Appropriate Assessment of the
National Strategic Plan for Sustainable Aquaculture Development

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1.0 INTRODUCTION

Appropriate Assessment (AA) is a legal requirement under Article 6 of the *Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora* (as amended), hereafter referred to as the Habitats Directive. This is transposed in Ireland primarily by *S.I. No. 477 of 2011 European Communities (Birds and Natural Habitats) Regulations 2011,* hereafter referred to as the Birds and Habitats Regulations. AA forms an integral part of the decision-making process. The findings of this step-by-step process determine the decision made at the end.

A full scale appropriate assessment consists of four stages:

- Stage One: Screening
- Stage Two: Appropriate Assessment
- Stage Three: Assessment of alternative solutions
- Stage Four: Assessment of mitigation measures

This screening exercise for the Appropriate Assessment of the draft National Strategic Plan for Aquaculture (NSPA) provides information on and assesses the potential for the draft plan to impact on Natura 2000 sites in view of the sites' specific conservation objectives. As the European Court of Justice has confirmed through case law the need to apply the precautionary principle in making key decisions in relation to tests of AA, AA will be required where significant effects are likely, possible or uncertain at screening stage.

The information in this document forms part of and should be read in conjunction with all documentation associated with the draft NSPA.

This document does not include a separate assessment under Article 12 of the Habitats Directive. The Strategic Environmental Assessment of the draft NSPA addresses the provisions under Article 12 in detail as this requires Member States to take measures to establish a system of strict protection for animal species listed in Annex IV (a). Some of these species are also Annex II species. This is separate to the provisions for a network of protected areas as covered by the Article 6 assessment. It applies to the whole of the Member State's territory and concerns the physical protection of the species as well as their breeding sites and resting places.

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Any queries on the content of the document, or the consultation, should be directed in the first instance to DAFM at the above address or email address.

Deadline for submissions is Friday 24 July 2015.

2.0 SCREENING

Screening for Appropriate Assessment is carried out to determine whether or not an Appropriate Assessment is required in accordance with Article 6 (3) of the Habitats Directive and to record reasons for the decision taken as a result of the exercise. A staged process for carrying out Appropriate Assessments is described in the reference guidance documents (Section 2.1). The first stage is referred to as screening and identifies the likely impacts on Natura 2000 sites, if any, which would arise from a proposed plan or project, either alone or in combination with other plans and projects, and further considers whether these impacts are likely to be significant.

There are two tests:

1. Whether a plan or project is directly connected to or necessary for the management of Natura 2000 sites.
2. Whether a plan or project alone or in combination with other plans and projects is likely to have significant effects on Natura 2000 sites in view of their conservation objectives.

If the effects are deemed to be significant, potentially significant or uncertain then a full Appropriate Assessment should be carried out.

Screening is an iterative process that involves the consideration of the plan or project and its likely effects on Natura 2000 sites and their ecological sensitivities, and the interaction between these.

This screening exercise will be conducted and presented in the following manner:

1. Description of the draft National Strategic Plan for Sustainable Aquaculture 2014-2020, its origin and its scope.
2. Discussion on the scope of the assessment, how it relates to bay scale and individual assessments.
3. Identification of relevant Natura 2000 sites and their qualifying interests.
4. Assessment of the likely effects of the draft NSPA undertaken on the basis of available information.
5. Potential cumulative effects.
6. Screening statement and conclusions.

2.1 GUIDANCE

This report has been prepared with regard to the following guidance documents where relevant:

- European Commission, 2012. Guidance on Aquaculture and Natura 2000. Sustainable Aquaculture activities in the context of the Natura 2000 Network.

- EC Environment Directorate-General, 2000. Managing Natura 2000 sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC.

- European Commission Environment Directorate-General, 2001. Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (this document provides a non-mandatory methodology for carrying out assessments required under Article 6(3) and (4) of the Habitats Directive.

- Department of Environment, Heritage and Local Government, 2010 revision. Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities.

- Department of Environment, Heritage and Local Government. Circular NPW 1/10 & PSSP 2/10. Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.

- Marine Institute, 2013. Tools for Appropriate Assessment of Fishing and Aquaculture Activities in Marine and Coastal Natura 2000 sites. Report series prepared by ABPmer on behalf of the Marine Institute.

- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the Concepts of Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence. Opinion of the European Commission, January 2007.

2.2 DRAFT NATIONAL STRATEGIC PLAN FOR SUSTAINABLE AQUACULTURE

The requirement for the draft NSPA is set out in a Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions, COM (2013) 229 final, issued on 29th April 2013, entitled "Strategic Guidelines for the Sustainable Development of EU Aquaculture"[1]. Screening is carried out to identify potential interactions of the policy measures contained in the draft NSPA with Natura 2000 sites, not potential significant effects.

2.2.1 OUTLINE OF THE DRAFT NSPA

The proposal for the Common Fisheries Policy (CFP) reform (COM (2011) 425) aims to promote aquaculture through "an open method of co-ordination." This means a voluntary process for cooperation based on Strategic Guidelines and Multiannual National Strategic Plans identifying common objectives and where possible, indicators to measure progress towards these goals. The Strategic Guidelines (COM (2013) 229) aim to assist Member States in defining their own national aquaculture targets taking account of their relative starting positions, national circumstances and institutional arrangements. The plan encourages Member States to set an overarching national growth objective for the period 2014 - 2020 and in addition covers four priority areas:

- Administrative Procedures;
- Co-ordinated Spatial Planning;
- Competitiveness;
- Promoting a level playing field.

Each priority area will contain the Member State's (MS) intended policy response and additional quantified targets and indicators.

The guidelines set targets at both MS and Commission level and outline a structure for the delivery of Multiannual National Strategic Plans for the promotion of Sustainable Aquaculture (NSPA) to be

[1] http://ec.europa.eu/fisheries/cfp/aquaculture/official_documents/com_2013_229_en.pdf

prepared by MSs on a national level for the period 2014 – 2020. The NSPA will compliment the National Seafood Operational Programme and at the latest is required to be submitted to the Commission along with the Operational Programme.

Key Information

National Strategic Plan for Aquaculture (NSPA)

- Preparation of an NSPA is a new initiative required to be prepared by MSs in accordance with COM (2013) 229 final
- DAFM have tasked Bord Iascaigh Mhara (BIM) with the preparation of the NSPA.
- The NSPA should cover the period 2014 – 2020.
- Section 4.2 of the Communication, *Strategic Guidelines for the sustainable development of EU aquaculture links* the draft NSPA with the European Maritime & Fisheries Fund (EMFF) and states that where aquaculture is concerned, it would be important for the Seafood Development Programme (SDP) to be consistent with the draft NSPA in order to foster coherence for the whole policy.

Table 2.2.1: Draft NSPA policy areas and actions

Aiming for Growth

1. Build capacity and scale in the industry
2. Dedicated supports to new entrants to the sector
3. Support organic certification of aquaculture production
4. Aid shellfish producers significantly affected by biotoxin closures

Knowledge, Innovation and Technology

5. Foster knowledge, innovation and technology transfer.
6. Enhance the skills base to foster a knowledge economy.
7. Provision of expert advice to improve environmental and business performance and enhanced strategic planning by aquaculture enterprises
8. Support best husbandry and disease management practice
9. Applied research and collaborations between industry, scientific and development bodies.
10. Development of commercial scale growing systems for novel species.

Ensuring Sustainability

11. Application of Guiding Principles for the Sustainable Development of Aquaculture.
12. Application of scale limits and phasing in relation to the development of individual offshore salmon farms
13. Development of an industry Code of Practice for Invasive Alien Species.
14. Continuation of Invasive Species Ireland Project in relation to aquaculture.
15. Quantify the environmental contribution of aquaculture.
16. Ensure that aquaculture monitoring is consistent with the requirements of the Marine Strategy Framework Directive.

Coordinated Spatial Planning

17. Develop opportunities and constraints mapping for aquaculture taking specific account of environmental issues, Natura 2000 sites and inshore fisheries.

18. Identify marine tourism opportunities from aquaculture

19. Study on integrated multi-trophic aquaculture and possible synergies with offshore wind farms or other marine renewable energy.

20. Study on how aquaculture contributes to communities in rural areas.

Aquaculture Licensing

21. Progressively remove the current aquaculture licensing backlog.

22. Review and revision of the aquaculture licensing process, including the applicable legal framework.

23. In the context of a reviewed process and revised legal framework, consider the phased introduction of appropriate timescales for licence determination.

24. Develop data management and information system with online aquaculture licence application and tracking functionality and spatial mapping of aquaculture sites and exclusion areas.

COM (2013) 229 final encourages Member States to *'indicate in the multiannual national plan its own aquaculture growth objective (volume and value) in the period covered by the plan.'*

In terms of production metrics, the draft NSPA is carefully aligned with the Seafood Development Programme. The result indicators of the SDP and this plan anticipate that there will be an increase of forty five thousand tonnes in the output from the sector by 2023 over the base year of 2011 where total aquaculture production was thirty seven thousand six hundred tonnes. It should be understood that this estimate is at the upper level of reasonable expectation. It should also be noted that in 2003 total Irish aquaculture production was sixty three thousand tonnes.

Table 2.2.1a: Aquaculture production in Ireland 2003/2011/2013 (BIM)

Species	Amount (tonnes) 2003	Amount (tonnes) 2011	Amount (tonnes) 2013
Salmon	*c.*16,347	12,000	*c.*15,000
Trout	*c.*1,451	*c.*600	*c.*728
Rope grown mussels	*c.*9,319	*c.*10,000	*c.*10,000
Bottom grown mussels	*c.*29,976	*c.*13,000	*c.*5,527
Oyster *(gigas and edulis)*	*c.*5,155	7,527	*c.*8,700
Novel species **Seaweed**	*c.*268 n/a	*c.*200 *c.*3	*c.*123 *c.*50
Total production	*c.*62,516	*c.*43,330	*c.*40,128

Therefore, output increase will be derived from a combination of primarily increased productivity from the existing aquaculture licence portfolio with the balance from new licences. The makeup of this increased output will include shellfish, finfish, novel species, seaweed and multi-trophic aquaculture in a variety of different production systems both intensive and extensive. This overall output increase will be largely dictated by market forces and site suitability for the cultivation of particular species. Of this total increase in output it is anticipated that approximately 25% will be derived from net new licence capacity and the remainder will be achieved through optimisation of the current bank of aquaculture licences. Given the very wide variability of production systems and the large number of species being farmed, with more to be added into the future, it is not feasible to offer a meaningful prediction of precisely which species and which production systems will yield the projected increases.

Table 2.2.1b: Anticipated growth in relation to licence

	% anticipated growth
Current licence portfolio	75
Additional licences	25

It can clearly be seen that the overall growth of the aquaculture industry will be derived mainly from increased production output, **not** increased licensed area.

In addition, a 30% increase in Recirculating Aquaculture System derived production is targeted together with an increase of 25% of organically certified output when compared to existing levels. Further increase in output value is expected to be generated from the cultivation of novel aquaculture species, an increasing level of organic and eco-label aquaculture products and the introduction of multi-trophic aquaculture techniques.

2.2.2 LINKS TO OTHER NATIONAL PLANS AND PROGRAMMES

Seafood Development Programme 2014 – 2020 (SDP)

The purpose of the Seafood Development Programme is to identify actions that each Member State intends to fund through the European Maritime and Fisheries Fund (EMFF). The SDP relates to the funding of a range of seafood aspects: aquaculture, fisheries, markets, seafood processing, data collection, control and enforcement and integrated maritime policy. The SDP for the period 2007-2013 was subject to SEA and AA[2]. The SDP for the forthcoming period 2014 – 2020 will also be subject to SEA and AA. The Seafood Development Programme lays out the programme of financial measures that Ireland intends to carry out under the European Maritime and Fisheries Fund. One part of this is financial measures to support aquaculture. These must be in line with policies laid out in the National Strategic Plan for Aquaculture. For aquaculture the draft NSPA covers a wider range of issues than the SDP. The SDP, however, relates to other aspects of the seafood sector as detailed above. Table 2.2.2 details the result indicator plan to meet Union Priority 2 under the proposed SDP.

