas Pipeline

Date	By	Size	Version
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Coordinate System		British National Grid	
Projection		Transverse Mercator	
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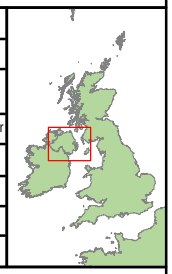

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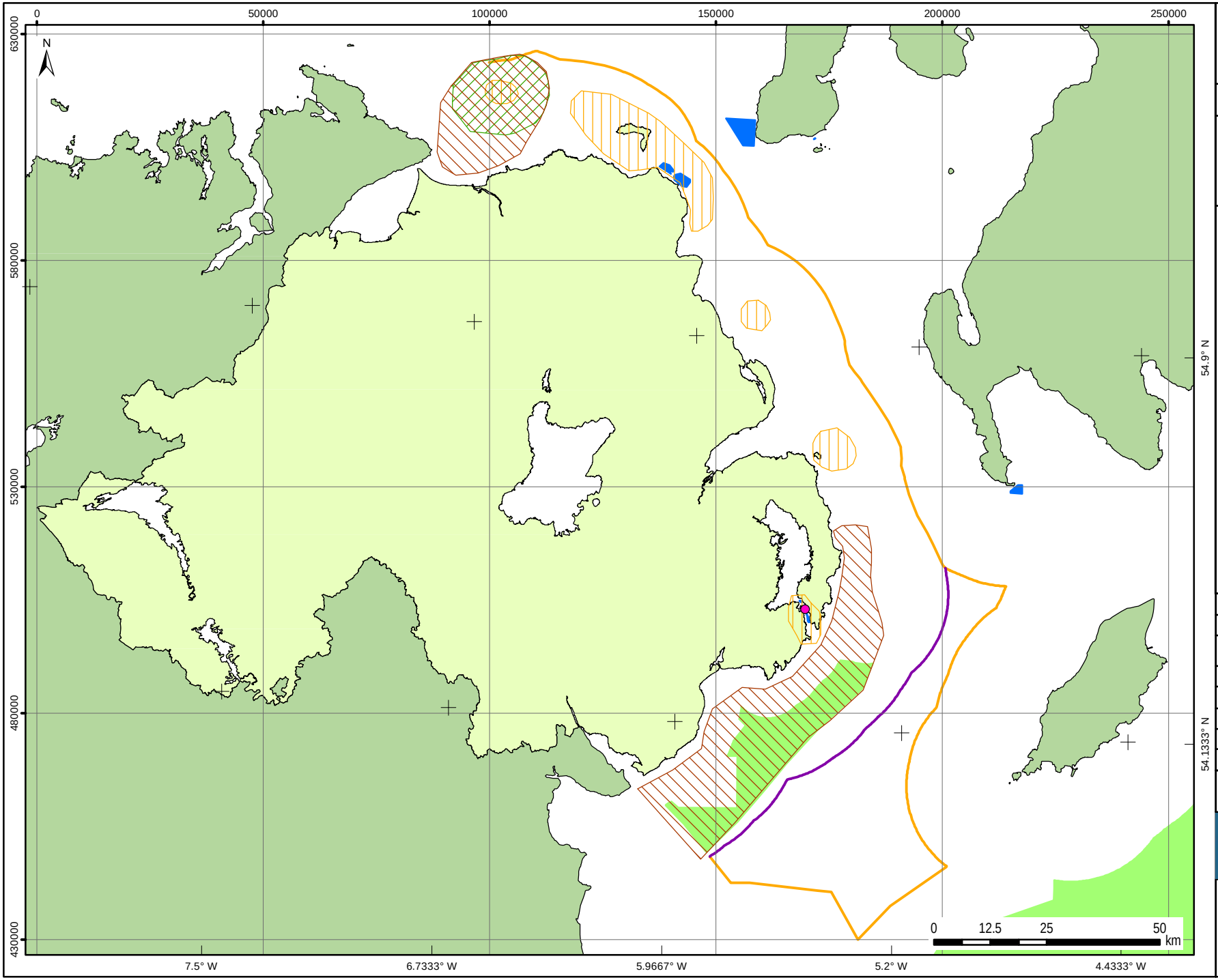

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Figure 19

Renewable Energy

- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary
- Seagen
- Tidal Energy Lease Area
- Wind Farm Lease Area

NI Future Renewable Resource

- Tidal
- Wave
- Wind

Date	By	Size	Version
Aug 14	TAP	A4	1
Coordinate System		British National Grid	
Projection		Transverse Mercator	
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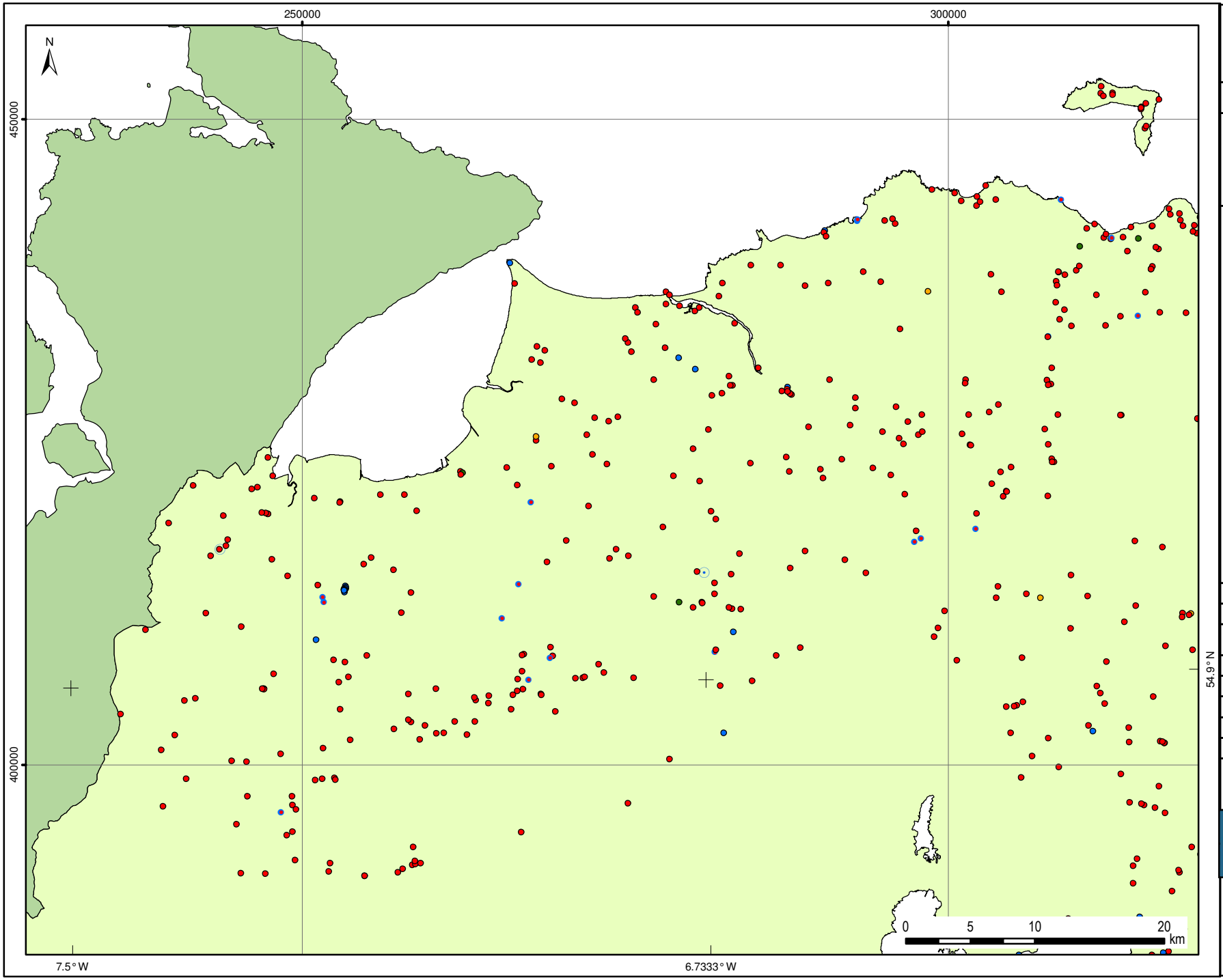