Table 2.2.2: Union Priority 2 – Result Indicator Plan

Union priority	2 - Fostering environmentally sustainable, resource-efficient, innovative, competitive and knowledge-based aquaculture	
Specific objective	1 - Provision of support to strengthen technological development, innovation and knowledge transfer	
Title of the result indicator	**Target value for 2023**	**Measurement unit**
Change in volume of aquaculture production	45,000	Tonnes
Change in value of aquaculture production	112 million	Euro (€)
Change in profitability (net profit)	47.8 million	Euro (€)
Specific objective	2 - The enhancement of the competitiveness and viability of aquaculture enterprises, including the improvement of safety and working conditions, in particular of SMEs;	
Title of the result indicator	**Target value for 2023**	**Measurement unit**
Change in volume of aquaculture production	45,000	Tonnes
Change in value of aquaculture production	112 million	Euro (€)
Change in profitability (net profit)	47.8 million	Euro (€)
Specific objective	3 - Protection and restoration of aquatic biodiversity and enhancement of ecosystems related to aquaculture and promotion of resource-efficient aquaculture.	
Title of the result indicator	**Target value for 2023**	**Measurement unit**
% (of total aquaculture production) of organic aquaculture production and recirculation system.	60	%
% of total aquaculture production certified under voluntary sustainability schemes.	50	%
Number of aquaculture farms providing environmental services	20	number
Specific objective	4 - Promotion of aquaculture having a high level of environmental protection, and the promotion of animal health and welfare and of public health and safety.	
Title of the result indicator	**Target value for 2023**	**Measurement unit**

[2] http://www.bim.ie/our-publications/corporate-&-other-reports/

Change in volume of aquaculture production	45,000	Tonnes
Change in value of aquaculture production	112 million	Euro (€)
% (of total aquaculture production) of organic aquaculture production and recirculation system.	60	%
% of total aquaculture production certified under voluntary sustainability schemes.	50	%
Specific objective	5 - Development of professional training, new professional skills and lifelong learning	
Title of the result indicator	**Target value for 2023**	**Measurement unit**
Employment created	450	FTE
Employment Maintained	958	FTE

Food Harvest 2020

Food Harvest 2020[3] provides a vision for Irish Agri-food and fisheries with the overall aim of achieving Smart, Green Growth and specific targets of reaching €1 billion seafood value (€650 million in exports, €350 in domestic sales) and €1.5 billion revenue from marine & coastal tourism and leisure by 2020. The draft NSPA will be aligned with the relevant targets for the seafood sector laid out in Food Harvest 2020. Food Harvest anticipated a 78% increase in aquaculture production and a 43% increase in value by 2020. However, there was no base year given in the plan to gauge this increase against. The value of aquaculture increased by over 27.5 % (€104.2m to €113m) but by 2012 the volume of production actually fell by 26%. By end 2013, the situation had disimproved further due to a combination of an outbreak of amoebic gill disease in salmon, issues with licences and poor weather conditions affecting seed mussel development.

Harnessing Our Ocean Wealth

Harnessing Our Ocean Wealth[4], the National Integrated Marine Plan (IMP) for Ireland establishes a roadmap for the Government's vision, high-level goals and integrated actions across policy, governance and business to enable Ireland's marine potential to be realised. The IMP provides a new momentum for growth in the marine area and seeks to ensure government departments work together more efficiently and effectively. This will enable economic growth, investment and the creation of jobs in our ocean economy, relying heavily on investment and participation by the private sector. The IMP will also allow Ireland to strike a balance between protecting our marine ecosystems and maximising the use of its resources as a source of economic growth. Implementation of this plan will see Ireland evolve an integrated system of policy and programme planning for marine affairs. The draft NSPA will be aligned with the targets established in Harnessing Our Ocean Wealth.

[3] http://www.agriculture.gov.ie/agri-foodindustry/foodharvest2020/

[4] http://www.ouroceanwealth.ie/SiteCollectionDocuments/Harnessing%20Our%20Ocean%20Wealth%20Report.pdf

National Biodiversity Plan 2011-2016

'Actions for Biodiversity 2011-2016' is Ireland's 2nd National Biodiversity Plan. Following on from the first plan it focusses on actions that were not fully completed and addresses emerging issues grouped under seven specific objectives:

- To mainstream biodiversity in the decision making process across all sectors;
- To substantially strengthen the knowledge base for conservation, management and sustainable use of biodiversity;
- To increase awareness and appreciation of biodiversity and ecosystem services;
- To conserve and restore biodiversity and ecosystem services in the wider countryside;
- To conserve and restore biodiversity and ecosystem services in the marine environment;
- To expand and improve on the management of protected areas and legally protected species;
- To substantially strengthen the effectiveness of international governance for biodiversity and ecosystem services.

These objectives are supported by 21 targets and 102 actions.

The draft NSPA is consistent with these objectives and targets particularly through its support of the National Integrated Marine Plan for Ireland and its support for various organic, environmental and quality management schemes.

Food Wise 2025

Food Wise 2025 sets out a cohesive, strategic plan for the development of agri-food sector over the next decade. The Agri Food Strategy Committee has identified opportunities arising as a result of significant population growth and greater access to international markets. In addition, the Committee recognises that the increased pressure on global agricultural resources and the environment will offer potential further growth opportunity for the Irish agri-food and fisheries sector.

The long-term vision as set out in the Report is of 'Local Roots Global Reach' based on the continued development of the sector where efficient and environmentally-friendly production delivers sustainable export growth on global markets.

On the basis of available data and by taking the actions identified in the Report, the Committee has set the following growth projections, which it believes are achievable by 2025:

- Increasing the value of agri-food exports by 85% to €19 billion.
- Increasing value added in the agri-food, fisheries and wood products sector by 70% to in excess of €13 billion.
- Increasing the value of Primary Production by 65% to almost €10 billion
- The creation of an additional 23,000 direct jobs in the agri-food sector all along the supply chain from primary production to high valued added product development.

To achieve the projections set out above, Food Wise 2025 identifies over 350 recommendations to achieve sustainable growth and these will require a concerted and coordinated approach by primary producers, industry, Departments and State agencies.

http://www.agriculture.gov.ie/foodwise2025/

BIM Corporate Strategy 2013 - 2017

BIM's mission is to grow a thriving Irish seafood industry, expand the raw material base, add value and develop efficient supply chains that together deliver on the Government's Food Harvest 2020 targets for seafood and create sustainable jobs. Its vision focusses on a scaled Irish seafood industry capitalising on the growing opportunities for seafood in global markets and providing sustainable employment in Ireland's coastal communities with the following 5 specific targets identified:

- Sales Value - €1 billion
- 1,200 jobs created
- 8,100 Training places created
- Expand Raw Material supply by 45,000 tonnes
- 4 companies with a turnover of +€50 million

The key areas of focus through which BIM will seek to achieve the targets are:

- Expand the raw material base,
- Optimise added value to seafood products,
- Enhance the industry's structures,
- Seek new sources of finance and strategic partners,
- Continue to pro-actively improve the skills of fishermen, fish farmers and processors, and
- Enhance the sustainability of Irish seafood.

The BIM Corporate Strategy was created to fully streamline with the Food Harvest 2020 objectives and is linked with the wider sector objectives described in national policies. It proposes means to lever EMFF funds to deliver the proposed targets. The draft NSPA is therefore appropriately aligned with the BIM corporate strategy.

2.2.3 GEOGRAPHICAL SCOPE

The draft Multiannual National Strategic Plan for the Promotion of Sustainable Aquaculture (NSPA) is a national plan. Aquaculture takes place throughout Ireland, mainly in coastal areas but also occurs in inland areas for freshwater culture and in closed recirculation facilities. Any individual is entitled to make an application for an aquaculture licence in any location. The licensing process is rigorous. In marine areas the application for an aquaculture licence to DAFM includes an application for an accompanying foreshore licence. For landbased and freshwater aquaculture operations appropriate planning permission must be obtained prior to the award of an aquaculture licence. A large number of licensed aquaculture activities are situated within the boundaries of designated Natura 2000 sites as Figure 2.2.3a-g show.

Ireland has a land area of 84,421km^2. SAC and SPA designations cover an area, both terrestrial and aquatic, of approximately 1,950,000 hectares (19,500 km^2). Of this area cover, approx. half relates to terrestrial habitats (9227km^2) and half to marine (10,227km^2)[5], however, these two designation types frequently overlap, either partially or in their entirety.

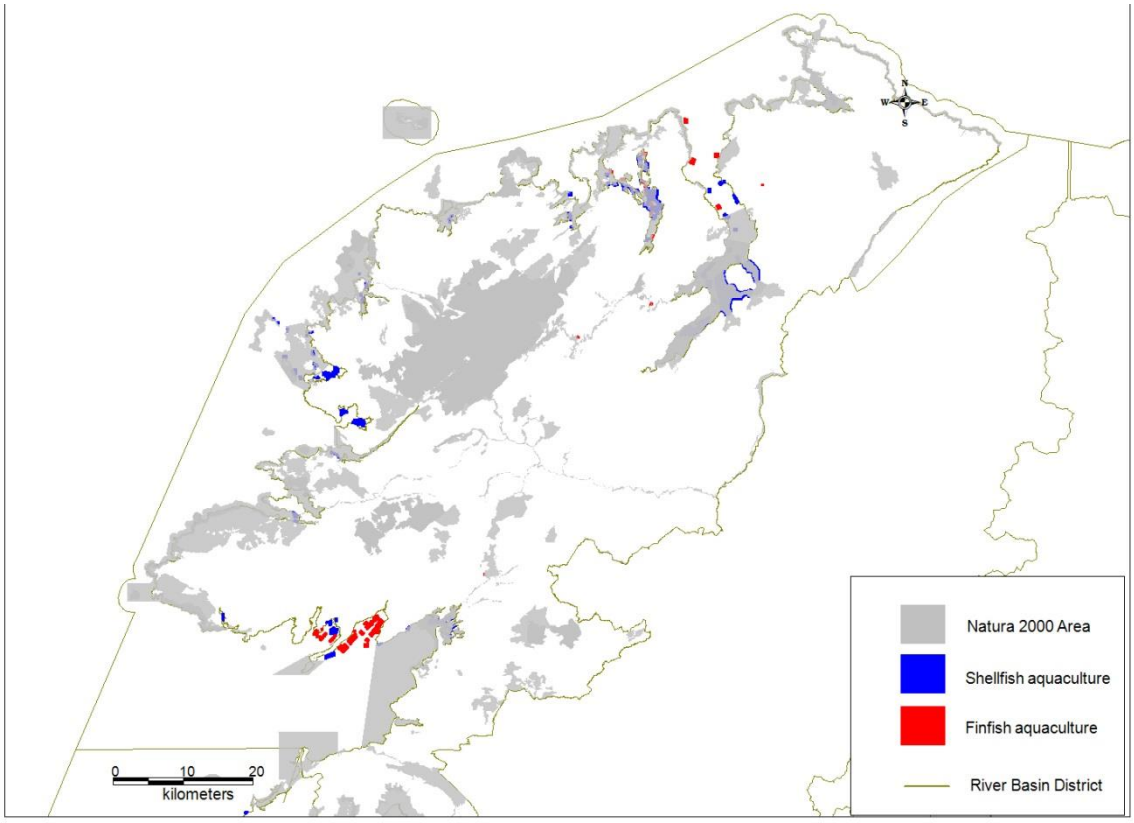
Aquaculture licenses, both freshwater and marine, currently occupy a total area of 14,986 hectares (149.86km^2). This figure relates to <u>all</u> aquaculture licences, including those that are not within a designated Natura 2000 area.