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Figure 20a - 1 of 6

Terrestrial Cultural Heritage Within the 30km Landward Buffer

- Listed
- Scheduled
- Proposed for Scheduling
- State Care
- State Care and Scheduled
- State Care with Proposed Scheduled Area
- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
Aug 14	GB	A4	1
Coordinate System		TM75 - Irish Grid	
Projection		Transverse Mercator	
Scale		1:400,000	
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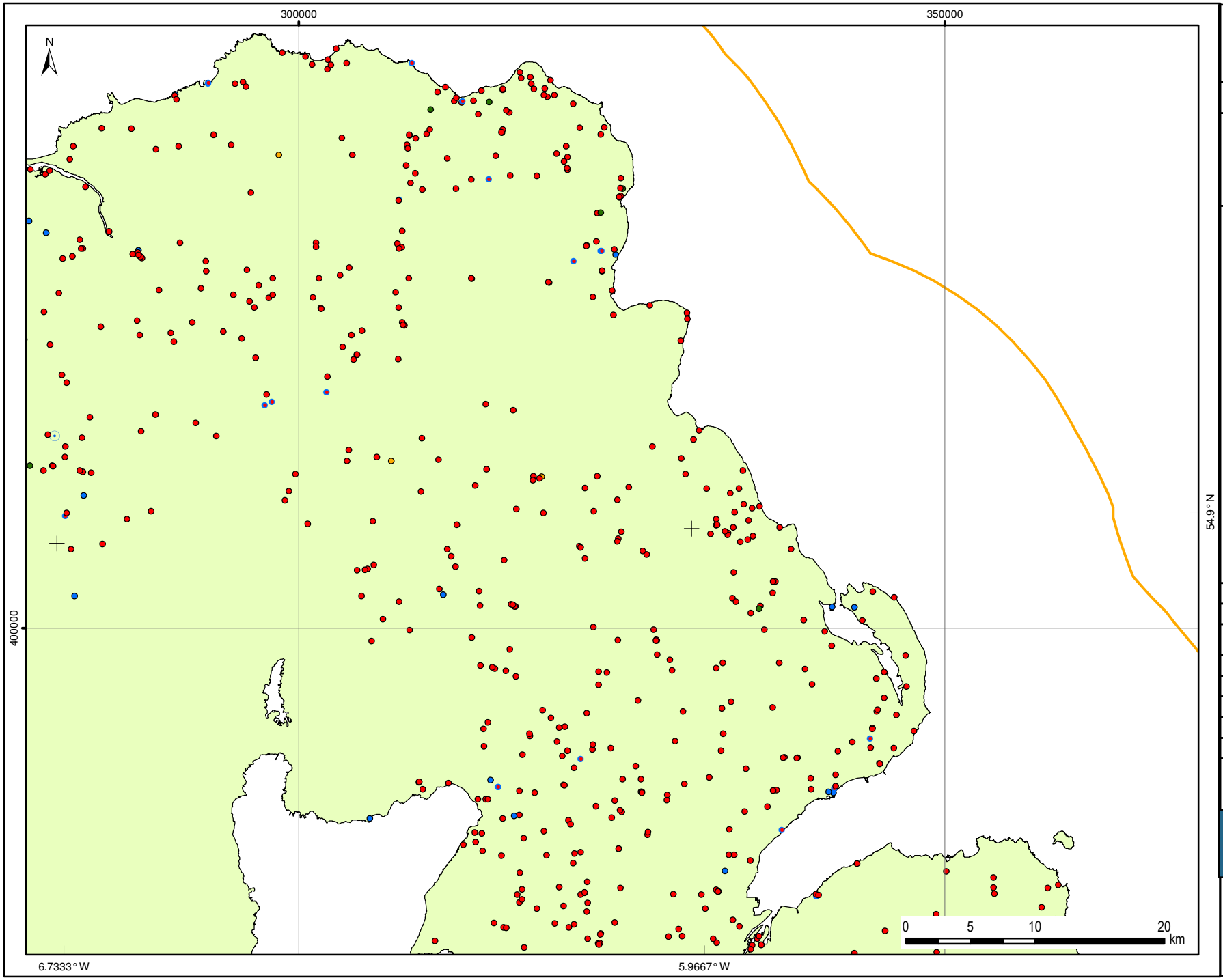

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Figure 20b - 2 of 6

Terrestrial Cultural Heritage Within the 30km Landward Buffer

- Listed
- Scheduled
- Proposed for Scheduling
- State Care
- State Care and Scheduled
- State Care with Proposed Scheduled Area
- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
Aug 14	GB	A4	1
Coordinate System		TM75 - Irish Grid	
Projection		Transverse Mercator	
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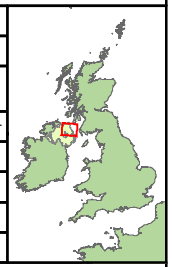