[5] Natura 2000 Nature and Biodiversity newsletter Number 37, January 2015

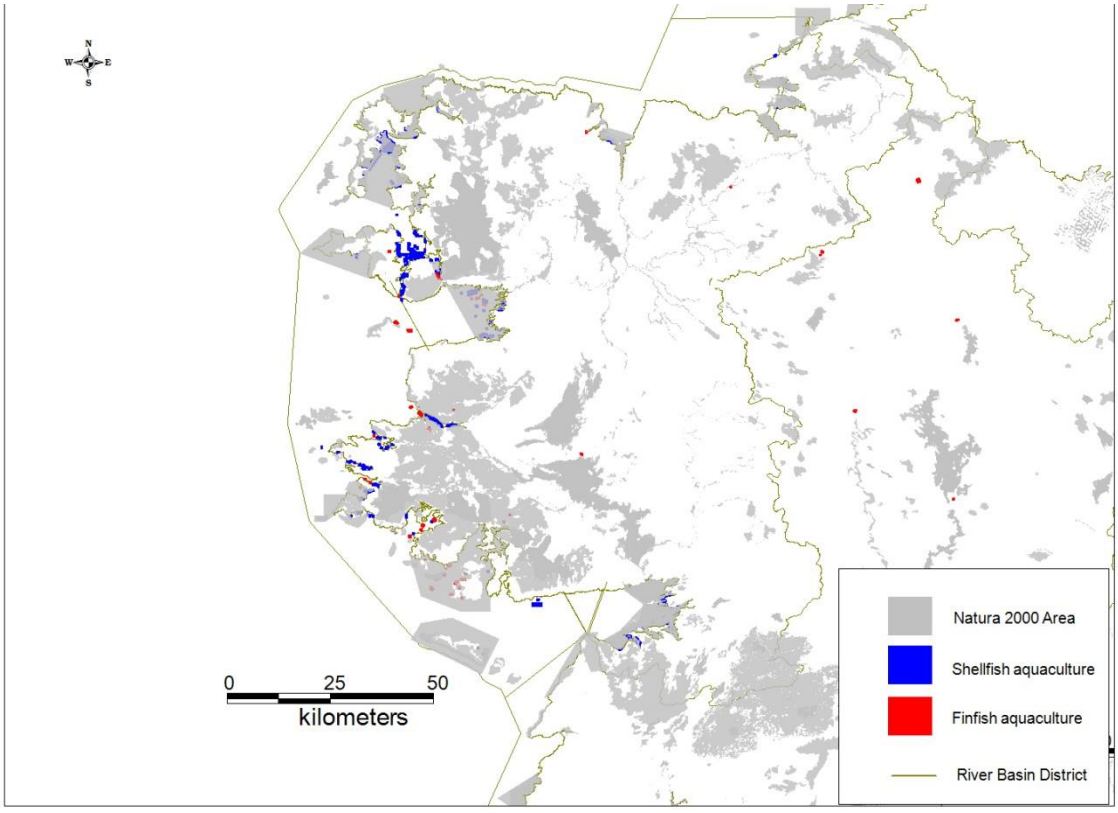
Since SAC and SPA designations often overlap, some licensed aquaculture operations are situated both within the SAC and the SPA. When comparing the overall area covered by SAC and SPA designation to the overall area covered by aquaculture licences it can be seen that the latter occupies less than 1% of total designated area (though the total area cover for aquaculture includes operations that are not within a designated area). Since a large number of aquaculture licences are marine based, even if it was assumed that the total area cover for aquaculture related to only marine farms, this would still only represent approx. 1.5% of designated marine Natura 2000 sites (149.86km^2:10,227 km^2x100=1.47%).

The draft NSPA focuses on policies for the future operation of aquaculture in Ireland. While there are objectives for building capacity and scale in the industry and better management of current and new operations within the context of marine spatial planning, the plan itself does not have a spatial focus and will not identify/determine areas where aquaculture may or may not take place.

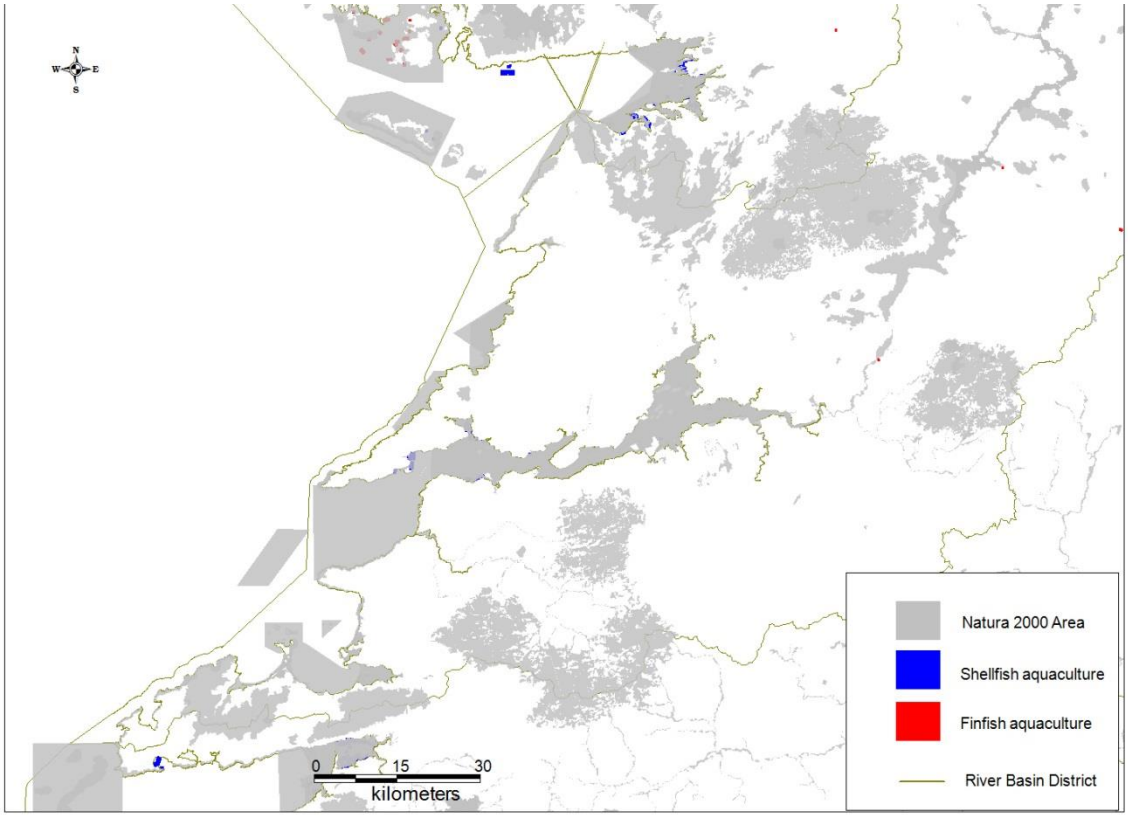
Figure 2.2.3: Location of current designated Natura 2000 sites in Ireland.



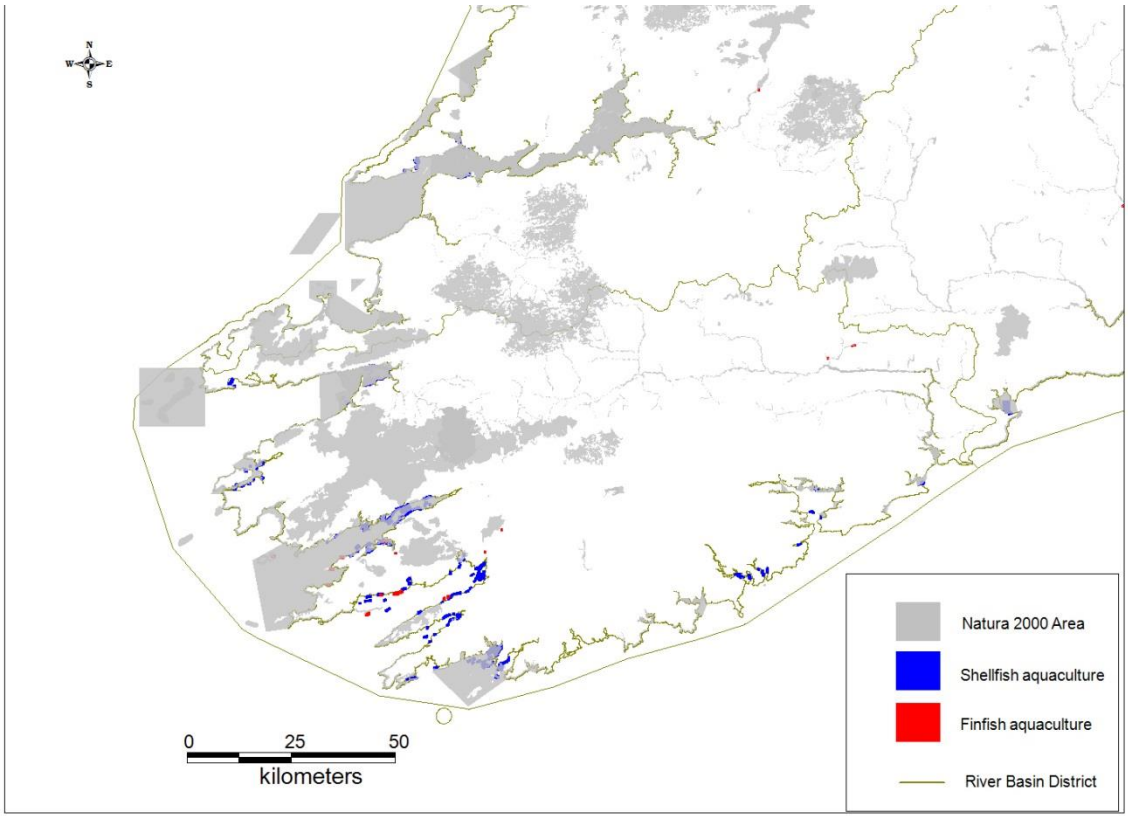
Map 2.2.3 a: Current licensed aquaculture sites in relation to Natura 2000 sites in the NWIRBD



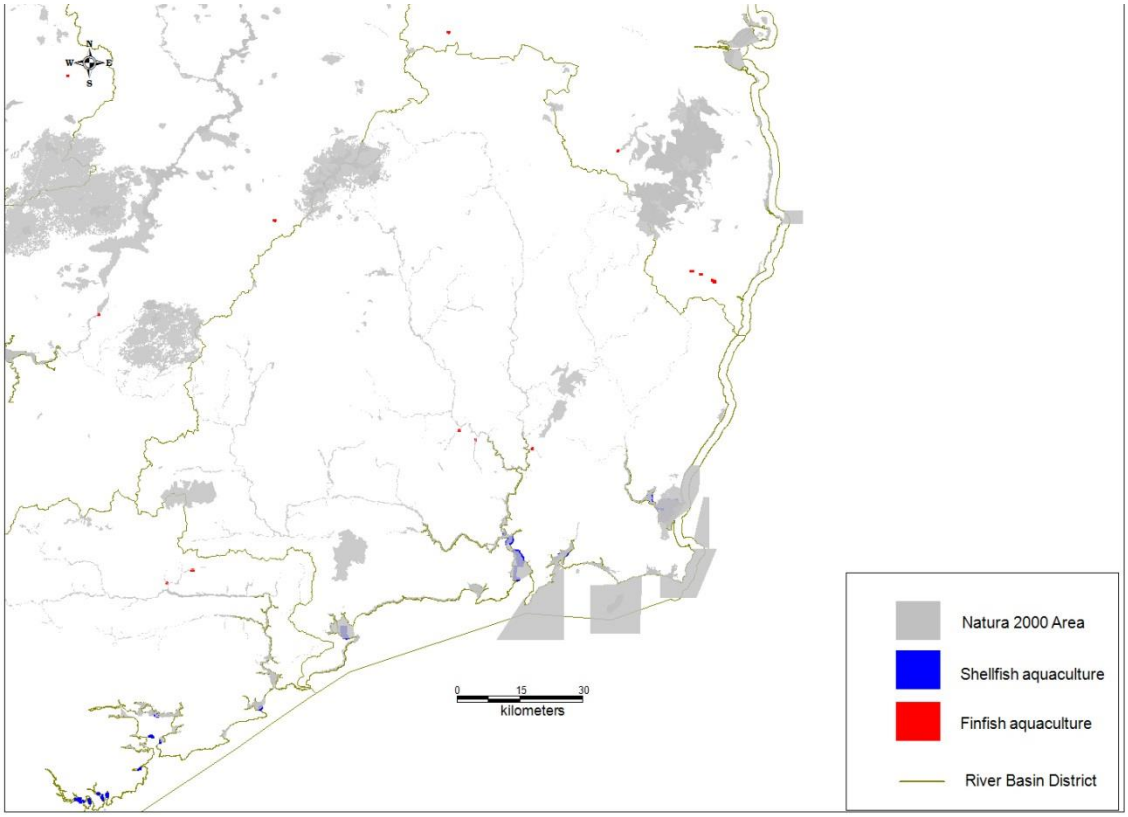
Map 2.2.3 b: Current licensed aquaculture sites in relation to Natura 2000 sites in the WRBD