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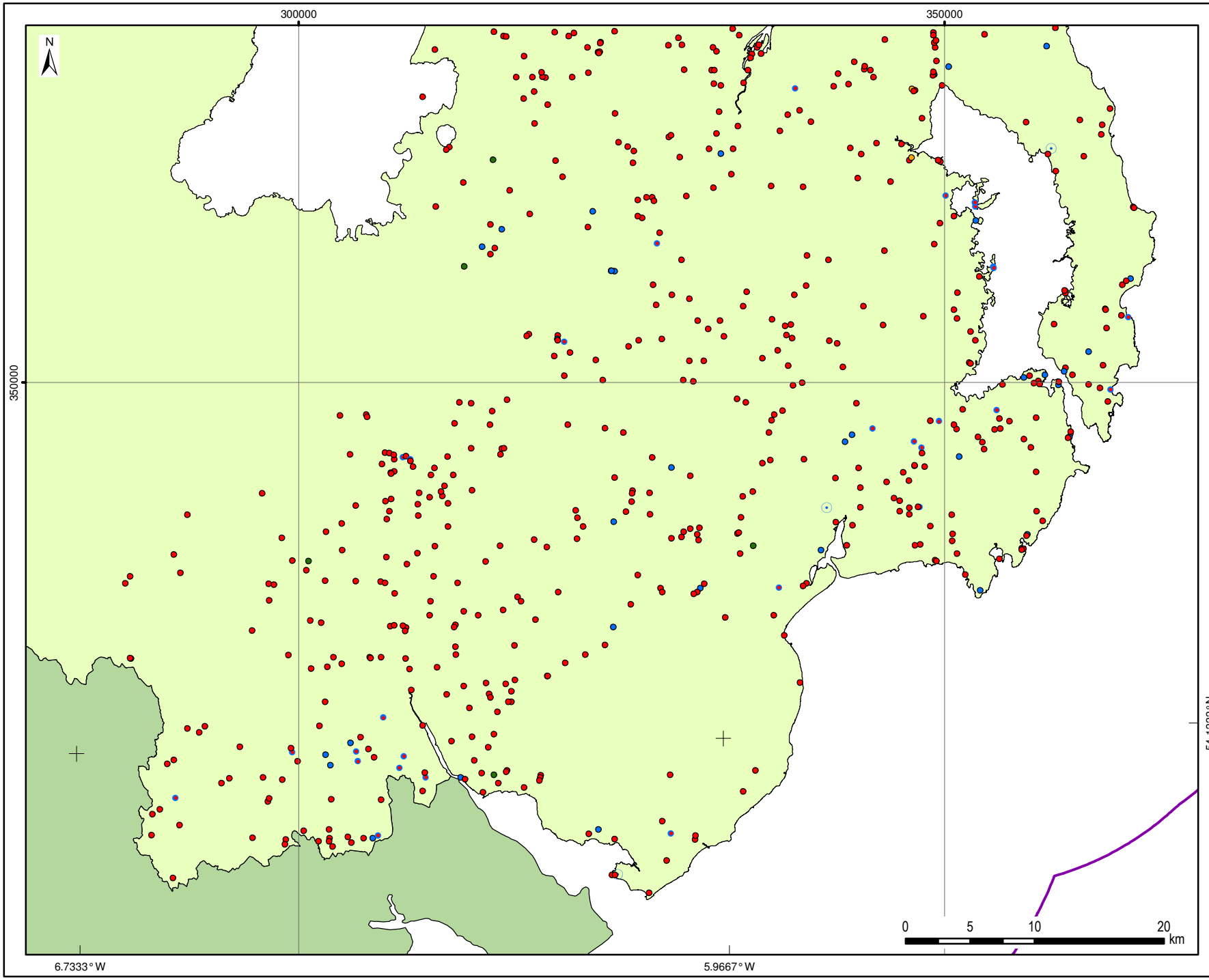

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Figure 20c - 3 of 6

Terrestrial Cultural Heritage Within the 30km Landward Buffer

- Listed
- Scheduled
- Proposed for Scheduling
- State Care
- State Care and Scheduled
- State Care with Proposed Scheduled Area
- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
Aug 14	GB	A4	1
Coordinate System		TM75 - Irish Grid	
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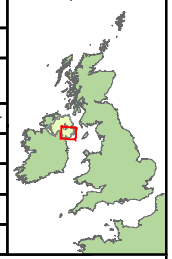

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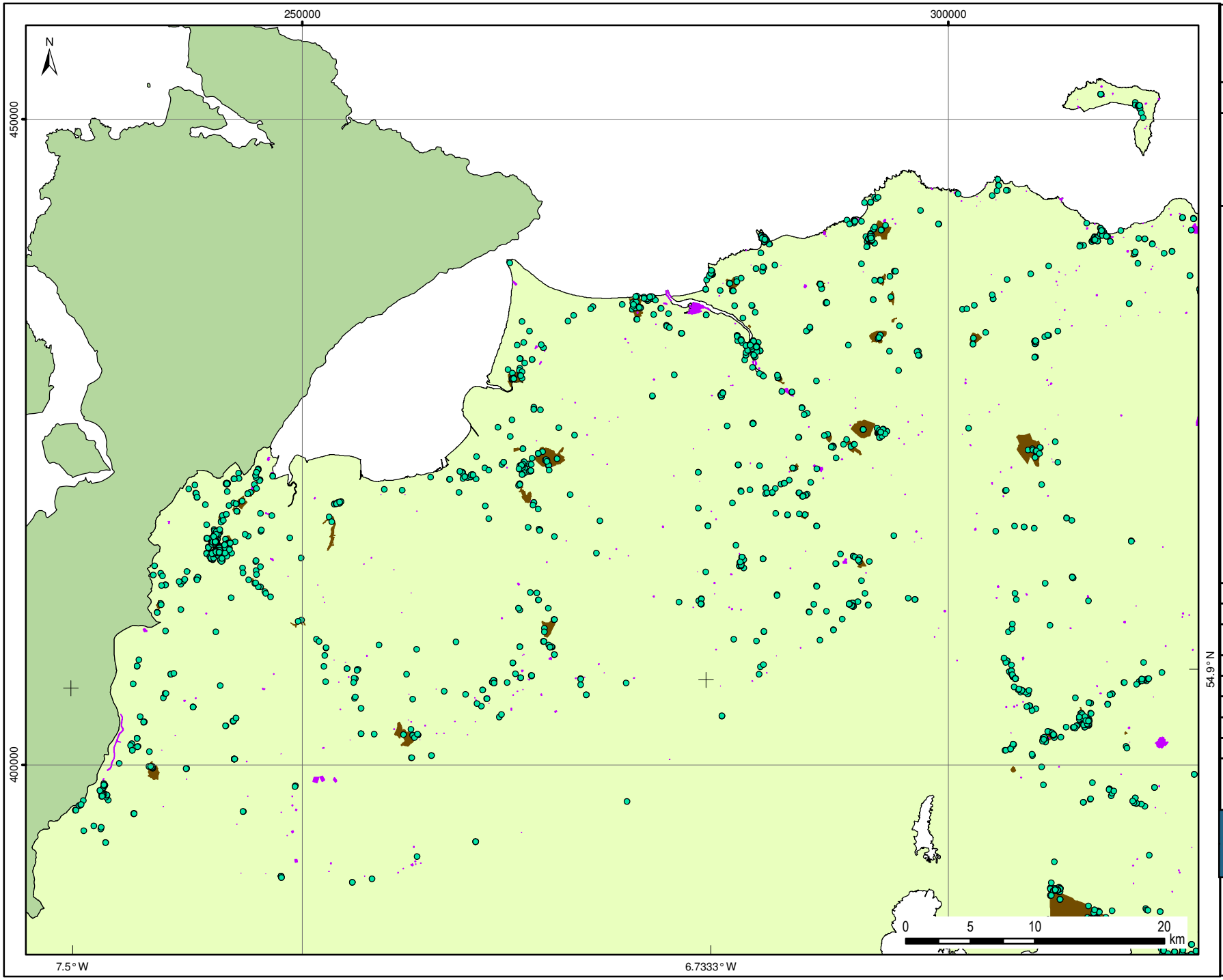