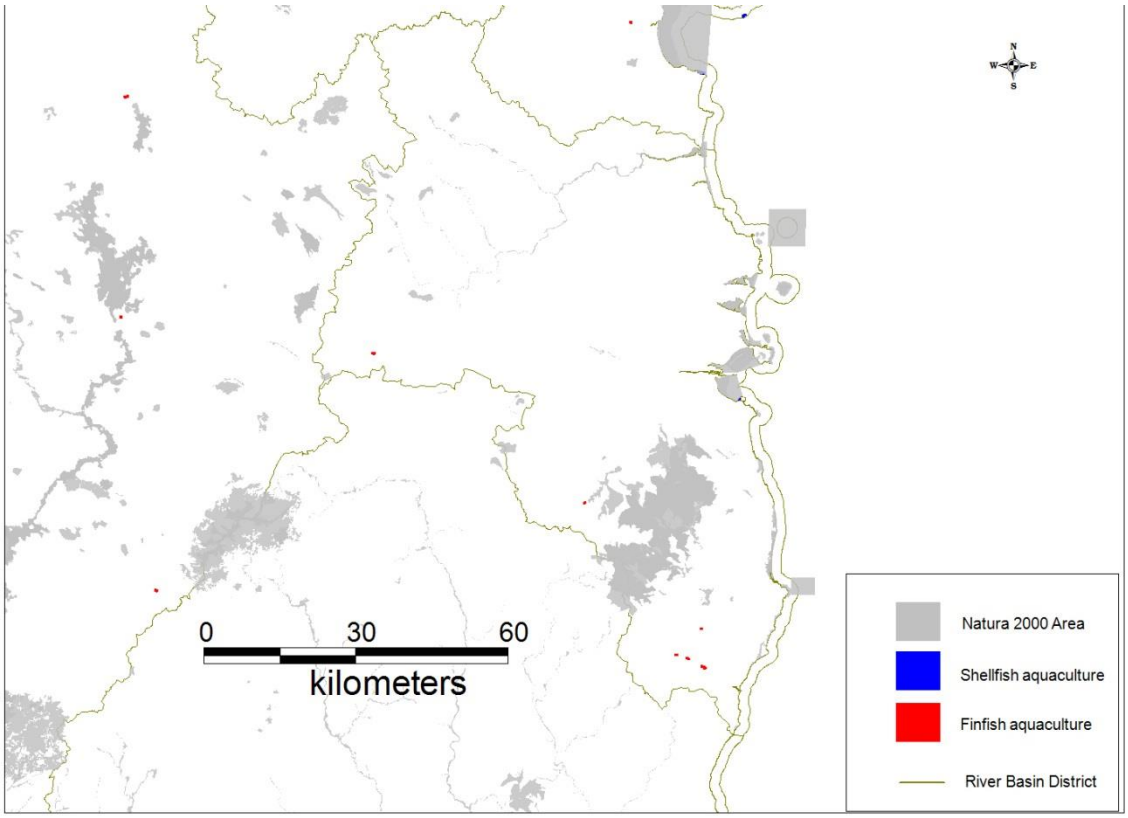
Map 2.2.3 c: Current licensed aquaculture sites in relation to Natura 2000 sites in the Shannon IRBD



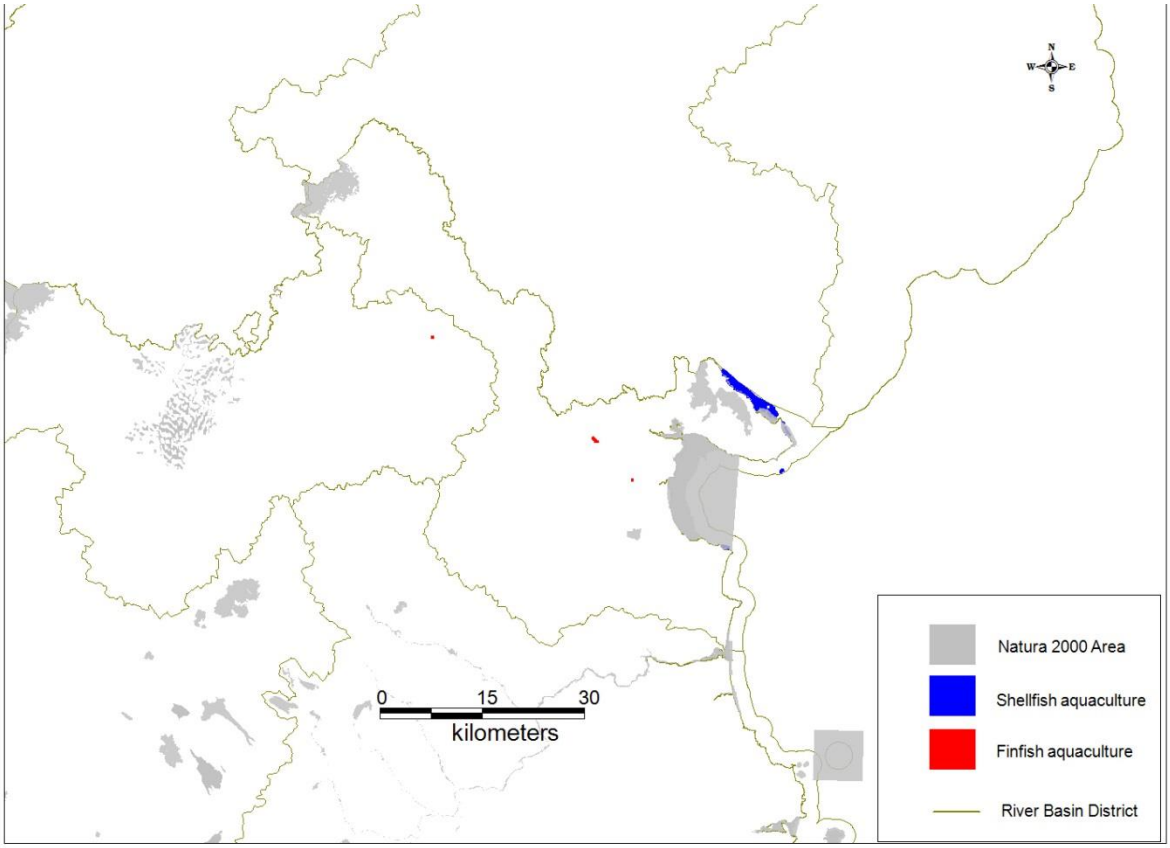
Map 2.2.3 d: Current licensed aquaculture sites in relation to Natura 2000 sites in the SWRBD



Map 2.2.3 e: Current licensed aquaculture sites in relation to Natura 2000 sites in the SERBD



Map 2.2.3 f: Current licensed aquaculture sites in relation to Natura 2000 sites in the ERBD



Map 2.2.3 g: Current licensed aquaculture sites in relation to Natura 2000 sites in the Neagh-Bann IRBD

2.2.4 OBJECTIVES OF THE DRAFT NSPA

Below is a summary of the policy responses proposed for the draft National Strategic Plan for Aquaculture set across four priority areas.

Aiming for Growth

Vision for 2020

A sustainable and competitive aquaculture sector, where production will grow according to market and consumer demands and in balance with nature and society.

Policy Actions

1. **Build capacity and scale in the industry**

    a. Increased productivity from the existing aquaculture licence portfolio
    b. The establishment of new aquaculture enterprises
    c. The cultivation of novel aquaculture species
    d. Increasing the level of organic and eco-label aquaculture products
    e. Introduction of multi-trophic aquaculture techniques

2. **Dedicated supports to new entrants to the sector**

    It is proposed to establish a dedicated support scheme through the Seafood Development Programme 2014-2020, co-funded by the Exchequer and European Maritime and Fisheries Fund, to assist new entrants with capital investment, similar to the Commercial Aquaculture Development Scheme, by which is more tailored to the specific needs and obligations on new entrants.

3. **Support organic certification of aquaculture production**

    It is proposed to initiate a support scheme through the Seafood Development Programme 2014-2020, co-funded by the Exchequer and European Maritime and Fisheries Fund, to encourage conventional producers to move to organic production and to participate in EU Eco-management and audit schemes (EMAS).

4. **Aid shellfish producers significantly affected by biotoxin closures**

    It is proposed to establish a limited scheme of aid to shellfish producers significantly affected by such biotoxin closures through the Seafood Development Programme 2014-2020, co-funded by the Exchequer and European Maritime and Fisheries Fund.

Knowledge, Innovation and Technology

Vision for 2020

A more competitive, efficient and innovative aquaculture sector.

Policy Actions

5. **Foster knowledge, innovation and technology transfer.**

   It is proposed to initiate a support scheme through the Seafood Development Programme 2014-2020, co-funded by the Exchequer and European Maritime and Fisheries Fund, to support:
   a) Development of technical, scientific or organisational knowledge in aquaculture farms;
   b) Development or introduction in the market new aquaculture species with good market potential, new or substantially improved products, new or improved processes, new or improved management and organisation systems;
   c) Exploration of the technical or economic feasibility of innovative products or processes.

6. **Enhance the skills base to foster a knowledge economy.**

   A Training and Networking Scheme is proposed to be implemented through the Seafood Development Programme 2014-2020, co-funded by the Exchequer and European Maritime and Fisheries Fund, with the objective of development of professional training, new professional skills, lifelong learning and the dissemination of scientific and technical knowledge and innovative practices.

7. **Provision of expert advice to improve environmental and business performance and enhanced strategic planning by aquaculture enterprises**

   A Business, Planning and Environmental Advisory Services scheme is proposed to be implemented through the Seafood Development Programme 2014-2020, co-funded by the Exchequer and European Maritime and Fisheries Fund, in order to improve performance and competitiveness and to reduce the environmental impact of operations.

8. **Support best husbandry and disease management practice**

   It is proposed to develop a support scheme through the Seafood Development Programme 2014-2020, co-funded by the Exchequer and European Maritime and Fisheries Fund, to aid in the investigation of alternatives to medicines, studies into best practice techniques and knowledge transfer.

9. **Applied research and collaborations between industry, scientific and development bodies.**

   Working with technical and research institutions will allow innovative products and investment in innovative technology and trialling such technology under commercial conditions to improve

performance and competitiveness, whilst also assisting measures to improve long term environmental sustainability.

10. **Development of commercial scale growing systems for novel species.**

    Projects to develop the appropriate techniques and technologies from pilot through to commercial scale production will be prioritised under the plan along with training, networking and international technology transfer for novel species.

Ensuring Sustainability

Vision for 2020

An aquaculture industry that develops in harmony with nature, and with the confidence of stakeholders.

Policy Actions

11. **Application of Guiding Principles for the Sustainable Development of Aquaculture.**

    Six high-level principles (Responsible Planning/ Ecosystem Protection/ Science-based approach/ Compliance/ Openness, Transparency and Accountability/ Industry Best Practice) recommended by the Marine Institute are intended to provide a broad direction to guide the ongoing development of sustainable aquaculture in Ireland and instil confidence in all stakeholders in the commitment to appropriate development of the industry.