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Figure 20d - 4 of 6

Terrestrial Cultural Heritage Within the 30km Landward Buffer

- Listed Building
- Scheduled Zone
- Historic Park and Garden
- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
Aug 14	GB	A4	1
Coordinate System		TM75 - Irish Grid	
Projection		Transverse Mercator	
Scale		1:400,000	
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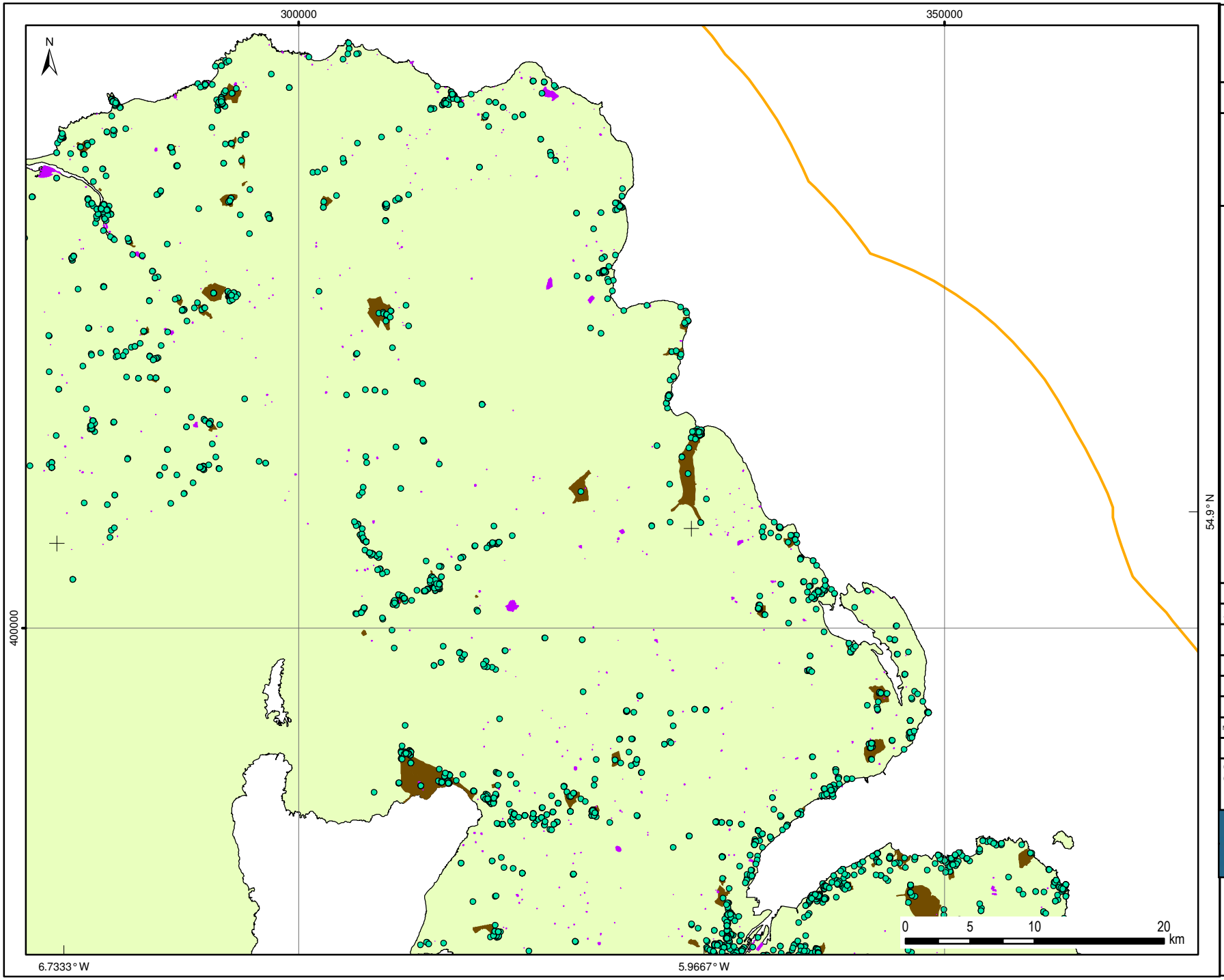

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Figure 20e - 5 of 6

Terrestrial Cultural Heritage Within the 30km Landward Buffer

- Listed Building
- Scheduled Zone
- Historic Park and Garden
- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
Aug 14	GB	A4	1
Coordinate System		TM75 - Irish Grid	
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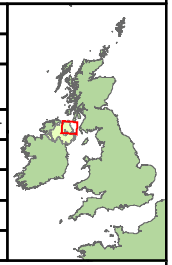

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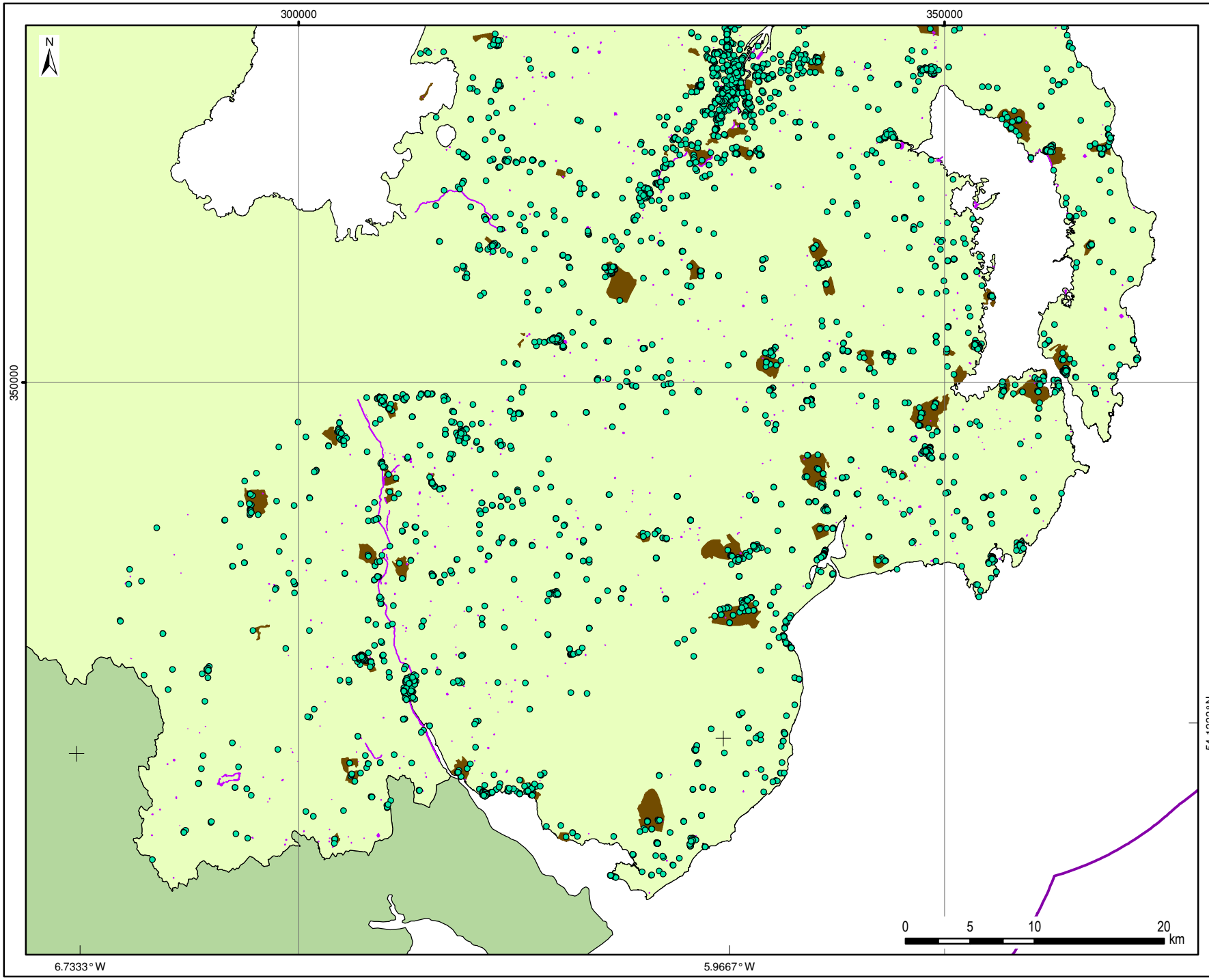

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Figure 20f - 6 of 6

Terrestrial Cultural Heritage Within the 30km Landward Buffer

- Listed Building
- Scheduled Zone
- Historic Park and Garden
- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
Aug 14	GB	A4	1
Coordinate System		TM75 - Irish Grid	
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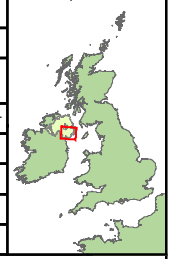

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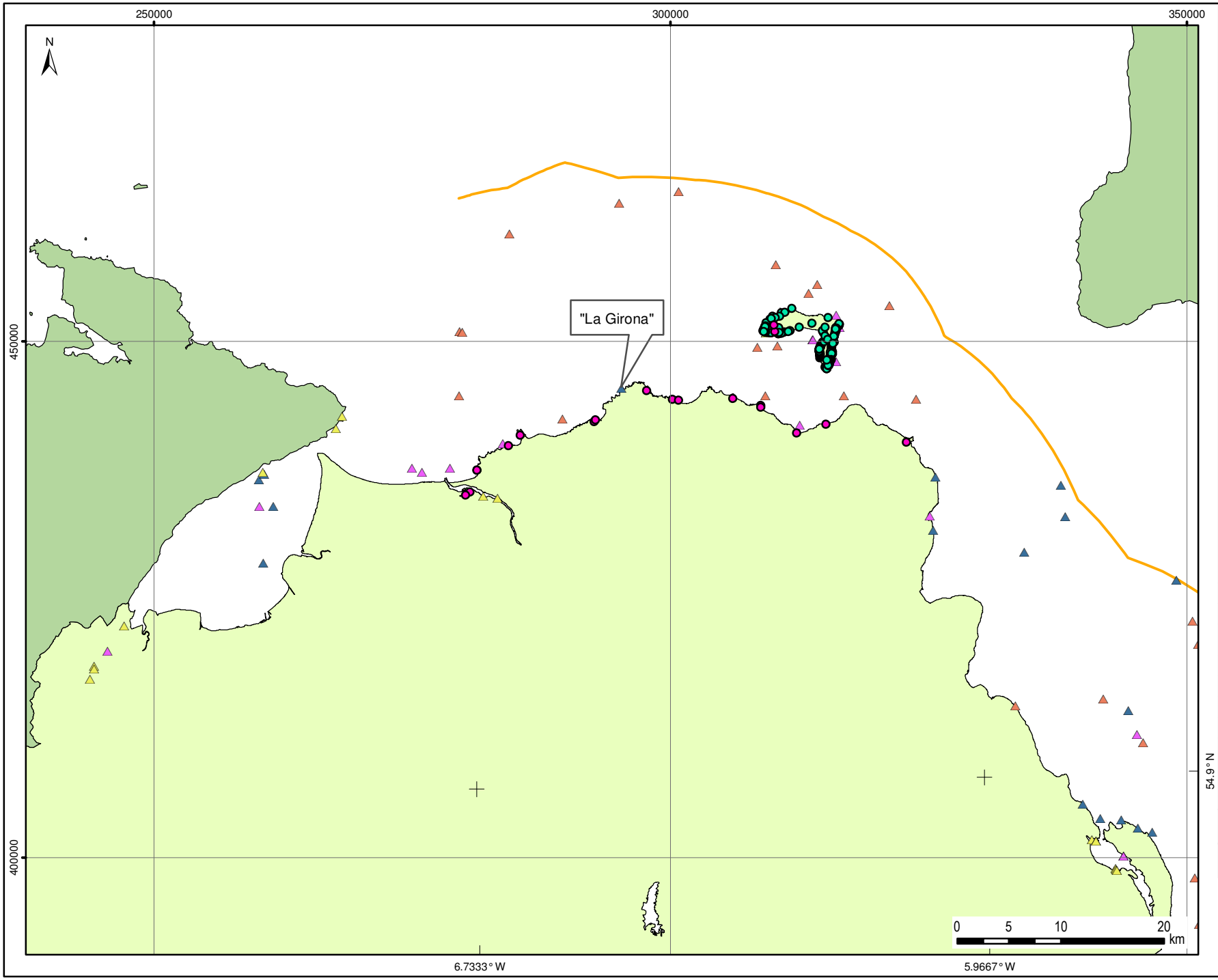

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Figure 21a - 1 of 3

Intertidal and Marine Heritage

Marine Sites & Monuments Record
- Scheduled
- Unscheduled

Recorded Wrecks
- Dangerous Wreck
- Distributed Remains of Wreck
- Non-Dangerous Wreck
- Undefined Wreck
- Wreck Showing Any Portion of Hull or Superstructure

- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
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Coordinate System		TM75 - Irish Grid	
Projection		Transverse Mercator	
Scale		1:500,000	
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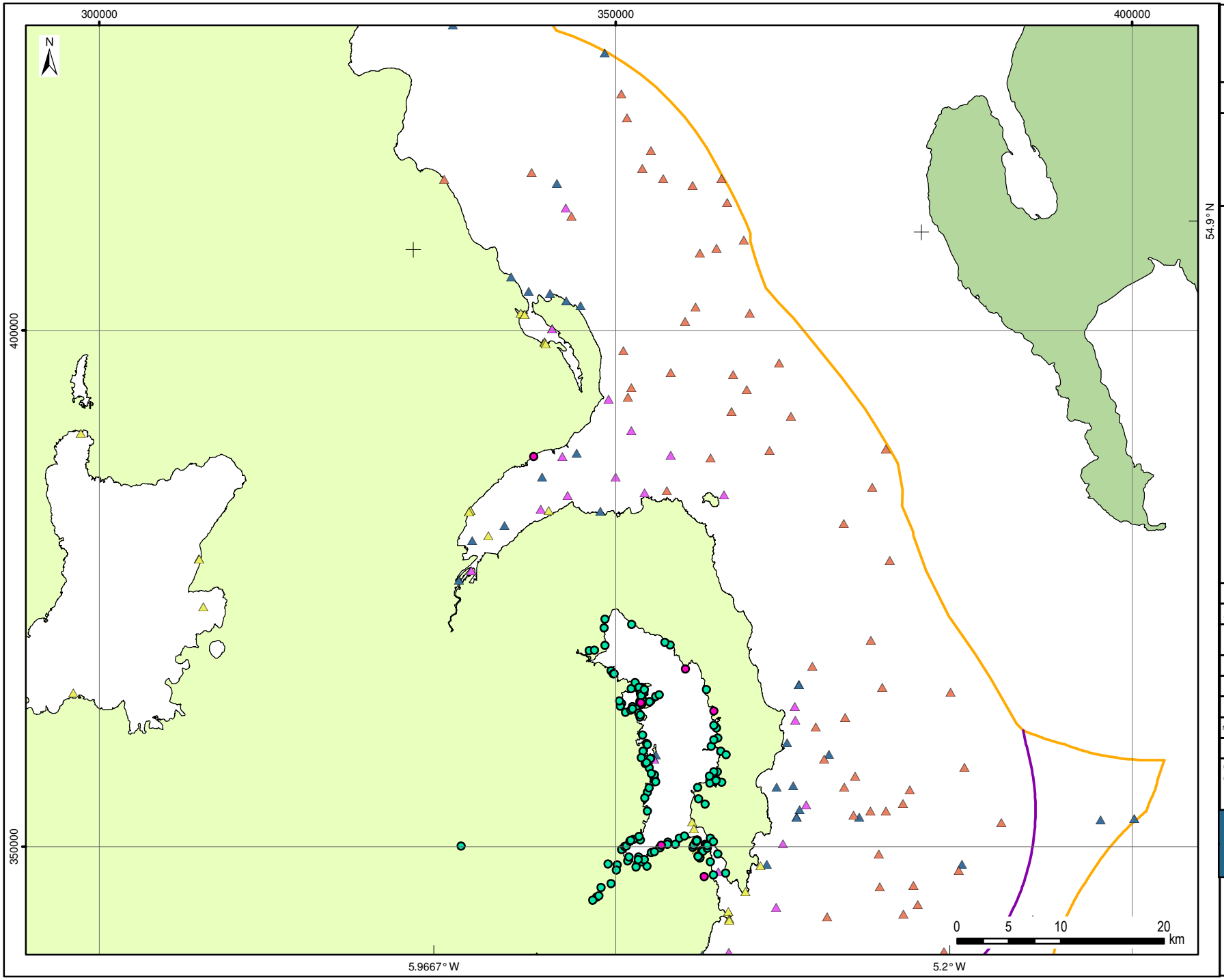

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Figure 21b - 2 of 3

Intertidal and Marine Heritage

Marine Sites & Monuments Record
- Scheduled
- Unscheduled

Recorded Wrecks
- Dangerous Wreck
- Distributed Remains of Wreck
- Non-Dangerous Wreck
- Undefined Wreck
- Wreck Showing Any Portion of Hull or Superstructure

- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
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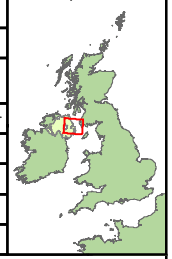

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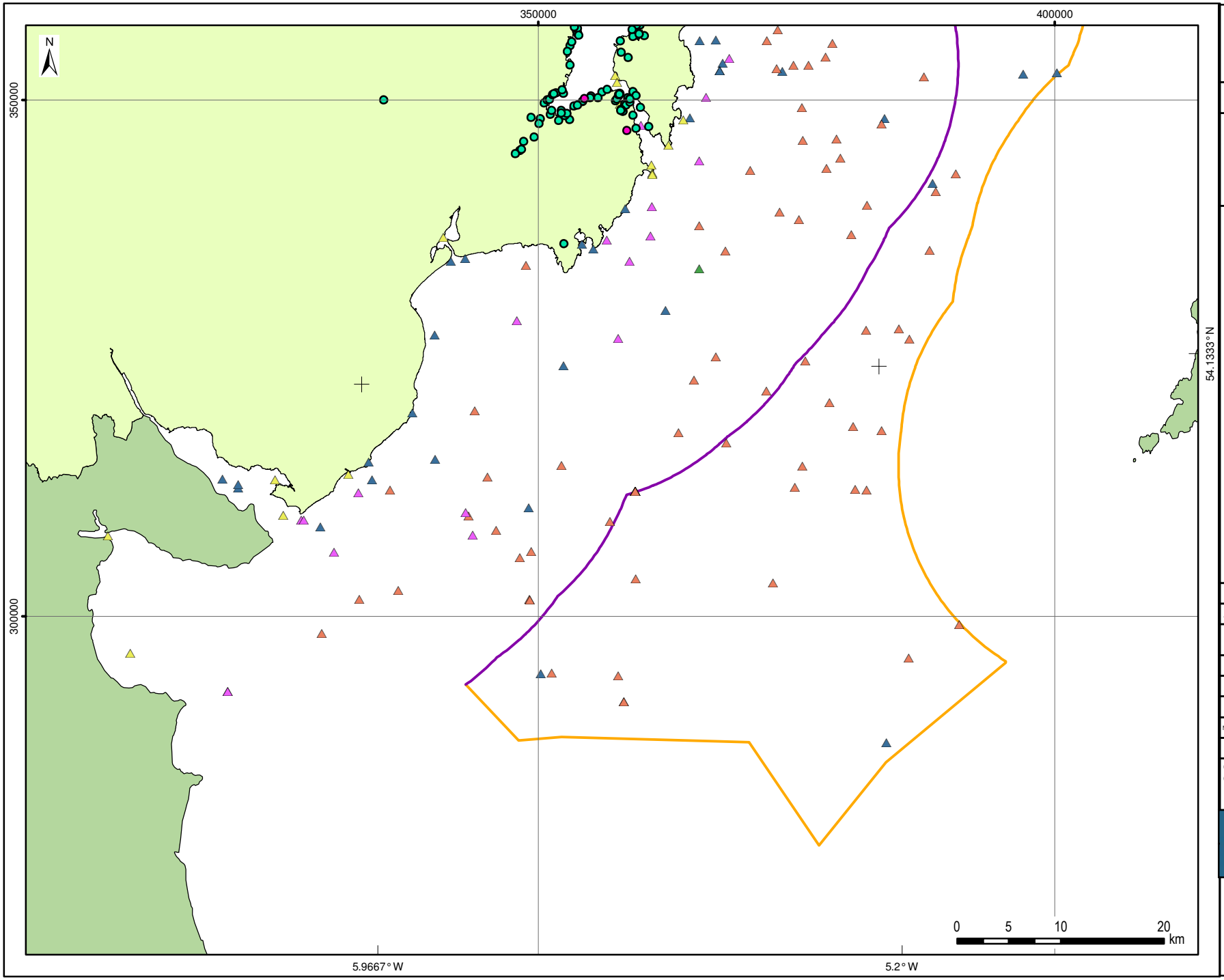