12. **Application of scale limits and phasing in relation to the development of individual offshore salmon farms**

    Scale limits and phasing as recommended by the Marine Institute will be applied.

13. **Development of an industry Code of Practice for Invasive Alien Species.**

    The project actions include research into prevention and control of NIS, promoting opportunities for the aquaculture sector to learn about and take appropriate action to reduce the risks of invasive species introduction and spread, of species both impacting upon and impacted by existing and new operations in line with MSFD targets

14. **Continuation of Invasive Species Ireland Project in relation to aquaculture.**

    Control of invasive species is a major challenge, and involves cross-sectoral and cross-border co-operation by a range of responsible bodies and sectoral interests. In response to this issue a joint approach was undertaken by the relevant Departments in Northern Ireland and the Republic of Ireland to establish the Invasive Species Ireland project.

15. **Quantify the environmental contribution of aquaculture.**

    In the National Biodiversity Plan there are objectives and targets related to raising awareness and appreciation of biodiversity and ecosystem services and to conserve and restore these in the wider countryside. One of the targets is to optimise use of opportunities under agricultural, rural development and forest policy to benefit biodiversity.

16. **Ensure that aquaculture monitoring is consistent with the requirements of the Marine Strategy Framework Directive.**

    Aquaculture monitoring must be consistent with MSFD requirements and be reflected in MSFD assessment and reporting.

Coordinated Spatial Planning

Vision for 2020

Aquaculture incorporated into an effective and equitable marine spatial planning system.

Policy Actions

17. **Develop opportunities and constraints mapping for aquaculture taking specific account of environmental issues, Natura 2000 sites and inshore fisheries.**

    The mapping study will assess the spatial constraints and opportunities and should provide maps showing specific areas suitable for specific aquaculture activities and areas where there are constraints to specific aquaculture activities. These may be identified as anticipated benefits, including the contribution that the proposals would make to policy objectives, or anticipated adverse effects.

18. **Identify marine tourism opportunities from aquaculture**

    A study will be initiated to identify marine tourism opportunities for the aquaculture sector and to provide guidance to farmers wishing to become involved.

19. **Study on integrated multi-trophic aquaculture and possible synergies with offshore wind farms or other marine renewable energy.**

    A study or studies into possible synergies between these renewables and aquaculture activities would yield valuable planning information.

20. **Study on how aquaculture contributes to communities in rural areas.**

    These studies would outline how aquaculture contributes to the societal benefits in the marine area, including the sustainable use of marine resources to address local social and economic issues.

Aquaculture Licensing

VISION FOR 2020

A streamlined and efficient licencing system that provides greater business certainty to applicants, and more transparency to the general public.

Policy Actions

21. Progressively remove the current aquaculture licensing backlog.

While the overall process will continue to need to reflect the engineering, scientific, environmental, legal and public policy aspects of all applications, the incremental availability and ultimate completion in 2016 by the Marine Institute of Appropriate Assessments will facilitate the processing of aquaculture licence applications currently on hand.

22. Review and revision of the aquaculture licensing process, including the applicable legal framework.

A full review of the procedures and processes involved in the consideration of aquaculture licence applications including, of necessity, the legislative framework is proposed.

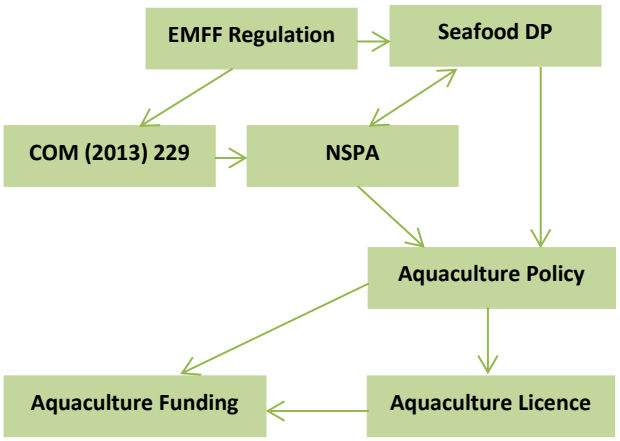
23. In the context of a reviewed process and revised legal framework, consider the phased introduction of appropriate timescales for licence determination.

Implementation of a more streamlined process, within a revised legal framework, together with completion of appropriate assessment, will allow for the phased introduction of appropriate timescales for licence determination.

24. Develop data management and information system with online aquaculture licence application and tracking functionality and spatial mapping of aquaculture sites and exclusion areas.

- Real time reporting and monitoring of the aquaculture industry;
- Potential to improve processing efficiency by the introduction of Registered Aquaculture Agents to assist clients to prepare aquaculture licence applications to the required standard of completeness and accuracy;
- A standardised reporting and input process to the aquaculture licensing process from internal and external consultees;
- Improved efficiencies in processing time of applications such as instant on-screen accessibility and two-way electronic delivery of internal, statutory and public consultation material;
- Public Viewer will deliver transparency for the aquaculture industry and the public;
- Enhanced efficiencies, arising from improved levels of reliability and predictability with consequent cost reduction to applicants, DAFM and other agencies by the use of a standardised paperless system.
- Secure web based system with controlled levels of access (DAFM, agency and public) managed by DAFM.
- Improved efficiency in information accuracy and decision-making by central file sharing and single on-screen viewer.

2.2.5 POSITION OF THE NSPA IN THE AQUACULTURE PLANNING HIERARCHY



2.3 SCOPE OF THE APPROPRIATE ASSESSMENT

The structure for the draft NSPA is set out in Com (2013) 229 Final. The draft NSPA is a high level strategic plan which outlines policy across four priority areas that in turn will influence how the aquaculture sector will develop in Ireland in the future. The draft NSPA takes into account objectives for building capacity and scale for the seven year period as outlined in Section 2.2.4. The European Commission's objective is to grow aquaculture production in order to address the eight million tonne deficit that exists between the amount of seafood produced in the EU and the amount which is consumed. However, the draft NSPA reaches far beyond simply the scale of aquaculture production to examine how it is managed and supported from departmental through to individual business level, and how it will operate within the wider planning framework, working with the natural environment, creating employment and supplying high quality seafood to the market.

In Ireland, as any individual can apply for an aquaculture licence at any location, the plan necessarily covers large non-specific areas and does not identify specific areas for development. In the absence of site specific information, it will be difficult to determine whether the plan will or will not have significant effects on the integrity of individual sites that are part of the Natura 2000 network. The consequence of this is a limitation on what can be reasonably assessed, at this level, within the appropriate assessment. One of the conclusions of this assessment will be that screening and where applicable full assessment will be required at project level (i.e. individual licence scale) in all cases to ensure no significant adverse effect on the integrity of Natura 2000 sites.

European Commission guidance on Aquaculture Activities in the context of the Natura 2000 network recognises this limitation, and identifies the need for a case by case approach stating:

"All types of farming interact with the environment and aquaculture is no exception. Potential effects of different aquaculture systems are widely described in the scientific and technical literature. Those effects are highly specific to the site and depend on the environmental and rearing conditions. Any possible risks must be assessed taking into account all the relevant features and their specific condition as well as the conservation objectives of the relevant site."

Given the range of factors that influence the significance of an impact, a general assessment, supported by site specific assessments at a later stage, is considered to be permissible because important information about the effects of the plan may only become evident once specific proposals and projects are brought forward (SNH/David Tyldesley 2010). The guidance indicates that, where a high level assessment

"cannot reasonably assess the effects on a European site in a meaningful way"

because of the high level nature of the plan, reliance on the lower tier project (or a more detailed lower tier plan) assessment may be more appropriate, provided that such lower tier assessments can influence the details of how the projects are implemented, where it cannot otherwise be demonstrated that there will be no Likely Significant Effects on interest features. For aquaculture in Ireland, this lower tier i.e. project scale assessment will actually help to determine whether or not a licence can be issued as well as influencing how operations will be carried out. Further to this the European Commission Guidance for Aquaculture and Natura 2000 areas highlights that

"The location and siting of aquaculture is probably the single most important factor in determining its environmental impact."

One of the objectives of the draft NSPA within the priority area to *Aquaculture Licensing* includes a full clearance of the current licensing backlog of applications and renewals within the seven year timeframe of the plan, a process which is already ongoing as part of the *"Roadmap to Compliance".* The existing licensing structure in Ireland includes Appropriate Assessment Screening (followed as necessary by full assessment), and EIA Screening of all applications also followed by a full EIA if necessary or mandatory as for marine cage salmon farming over 100 tonnes. Therefore, the site level environmental assessment process is already well established and should ensure that aquaculture developments over the period of the plan will not adversely affect the integrity of the Natura 2000 network in Ireland.

The above section details the limited ability of the draft NSPA to deliver site scale determinations. The following section examines how Appropriate Assessment of the draft NSPA may be able to assist with aquaculture planning both for licence applicants and for licensing authorities. As the environmental impact of aquaculture is largely determined by its location and siting, following discussions with NPWS it was agreed that guidance to assist with site scale aquaculture planning would be a very useful way of presenting an Appropriate Assessment in this instance.

Bearing in mind that site scale assessment is not possible, an assessment of the qualifying features most commonly linked with aquaculture operations in Ireland will therefore be carried out. A generic assessment of the linkages between different culture methods and Natura 2000 qualifying features would assist potential future applicants with site selection decisions and could also assist the licensing authority with the establishment of management interventions or mitigation to minimise potential significant effects should a licence be issued. Therefore, the Appropriate Assessment of the draft NSPA will focus on qualifying features, identifying the types of habitats and species most likely to be impacted by aquaculture operations in Ireland, rather than individual Natura 2000 sites.

2.4 IDENTIFICATION OF NATURA 2000 SITES

As the draft NSPA addresses the strategic development of aquaculture on a national scale, and given that aquaculture exists in a wide range of marine, coastal, freshwater and even land-based facilities, there is potential for aquaculture to take place within or adjacent to a large number of Natura 2000 sites. Aquaculture operations already do exist in and adjacent to Natura sites across the whole of Ireland. These are mainly in coastal locations. In many cases aquaculture was present and operational in an area prior to its designation as an SAC or SPA.

National Guidelines for Appropriate Assessment recommend that in the case of plans, a distance of 15km is considered as the likely zone of impact, with evaluation carried out on a case by case basis. For water dependent habitats the zone of influence has the potential to be greater that 15km. In relation to aquaculture operations, the zone of impact will relate only to certain qualifying features.

A process for completing Appropriate Assessments of aquaculture and fishing activities in and adjacent to Natura 2000 sites is ongoing[6]. The process proposed for the assessment of the draft NSPA does not negate any requirement to undertake appropriate assessment for individual aquaculture projects.