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Figure 21c - 3 of 3

Intertidal and Marine Heritage

Marine Sites & Monuments Record
- Scheduled
- Unscheduled

Recorded Wrecks
- Dangerous Wreck
- Distributed Remains of Wreck
- Non-Dangerous Wreck
- Undefined Wreck
- Wreck Showing Any Portion of Hull or Superstructure

- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
Aug 14	GB	A4	1
Coordinate System		TM75 - Irish Grid	
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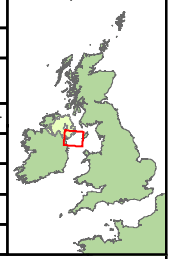

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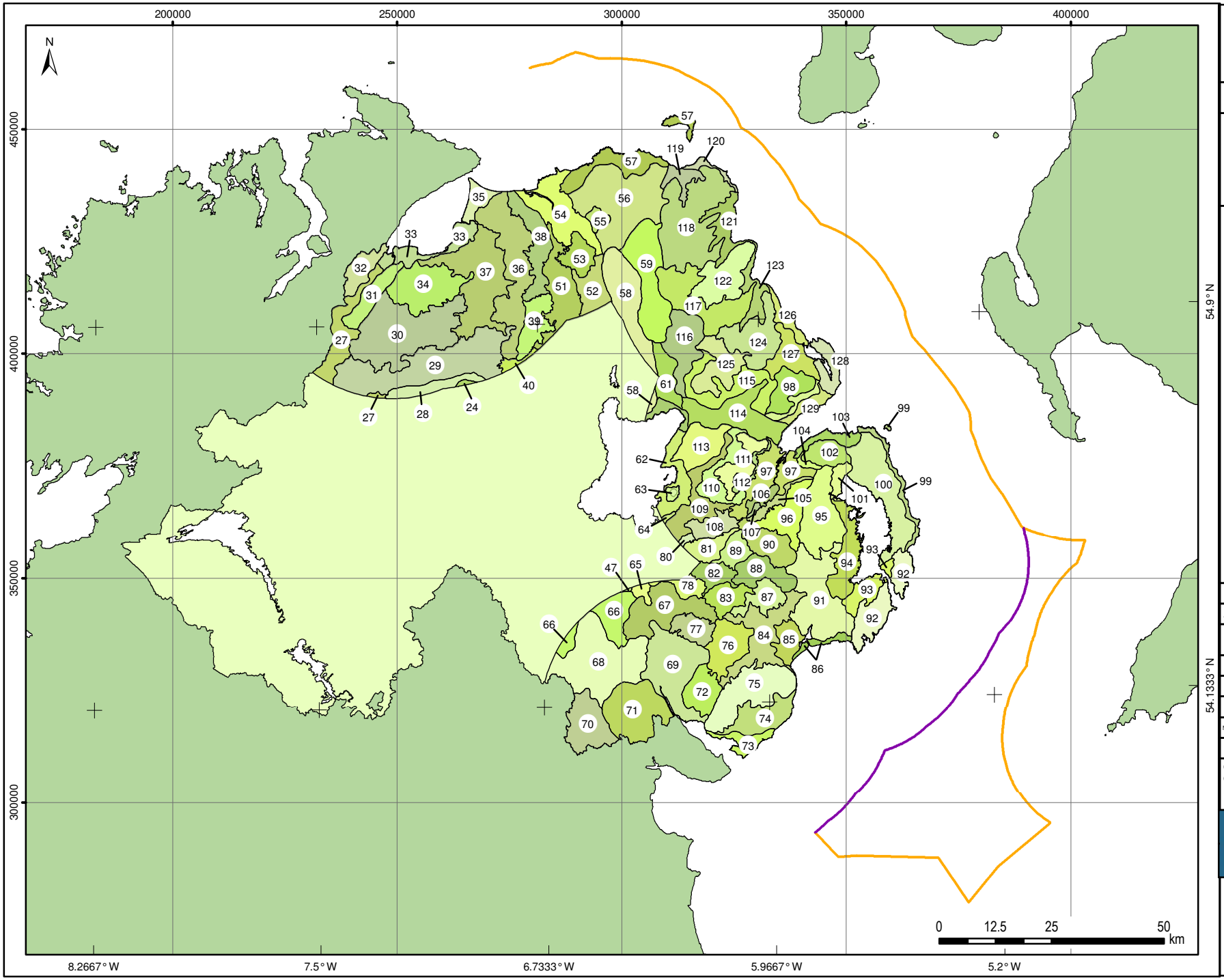

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Figure 22a - 1 of 2

Landscape Character Areas Within the 30km Landward Buffer

- 100 — LCA Number (see Figure 22b - 2 of 2 for details)
- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
Aug 14	GB	A4	1
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Projection		Transverse Mercator	
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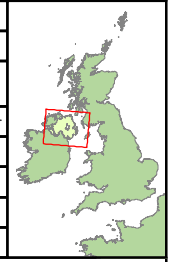

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24 South Sperrin
27 Foyle Valley
28 Glenelly Valley
29 Sperrin Mountains
30 Sperrin Foothills
31 Burngibbagh and Drumahoe
32 Derry Slopes
33 Lough Foyle Alluvial Plain
34 Loughermore Hills
35 Magilligan Lowlands
36 Binevenagh
37 Roe Basin
38 Eastern Binevenagh Slopes
39 Glenshane Slopes
40 Upper Moyola Valley
47 Loughgall Orchard Belt
51 Garvagh Farmland
52 Lower Bann Valley
53 Lower Bann Floodplain
54 Coleraine Farmland
55 Garry Bog
56 Dervock Farmlands
57 Causeway Coast and Rathlin Island
58 Long Mountain Ridge
59 Cullybackey and Clogh Mills Drumlins
60 River Main Valley
61 North Lough Neagh Shores
62 East Lough Neagh Points
63 Portmore Lough Fringe
64 Lough Neagh Peatlands
65 Upper Bann Floodplain
66 Armagh Drumlins
67 Armagh/Banbridge Hills
68 Carrigatuke Hills
69 Newry Basin
70 Crossmaglen Drumlins and Loughs
71 Ring of Gullion
72 Slieve Roosley
73 Kilkeel Coast
74 The Kingdom of Mourne
75 Mourne Mountains
76 Ballyroney Basin
77 Iveagh Slopes
78 North Banbridge Hills
80 Donaghcloney Valley
81 Kilwarlin Plateau
82 Dromore Lowlands
83 Lower Slieve Croob Foothills
84 Mourne Foothills
85 Newcastle Valleys
86 Tyrella Coastal Dunes
87 Slieve Croob Summits
88 Craggy Dromara Uplands
89 Hillsborough Slopes
90 Ravarnet Valley
91 Quoile Valley Lowlands
92 Ballyquintin and Lecale Coast
93 Portaferry and North Lecale
94 Strangford Drumlins and Islands
95 Ballygowan Drumlins
96 Castlereagh Plateau
97 Belfast/Lisburn
98 Carrickfergus Upland Pastures
99 Outer Ards Coast
100 Ards Farmlands and Estates
101 Scrabo
102 Holywood Hills
103 Bangor Coastline
104 Craigantlet Escarpment
105 Castlereagh Slopes
106 Lagan Parkland
107 Hummocky Lagan Lowlands
108 Broad Lagan Valley
109 Upper Ballinderry Plateau
110 Derrykillultagh
111 Divis Summits
112 Belfast Basalt Escarpment
113 Expansive Crumlin Farmland
114 Three and Six Mile Water Valleys
115 Tardree and Six Mile Water Slopes
116 Ballymena Farmland
117 Central Ballymena Glens
118 Moyle Moorlands and Forest
119 Ballycastle Glens
120 Fair Head
121 Moyle Glens
122 Garron Plateau
123 Larne Glens
124 Larne Basalt Moorland
125 Tardree Upland Pastures
126 Larne Coast
127 Larne Ridgeland
128 Island Magee
129 Carrickfergus Shoreline
130 Carrickfergus Farmed Escarpment

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Figure 22b - 2 of 2

Landscape Character Areas Within the 30km Landward Buffer

100 LCA Number (see Figure 22a - 1 of 2 for location)

Date	By	Size	Version
Aug 14	GB	A4	1
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Projection		N/A	
Scale		N/A	
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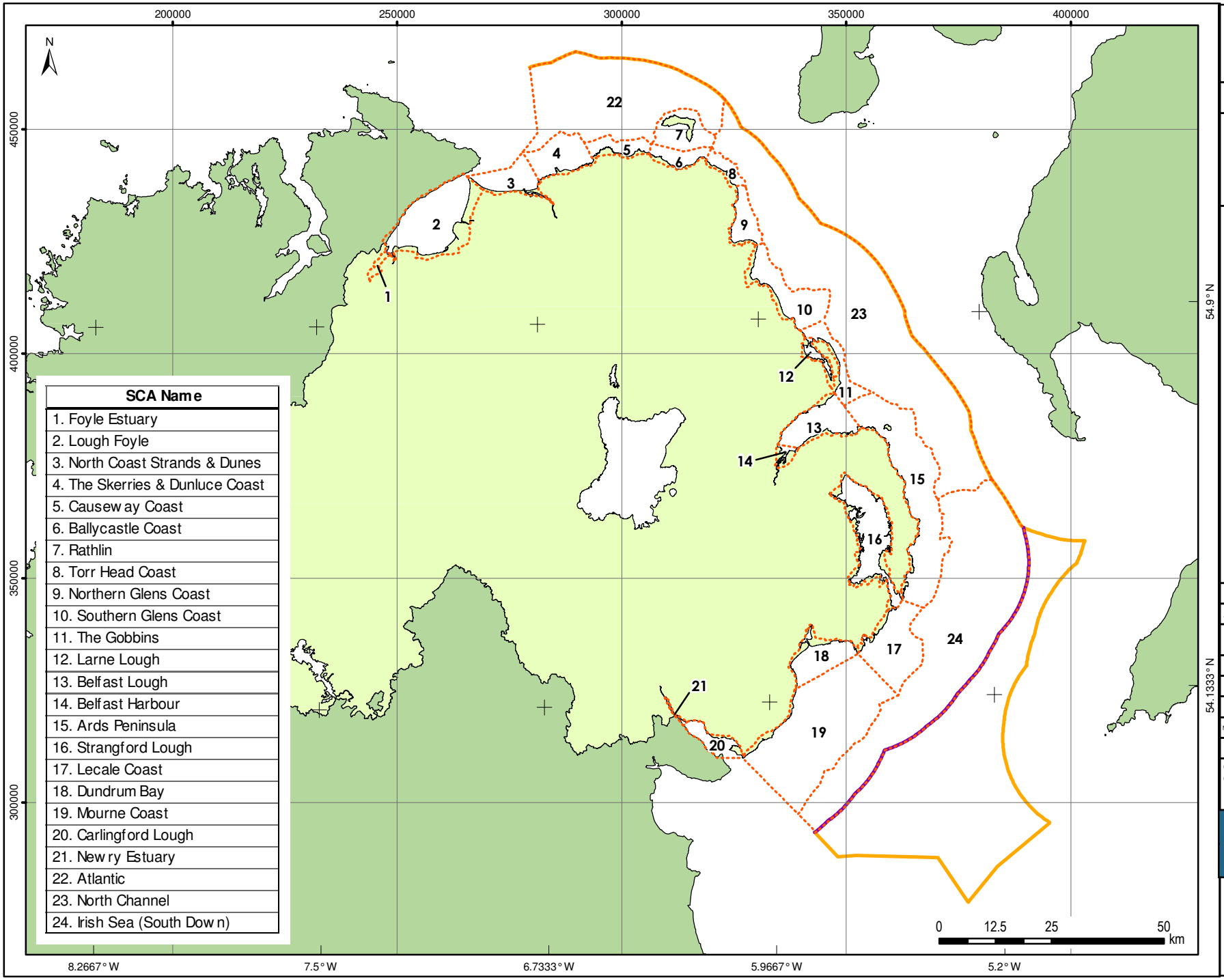

SCA Name
1. Foyle Estuary
2. Lough Foyle
3. North Coast Strands & Dunes
4. The Skerries & Dunluce Coast
5. Causeway Coast
6. Ballycastle Coast
7. Rathlin
8. Torr Head Coast
9. Northern Glens Coast
10. Southern Glens Coast
11. The Gobbins
12. Larne Lough
13. Belfast Lough
14. Belfast Harbour
15. Ards Peninsula
16. Strangford Lough
17. Lecale Coast
18. Dundrum Bay
19. Mourne Coast
20. Carlingford Lough
21. Newry Estuary
22. Atlantic
23. North Channel
24. Irish Sea (South Down)

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Figure 23

Northern Ireland Seascape Character Areas

- Seascape Character Area
- Northern Ireland Boundary
- NI Inshore/Offshore Waters Boundary
- Adjacent Waters Boundary

Date	By	Size	Version
Aug 14	GB	A4	1
Coordinate System		TM75 - Irish Grid	
Projection		Transverse Mercator	
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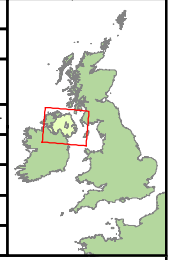

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