In order to identify the Natura 2000 sites that may be affected by the implementation of the draft NSPA, a screening exercise was carried out. All SACs and SPAs in Ireland were considered. The

6

http://agriculture.gov.ie/fisheries/aquacultureforeshoremanagement/aquaculturelicensing/appropriateassessmentscarriedout/

total area covered by SACs and SPAs is approx. 19,500km^2. Information for the sites was gathered from the NPWS online database. In Ireland there are 423 SACs of which 90 are marine based. There are a total of 165 SPAs although not all of these are as yet protected by Statutory Instruments. The Statutory Instrument is the final step in the designation process, however, all SPAs are considered protected from their date of classification. To begin the exercise, all SACs and SPAs were listed together with their qualifying features (Appendix 6.1, 6.2, 6.4)

Natura 2000 sites were screened IN (BLUE) or OUT (GREEN) for further consideration on the basis of their qualifying features (habitats and species) focusing only on the potential for aquaculture to exist in or adjacent to Natura 2000 qualifying features:

- Habitats, or a species whose habitat already hosts aquaculture or could be suitable for the location of an aquaculture operation, are screened IN (BLUE) for further assessment. This includes:
    - *Migratory mammals (such as cetaceans, otters or seals) or fish (such as salmonids or lamprey) which are qualifying features;*
    - *Qualifying bird species for SPAs. Acknowledging that they are mobile species frequently occupying a range of habitats especially water habitats, at this scale of assessment it is not possible to screen out any SPAs due to the qualifying bird species that they host.*
- The majority of aquatic habitats (freshwater and marine) are screened IN (BLUE). Some aquatic habitats, however, are screened OUT (GREEN), as they are not of suitable quality to support aquaculture animals, e.g. natural dystrophic lakes and ponds.
- Coastal habitats such as dune environments are also screened IN (BLUE). Aquaculture is unlikely to take place in these habitats but they may be used for land based facilities and as access routes etc.
- All other terrestrial habitats (i.e. those which are not aquatic habitats) are screened OUT (GREEN).
- Where a Natura 2000 site hosts a habitat or species that has been screened IN, that site will also be screened IN. This list contains 188 SACs and 165 SPAs. The full list of SACs and SPAs together with their qualifying features for which they were screened is available in Appendix 6.1.2 and 6.1.3. The final list of SACs that have been screened IN is contained in Appendix 6.1.3. In reality, environmental conditions at many of the sites that have been screened in may mean that aquaculture is not actually suitable to the area. Therefore, it cannot be assumed that aquaculture will take place in all sites.
- The focus of the full assessment (Stage 2 Appropriate Assessment) will be on the qualifying features most likely to interact with aquaculture. There are 27 habitats and 15 species for SACs and 67 bird species for SPAs as screened above. These are detailed in Figures 2.4a, 2.4c and 2.4f on the following pages.

The qualifying features identified will be studied in greater detail in the full assessment.

A note on differing approach for terrestrial vs marine/coastal habitats and species. *Analysis of the terrestrial component of the AA is not as straightforward as that for coastal and marine environments. It is difficult to predict where development of aquaculture activities is likely to take place. This, together with the much smaller scale of land based aquaculture production (the majority of Irish aquaculture takes place in marine and coastal environments) makes the identification and assessment of the full range of qualifying features which may coincide with aquaculture on land sites a very challenging exercise. Hence, in this exercise all other terrestrial habitats (i.e. those which are not water habitats) have been screened OUT (GREEN), but with a caveat that it is possible that aquaculture could take place there in the future: As anyone is entitled to make an application for an aquaculture licence at any location, it is still possible that aquaculture could take place in an SAC with qualifying features which have been screened out of this exercise at some time in the future. Prior to the establishment of these activities, however, project scale appropriate assessment mechanisms will be instigated both for securing planning permission and for obtaining an aquaculture licence. Because terrestrial aquaculture operations are part of the land planning jurisdiction, aquaculture in terrestrial environments has further checks prior to authorisation. In addition to an aquaculture licence, (and accompanying AA and EIA) planning permission and water discharge / abstraction licensing are also required. Hence the lack of detailed assessment at NSPA level is unlikely to impact negatively on the environment even if that qualifying feature has not been considered within this assessment.*

The outcome of the above screening exercise is contained in the following lists of habitats and species:

- Figure 2.4a SAC habitats screened IN for further assessment (27 habitats in total);
- Figure 2.4b: SAC habitats screened OUT;
- Figure 2.4c: SAC species screened IN for further assessment (15 species);
- Figure 2.4d: SAC Species screened OUT;
- Figure 2.4e: SPAs screened IN (165);
- Figure 2.4f: Bird species screened IN (67 species).

Conservation status and trends for each specific habitat and species were sourced from the National Parks and Wildlife Service (www.npws.ie). For a full list of habitats, species and birds please refer to the relevant Annex.

Figure 2.4a SAC habitats screened IN for further assessment (27 habitats in total)

Screened IN			
Code	**Habitat Name**	**Conservation Status**	**Conservation Trend**
1210	Annual vegetation of drift lines	Inadequate	Declining
2150	Atlantic decalcified fixed dunes *(Calluno-Ulicetea)*	Inadequate	Stable
1330	Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)*	Inadequate	Stable
1150	Coastal lagoons	Bad	Stable
2140	Decalcified fixed dunes with *Empetrum nigrum*	Inadequate	Stable
2170	Dunes with *Salix repens* ssp. *argentea (Salix arenariae)*	Inadequate	Stable
2110	Embryonic shifting dunes	Inadequate	Stable
1130	Estuaries	Inadequate	Improving
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)	Bad	Stable
3140	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.	Bad	Declining
2190	Humid dune slack	Inadequate	Declining
1160	Large shallow inlets and bays	Inadequate	Improving
21A0	Machair	Bad	Stable
1420	Mediterranean and thermo-Atlantic halophilous scrubs *(Sarcocornetea fruticosi)*	Bad	Declining
1410	Mediterranean salt meadows *(Juncetalia maritimi)*	Inadequate	Stable
1140	Mudflats and sandflats not covered by seawater at low tide	Inadequate	Improving
3150	Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation	Inadequate	Stable
3110	Oligotrophic waters containing very few minerals of sandy plains *(Littorelletalia uniflorae)*	Bad	Declining
1220	Perennial vegetation of stony banks	Inadequate	Stable
1170	Reefs	bad	Declining
3270	Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation	Favourable	n/a
1310	Salicornia and other annuals colonising mud and sand	Inadequate	Declining
1110	Sandbanks which are slightly covered by sea water all the time	Favourable	n/a
2120	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	Inadequate	Stable
8330	Submerged or partly submerged sea caves	Favourable	n/a
3260	Floating river vegetation	Inadequate	Declining

Figure 2.4b: SAC habitats screened OUT

Screened OUT	
Code	**Habitat Name**
7110	Active Raised Bogs
7230	Alkaline Fens
91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)
4060	Alpine and Boreal Heaths
7130	Blanket Bog
91D0	Bog Woodland
6130	Calaminarian grasslands of the *Violetalia calaminariae*
8120	Calcareous and calcshist screes of the montane to alpine levels *(Thlaspietea rotundifolii)*
7210	Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*
8210	Calcareous rocky slopes with chasmophytic vegetation
8310	Caves not open to the public
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion
4030	European Dry Heaths
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
5130	*Juniperus communis* formations on heaths or calcareous grasslands
8240	Limestone Pavements
6510	Lowland hay meadows *(Alopecurus pratensis, Sanguisorba officinalis)*
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils *(Molinion caeruleae)*
3160	Natural dystrophic lakes and ponds
4010	Northern Atlantic wet heaths with *Erica tetralix*
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in British Isles
3130	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the Isoëto-Nanojuncetea
7220	Petrifying springs with tufa formation (Cratoneurion)
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates *(Festuco-Brometalia)*(*important orchid sites)
8220	Siliceous rocky slopes with chasmophytic vegetation
8110	Siliceous scree of the montane to snow levels *(Androsacetalia alpinae* and *Galeopsietalia ladani)*
6230	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
91J0	*Taxus baccata* woods of the British Isles
7140	Transition mires and quaking bogs
3180	Turloughs
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts

Figure 2.4c: SAC species screened IN for further assessment (15 species)

Screened IN				
Code	**Species**	**Common Name**	**Conservation Status**	**Conservation Trend**
1103	*Alosa fallax*	Twaite Shad (fish)	Bad	Stable
1092	*Austropotamobius pallipes*	Freshwater Crayfish / White Clawed Crayfish	Unfavourable – inadequate	Stable
1364	*Halichoerus grypus*	Grey Seal	Favourable	n/a
1099	*Lampetra fluviatilis*	European River Lamprey	Favourable	n/a
1096	*Lampetra planeri*	European Brook Lamprey	Favourable	n/a
1355	*Lutra lutra*	Otter	Favourable	n/a
1990	*Margaritifera durrovensis*	Freshwater Pearl Mussel	Bad	Declining
1029	*Margaritifera margaritifera*	Freshwater Pearl Mussel	Bad	Declining
1095	*Petromyzon marinus*	Sea Lamprey	Bad	Stable
1365	*Phoca vitulina*	Harbour Seal	Favourable	n/a
1106	*Salmo salar*	Salmon	Inadequate	Stable
1349	*Tursiops truncatus*	Common Bottlenose Dolphin	Favourable	n/a
1833	*Najas flexilis*	Slender naiad (water plant)	Inadequate	Stable
1395	*Petalophyllum ralfsii*	Petalwort (sand dune habitat)	Favourable	n/a
1351	*Phocoena phocoena*	Harbour Porpoise	Favourable	n/a

Figure 2.4d: SAC Species screened OUT

Screened OUT		
Code	**Species**	**Common Name**
1393	*Drepanocladus vernicosus*	Slender Green Feather Moss
1065	*Euphydryas aurinia*	Marsh Fritillary (butterfly)
1024	*Geomalacus maculosus*	Kerry Slug
1303	*Rhinolophus hipposideros*	Lesser Horseshoe Bat
1528	*Saxifraga hirculus*	Marsh Saxifrage(flower)
1421	*Trichomanes speciosum*	Killarney Fern
1014	*Vertigo angustior*	Narrow mouthed Whorl Snail (terrestrial)
1013	*Vertigo geyeri*	Geyers Whorl Snail (terrestrial)
1016	*Vertigo moulinsiana*	Desmoulin's Whorl Snail

Figure 2.4e: SPAs screened IN – sites in **BOLD** contain aquaculture activities

NPWS Code	NAME	SPA Statutory List (NPWS Website) S.I.
004103	ALL-SAINTS BOG	298 of 1996
004135	ARDBOLINE ISLAND AND HORSE ISLAND	57 of 2010
004133	AUGHRIS HEAD	910 0f 2004
004016	BALDOYLE BAY	275 of 2010
004234	BALLINTEMPLE and BALLYGILGAN SPA	463 of 2012
004041	BALLYALLIA LOUGH	58 of 2010
004022	BALLYCOTTON BAY	59 of 2010
004101	BALLYKENNY-FISHERTOWN BOG	298 of 1996
004023	**BALLYMACODA BAY**	338 of 2013
004129	**BALLYSADARE BAY**	291 of 2011
004020	BALLYTEIGUE BURROW	383 of 2010
004033	**BANNOW BAY**	592 of 2011
004155	**BEARA PENINSULA**	587 of 2012
004105	BELLANGARE BOG	298 of 1996
004177	BILLS ROCKS	048 of 2007
004037	**BLACKSOD BAY/BROADHAVEN**	31 of 1995
004094	BLACKWATER CALLOWS	191 of 2012
004028	BLACKWATER ESTUARY	590 of 2012
004008	BLASKET ISLANDS	272 of 2010
004080	BOYNE ESTUARY	626 of 2011
004143	CAHORE MARSHES	293 of 2011
004078	**CARLINGFORD LOUGH**	464 of 2012
004052	CARROWMORE LAKE	713 of 2005
004029	**CASTLEMAINE HARBOUR**	244 of 2012
004136	CLARE ISLAND	273 of 2010
004005	CLIFFS OF MOHER	269 of 2010
004081	CLONAKILTY BAY	60 of 2010
004181	CONNEMARA BOG COMPLEX	269 of 1996
004107	COOLE-GARRYLAND	236 of 2010
004030	**CORK HARBOUR**	237 of 2010
004220	COROFIN WETLANDS	117 of 2012
004219	COURTMACSHERRY BAY	296 of 2011
004142	*Cregganna Marsh*	*no data*
004212	CROSS LOUGH (KILLADOON)	61 of 2010
004170	CRUAGH ISLAND	62 of 2010
004035	**CUMMEEN STRAND**	376 of 2011
004172	DALKEY ISLANDS	238 of 2010
004175	**DEENISH ISLAND AND SCARIFF ISLAND**	63 of 2010
004039	**DERRYVEAGH AND GLENDOWAN MOUNTAINS SPA**	31 of 1995
004153	DINGLE PENINSULA	480 of 2012
004151	**DONEGAL BAY**	295 of 2011
004235	*Doogort Machair SPA*	*no data*
004137	DOVEGROVE CALLOWS	384 of 2010
004013	**DRUMCLIFF BAY**	40 of 2012
004026	**DUNDALK BAY**	310 of 2012
004032	**DUNGARVAN HARBOUR**	349 of 1994
004145	DURNESH LOUGH	294 of 2011
004111	DUVILLAUN ISLANDS	64 of 2010

Code	NAME	SPA Statutory List (NPWS Website) S.I.
004108	Eirk Bog	298 of 1996
004149	*Falcarragh to Meenlaragh SPA*	*no data*
004148	FANAD HEAD SPA	439 of 2013
004140	FOUR ROADS TURLOUGH	589 of 2011
004190	GALLEY HEAD TO DUNEEN POINT	276 of 2010
004102	GARRISKIL BOG	298 of 1996
004045	GLEN LOUGH	65 of 2010
004082	**GREERS ISLE**	105 of 2010
004192	HELVICK HEAD TO BALLYQUIN	277 of 2010
004144	HIGH ISLAND, INISHSHARK AND DAVILLAUN	192 of 2012
004194	**HORN HEAD TO FANAD HEAD**	281 of 2013
004113	HOWTH HEAD COAST	185 of 2012
004132	**ILLANCRONE AND INISHKEERAGH**	66 of 2010
004074	ILLANMASTER	714 of 2005
004221	ILLAUNNANOON	297 of 2011
004114	ILLAUNONEARAUN	67 of 2010
004083	INISHBOFIN, INISHDOOEY AND INISHBEG SPA	269 of 1996
004231	*Inishbofin, Omey Island and Turbot Island SPA*	*no data*
004115	INISHDUFF	106 of 2010
004084	INISHGLORA AND INISHKEERAGH	047 of 2007
004004	INISHKEA ISLANDS	588 of 2011
004116	INISHKEEL	239 of 2010
004152	***Inishmore***	*no data*
004068	INISHMURRAY	534 of 2011
004100	INISHTRAHULL	107 of 2010
004031	**INNER GALWAY BAY**	349 of 1994
004117	IRELAND'S EYE	240 of 2010
004154	**IVERAGH PENINSULA**	241 of 2010
004118	KEERAGH ISLANDS	68 of 2010
004189	KERRY HEAD	385 of 2010
004095	KILCOLMAN BOG	386 of 2010
004036	**KILLALA BAY/MOY ESTUARY**	522 of 2011
004038	*Killarney National Park*	*no data*
004009	LADY'S ISLAND LAKE	69 of 2010
004069	LAMBAY ISLAND	242 of 2010
004119	LOOP HEAD	591 of 2011
004050	LOUGH ARROW	289 of 2011
004051	LOUGH CARRA	340 of 2011
004228	LOUGH CONN AND LOUGH CULLIN	590 of 2011
004042	LOUGH CORRIB	455 of 2012
004139	LOUGH CROAN TURLOUGH	292 of 2011
004056	LOUGH CUTRA	243 of 2010
004057	**LOUGH DERG (DONEGAL)**	244 of 2010
004058	LOUGH DERG (SHANNON)	285 of 1995
004043	LOUGH DERRAVARAGH	287 of 2011
004044	LOUGH ENNELL	618 of 2011
004060	LOUGH FERN	70 of 2010
004087	LOUGH FOYLE	341 of 2011
004048	LOUGH GARA	288 of 2011
004046	LOUGH IRON	270 of 2010

Code	NAME	SPA Statutory List (NPWS Website) S.I.
004061	LOUGH KINALE AND DERRAGH LOUGH	108 of 2010
004062	LOUGH MASK	84 of 2012
004110	LOUGH NILLAN BOG	633 of 2011
004049	LOUGH OUGHTER	585 of 2012
004047	LOUGH OWEL	71 of 2010
004134	LOUGH REA	72 of 2010
004064	LOUGH REE	456 of 2012
004065	LOUGH SHEELIN	290 of 2011
004075	**LOUGH SWILLY**	592 of 2012
004125	MAGHAREE ISLANDS	139 of 2012
004025	MALAHIDE ESTUARY	285 of 2011
004146	MALIN HEAD SPA	84 of 2013
004182	MID CLARE COAST	109 of 2010
004096	MIDDLE SHANNON CALLOWS	41 of 2012
004193	MID-WATERFORD COAST	558 of 2011
004017	*Mongan Bog*	*no data*
004162	MULLAGHANISH TO MUSHERAMORE MOUNTAINS	627of 2011
004227	MULLET PENINSULA	83 of 2013
004006	NORTH BULL ISLAND	211 of 2010
004021	OLD HEAD OF KINSALE	110 of 2010
004098	OWENDUFF/NEPHIN COMPLEX	S.I. 715/2005
004099	PETTIGOE PLATEAU NATURE RESERVE	298 of 1996
004063	POULAPHOUCA RESERVOIR	73 of 2010
004003	PUFFIN ISLAND	111 of 2010
004089	RAHASANE TURLOUGH	311 of 2012
004120	RATHLIN O'BIRNE ISLAND	112 of 2010
004232	RIVER BOYNE AND RIVER BLACKWATER SPA	462 of 2012
004086	RIVER LITTLE BROSNA CALLOWS	652 of 2011
004158	RIVER NANNY ESTUARY AND SHORE -	140 of 2012
004233	RIVER NORE SPA	193 of 2012
004077	**RIVER SHANNON AND RIVER FERGUS ESTUARIES**	210 of 1997
004097	RIVER SUCK CALLOWS	397 of 2012
004121	ROANINISH	113 of 2010
004014	ROCKABILL	94 of 2012
004015	ROGERSTOWN	271 of 2010
004002	SALTEE ISLANDS	274 of 2010
004191	SEVEN HEADS	268 of 2010
004156	**SHEEP'S HEAD TO TOE HEAD**	387 of 2010
004090	SHESKINMORE LOUGH	388 of 2010
004007	SKELLIGS	74 of 2010
004122	SKERRIES ISLANDS	245 of 2010
004168	**SLIEVE AUGHTY MOUNTAINS**	83 of 2012
004167	SLIEVE BEAGH	617 of 2011
004160	SLIEVE BLOOM MOUNTAINS	184 of 2012
004165	SLIEVEFELIM TO SILVERMINES MOUNTAINS	587 of 2011
004187	SLIGO/LEITRIM UPLANDS	75 of 2010
004159	**SLYNE HEAD TO ARDMORE POINT ISLANDS**	177 of 2012
004024	**SOUTH DUBLIN BAY AND RIVER TOLKA ESTUARY**	212 of 2010
004124	SOVEREIGN ISLANDS	114 of 2010
004091	STABANNAN-BRAGANSTOWN	546 of 2011

Code	NAME	SPA Statutory List (NPWS Website) S.I.
004161	STACK'S TO MULLAGHAREIRK MOUNTAINS	591 of 2012
004072	STAGS OF BROAD HAVEN	716 of 2005
004092	TACUMSHIN LAKE	178 of 2012
004093	TERMONCARRAGH LAKE AND ANNAGH MACHAIR	046 of 2007
004066	THE BULL AND THE COW ROCKS	76 of 2010
004109	THE GEARAGH	298 of 1996
004186	THE MURROUGH	298 of 2011
004019	**THE RAVEN**	533 of 2011
004073	TORY ISLAND SPA	287 of 1995
004188	TRALEE BAY COMPLEX	S.I. 48 of 1986, S.I. 106 of 1989, S.I. 269 of 1996
004027	TRAMORE BACK STRAND	286 of 2011
004034	**TRAWBREAGA BAY**	261 of 2012
004150	**WEST DONEGAL COAST**	389 of 2010
004230	***West Donegal Islands SPA***	*no data*
004076	**WEXFORD HARBOUR AND SLOBS**	194 of 2012
004127	*Wicklow Head*	*no data*
004040	WICKLOW MOUNTAINS	586 of 2012

Figure 2.4f: Bird species screened IN (67 species)

Species	Common Name	Group
Uria aalge	Guillemot	Auks
Fratercula arctica	Puffin	Auks
Alca torda	Razorbill	Auks
Fulica atra	Coot	Crakes & rails
Crex crex	Corncrake	Crakes & rails
Pyrrhocorax pyrrhocorax	Chough	Crows
Gavia immer	Great Northern Diver	Divers
Gavia stellata	Red-throated Diver	Divers
Podiceps cristatus	Great Crested Grebe	Grebes
Tachybaptus ruficollis	Little Grebe	Grebes
Chroicocephalus ridibundus	Black-headed Gull	Gulls
Larus canus	Common Gull	Gulls
Larus argentatus	Herring Gull	Gulls
Rissa tridactyla	Kittiwake	Gulls
Larus fuscus	Lesser Black-backed Gull	Gulls
Alcedo atthis	Kingfisher	Kingfishers & allies
Falco peregrinus	Peregrine	Raptors & Falcons
Falco columbarius	Merlin	Raptors & Falcons
Circus cyaneus	Hen Harrier	Raptors & Falcons
Phalacrocorax carbo	Cormorant	Seabirds
Fulmarus glacialis	Fulmar	Seabirds
Morus bassanus	Gannet	Seabirds
Oceanodroma leucorhoa	Leach's Petrel	Seabirds

Puffinus puffinus	Manx Shearwater	Seabirds
Phalacrocorax aristotelis	Shag	Seabirds
Hydrobates pelagicus	Storm Petrel	Seabirds
Sterna paradisaea	Arctic Tern	Terns
Sterna hirundo	Common Tern	Terns
Sterna albifrons	Little Tern	Terns
Sterna dougallii	Roseate Tern	Terns
Sterna sandvicensis	Sandwich Tern	Terns
Limosa lapponica	Bar-tailed Godwit	Waders
Limosa limosa	Black-tailed Godwit	Waders
Numenius arquata	Curlew	Waders
Calidris alpina	Dunlin	Waders
Pluvialis apricaria	Golden Plover	Waders
Tringa nebularia	Greenshank	Waders
Pluvialis squatarola	Grey Plover	Waders
Calidris canutus	Knot	Waders
Vanellus vanellus	Lapwing	Waders
Haematopus ostralegus	Oystercatcher	Waders
Tringa totanus	Redshank	Waders
Charadrius hiaticula	Ringed Plover	Waders
Arenaria interpres	Turnstone	Waders
Calidris alba	Sanderling	Waders
Calidris maritima	Purple Sandpiper	Waders
Ardea cinerea	Grey Heron	Water birds
Branta leucopsis	Barnacle Goose	Wildfowl
Cygnus columbianus bewickii	Bewick's Swan	Wildfowl
Somateria mollissima	Eider	Wildfowl
Anas strepera	Gadwall	Wildfowl
Bucephala clangula	Goldeneye	Wildfowl
Anser albifrons	Greenland White-fronted goose	Wildfowl
Anser anser	Greylag Goose	Wildfowl
Branta bernicla	Light-bellied Brent Goose	Wildfowl
Anas acuta	Pintail	Wildfowl
Aythya terina	Pochard	Wildfowl
Aythya marila	Scaup	Wildfowl
Tadorna tadorna	Shelduck	Wildfowl
Anas clypeata	Shoveler	Wildfowl
Anas crecca	Teal	Wildfowl
Aythya fuligula	Tufted Duck	Wildfowl
Cygnus cygnus	Whooper Swan	Wildfowl
Anas penelope	Wigeon	Wildfowl
Anas platyrhynchos	Mallard	Wildfowl
Melanitta nigra	Common Scoter	Wildfowl
Mergus serrator	Red-breasted Merganser	Wildfowl

2.5 POTENTIAL CUMULATIVE IMPACTS

Human activities overlap in many coastal areas. The combined effects of more than one activity, e.g. aquaculture, tourism, farming etc., may lead to a greater or lesser impact than each activity individually causing an interactive effect. Decision making in these areas will benefit from strategic planning taking into account potential additive or interactive (synergistic or antagonistic) effects of pressures and the subsequent impacts they may cause. Bearing in mind that the draft NSPA is a national programme with a focus on coastal areas this issue is of importance, however, the draft plan does not define local components and interactions, e.g. the location of potential activities.

Aquaculture does not operate in isolation. It requires key infrastructure such as water, roads and power to enable operation and the movement of supplies and products. Very often it is carried out in close proximity to other activities, from aquaculture to farming / fishing, recreational / tourism activities. Especially in coastal areas, the demands on the limited resource can compete and lead to conflict but for the most part, and with the application of careful planning, all activities can coexist harmoniously.

Since the draft NSPA is a strategic document addressing the development of an environmentally, socially and economically sustainable aquaculture sector in Ireland, it is impossible to provide a comprehensive list identifying all sources of interactions in the existing environment and any other effects likely to arise from other proposed projects or plans and their link with the draft plan. However, the following lists a number of sources of potential cumulative effects:

Marine & Coastal

- Other aquaculture
- Offshore renewable energy (OREDP)
- Cables / Telecommunications
- Fishing
- Shipping
- Outfalls and discharges
- County Development Plans, incl. tourism

Terrestrial

- County Development Plans
- Point and diffuse discharges to shared water courses.

Any developments carried in the areas above are subject to similar environmental assessment requirements as aquaculture development. These assessments, e.g. AA, EIA or SEA, are required to take into account all other plans and programmes and their related environmental assessments thus identifying where pressures on Natura 2000 sites exist. This is taken into account specifically in the application process and also as part of the Fisheries Act Section 61 assessments.

More information on the cumulative effects of aquaculture and other activities on Natura 2000 sites is currently being compiled and analysed in the Appropriate Assessments on bay scale carried out by the Marine Institute (see Section 3.7.4). This will lead to greater understanding and provide guidance for future development.

The draft NSPA is intricately linked with the Seafood Operational Programme and will operate in a context with *Harnessing our Ocean Wealth*, *Food Harvest 2020* and the BIM Corporate Strategy, which clearly target increased aquaculture production. It is the mechanism by which funding is drawn

down from the EMFF to support the economically, socially and environmentally sustainable development of aquaculture in Ireland and will be key to the delivery of these policy goals.

The cumulative impacts of the draft NSPA are expected to be positive as the draft plan will be implemented in conjunction with other measures, which in combination with the other national strategies explored in Section 2.2.2 will lead to more integration and strategic assessment of all coastal activities.

2.6 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

The task of establishing whether a plan is likely to have a significant effect on Natura 2000 sites is based upon preliminary impact assessment using available information and followed by a determination of whether there is a risk that the effects could be significant. A precautionary approach is fundamental and in cases of uncertainty it should be assumed the effects could be significant.

Aquaculture already exists in Natura 2000 areas across Europe, including Ireland. Many existing licensed areas in Ireland have the potential to increase production either through intensification or through the use of currently licensed but underutilised areas. An applicant for an aquaculture licence is not restricted to applying outside of Natura 2000 areas, and aquaculture activities in or adjacent to Natura 2000 sites are subject to project level appropriate assessment. Assessments are still being carried out on existing licences and new licence applications currently lodged with DAFM. Therefore, it is to be assumed that subject to assessment, aquaculture will continue to take place and may even increase within and adjacent to Natura 2000 sites.

The purpose of this screening is to assess on a strategic level the environmental effect of the measures proposed in the draft NSPA.

The following table shows which aspects of the draft NSPA were screened, establishes which measures under each aspect can be assessed on a strategic or local level and gives a value to the envisaged effect on the quality of the environment on a strategic level associated with each measure.

Key to Table 2.6: Assessment of draft NSPA aspects regarding impact level and effect

+: positive effect associated with the measure
- : potential negative effect associated with the measure
0: neutral effect associated with the measure
n/a: not applicable

Table 2.6: Assessment of draft NSPA aspects regarding impact level and effect

ASPECT OF DRAFT NSPA	STRATEGIC ASSESSMENT	LOCAL ASSESSMENT	STRATEGIC EFFECT
Aiming for Growth			
1. *Build capacity and scale in the industry.*	X		+/-
a. *Increased productivity from the existing aquaculture licence portfolio.*		x	n/a
b. *Establishment of new aquaculture enterprises.*	X		-
c. *Cultivation of novel aquaculture species.*		X	n/a
d. *Increasing the level of organic and eco-label products.*			n/a
e. *Introduction of multi-trophic aquaculture techniques.*	X		+
2. *Dedicated support to new entrants to the sector.*		X	n/a
3. *Support organic certification of aquaculture production.*	X		+
4. *Aid shellfish producers significantly affected by biotoxin closures.*		X	n/a
Knowledge, Innovation and Technology			
5. *Foster knowledge, innovation and technology transfer.*		x	n/a
a. *Development of technical, scientific or organisational knowledge in aquaculture farms.*		x	n/a
b. *Development or introduction in the market of new aquaculture species with good market potential.*		x	n/a
c. *Exploration of the technical or economic feasibility of innovative products or processes.*		x	n/a
6. *Enhance the skills base to foster a knowledge economy.*		x	n/a
7. *Provision of expert advice to improve environmental and business performance and enhanced strategic planning by aquaculture enterprises.*	X		+
8. *Support best husbandry and disease management practice.*		x	n/a
9. *Applied research and collaboration between industry, scientific and development bodies.*	X		+
10. *Development of commercial scale growing systems for novel species.*		x	n/a
Ensuring Sustainability			
11. *Application of guiding principles recommended by MI.*	X		+
12. *Application of scale limits and phasing in relation to the development of individual offshore salmon farms.*		x	n/a
13. *Development of an industry Code of Practice for Invasive Alien Species.*	X		+
14. *Continuation of Invasive Species Ireland Project.*	X		+
15. *Quantify the environmental contribution of aquaculture.*	X		+
16. *Aquaculture monitoring consistent with MSFD requirements.*	X		+
Coordinated Spatial Planning			
17. *Develop opportunities and constraints mapping for aquaculture taking specific account of environmental issues, Natura 2000 sites and inshore fisheries.*	X		+
18. *Identify marine tourism opportunities from aquaculture.*		x	n/a
19. *Study on integrated multi-trophic aquaculture and possible synergies with offshore wind farms or other marine renewable energy.*			n/a
20. *Conduct a study on how aquaculture contributes to communities in rural areas.*			n/a
Aquaculture Licensing			
21. *Progressively remove the current aquaculture licensing backlog.*	X		+
22. *Review and revision of the legal framework for aquaculture licencing.*	X		+
23. *Phased introduction of appropriate timescales for licence determination.*	X		+
24. *Develop a data management and information system with online application process and tracking functionality, spatial mapping of aquaculture sites and exclusion areas.*	X		+

As can be seen in the screening matrix, the overall effect of the measures contained in the draft NSPA on a strategic level is expected to be positive with the establishment of new aquaculture enterprises being the exception. While the overall national growth in production of the aquaculture industry is being considered on a strategic level in this assessment, the individual measures for growth cannot be assessed as they are related to site specific projects which have not been identified and will be assessed on an individual project level should they take place in the future.

The measures that were identified to contain local components and interactions that are not spatially defined in this plan will be assessed on an individual project basis at which both Appropriate Assessment and Environmental Impact Assessment are integrated into the aquaculture licensing process (see Section 3.6).

2.7 SCREENING STATEMENT AND CONCLUSION

Based on the strategic nature and the encompassing content of the draft NSPA in can be concluded that the proposed measures under the draft NSPA will have no significant impact on the quality of the environment in and of itself. Having identified and evaluated potential impacts and any residual risk based on the mitigation in place it can be concluded that the potential for negative effects is fully mitigated and controlled. However, in consultation with NPWS a Stage 2 full assessment will be conducted to assist in the identification of potential interactions of increased aquaculture production on Natura 2000 areas incl. specific habitats and species and inform where additional project level assessment may be required. The outcome of this process may provide information to support future site selection considerations and help identify sound mitigation measures and/or management interventions which reduce risks and minimise impacts.

The Stage 2 Full Appropriate Assessment will assess in greater detail the generic pressures arising from different aquaculture types and the associated potential impacts on the Natura 2000 qualifying features identified in the screening exercise. Some of the qualifying features will be grouped, e.g. the various dune habitats. Others will be split into the typical communities that comprise the habitat.

3.0 APPROPRIATE ASSESSMENT

Taking into account that the draft NSPA addresses the development of an environmentally, socially and economically sustainable aquaculture sector on a strategic level across the Republic of Ireland, an assessment on project or site scale is not possible. Thus, an assessment of the qualifying features most commonly linked with aquaculture operations in Ireland will therefore be carried out. A generic assessment of the linkages between different culture methods and Natura 2000 qualifying features would assist potential future applicants with site selection decisions and could also assist the licensing authority with the establishment of management interventions or mitigation measures to minimise potential significant effects should a licence be issued. Therefore, the Appropriate Assessment of the draft NSPA will focus on qualifying features, identifying the types of habitats and species most likely to be impacted by aquaculture operations in Ireland, rather than individual Natura 2000 sites.

This will be addressed in the following manner:

1. Overview of potential interactions.
2. Overview of licensing process.
3. Conservation objectives.
4. Aspects of draft NSPA which may interact with site integrity and conservation objectives.
5. Potential impacts of aquaculture activities on Natura 2000 sites.
6. Impact predictions and mitigation measures.

Policies adopted under the four priority areas of the draft NSPA seek to ensure that future aquaculture development is responsible and economically, socially and environmentally sustainable, performs to the highest standards of environmental management and seeks to minimise negative impacts. Practical management measures arising from the plan will reduce the potential significant effects but will not negate them because where there is growth in or adjacent to a Natura 2000 area there is potential for an effect. Appropriate Assessment both at plan and at project level will help to determine the significance of these effects.

As the draft NSPA is not spatially focused and is not intended to determine areas where aquaculture may or may not take place, the draft NSPA Appropriate Assessment will focus on generic impacts of aquaculture on various qualifying features of Natura 2000 sites as screened in the previous section. This approach fully acknowledges that a separate process for completing Appropriate Assessments of individual aquaculture operations in and adjacent to Natura 2000 sites is ongoing as agreed by the *Roadmap to Compliance*. This exercise is not intended to negate any requirement to undertake Appropriate Assessment for individual aquaculture projects. Rather, it is hoped that it will complement and enhance this already established process. It is hoped that this will help with future site selection and inform about possible management measures which may apply to any licensed aquaculture operations.

The potential impacts of aquaculture activities on Natura 2000 sites are related to the following:

- Culture site;
- Cultured species;
- Culture method;
- Sensitivity, resistance and resilience of the receiving environment;
- Assimilative capacity of the site;
- Site productivity.

The types of potential effects can be classified in two main categories:

- Habitat loss or degradation and modification of the communities present on it;
- Disturbance and displacement of species.

3.1 BASELINE ENVIRONMENT

Ireland is an island on the western fringe of Europe in the North Atlantic between latitude 51 ½ and 55 ½ degrees north, and longitude 5 1 ½ to 10 ½ degrees west. Its main geographical features include low central plains surrounded by a ring of coastal mountains. Ireland's temperate climate, though significantly warmer than other locations at similar latitude, e.g. Poland or Newfoundland, is a reflection of the warming influence of the North Atlantic drift. Most of the soils of Ireland are derived from glacial drift with large areas of fertile grey-brown podzolic soils on the better drained parts of the lowland as well as less fertile acid brown earths where the parent material is low in lime or to gleyed soils where the drainage is poor. Thin acid peaty soils are widespread on the hills. Following the last Ice Age Ireland separated from the European mainland which resulted in the island presenting a smaller range of flora and fauna today than is found elsewhere in Europe. Rivers and lakes contain a wide variety of naturally occurring fish life, e.g. salmon, trout, char, while other varieties have been introduced, e.g. roach and Rainbow trout. The only amphibians in Ireland are a single species each of frog (Common Frog, *Rana temporaria*), toad (Natterjack Toad, *Bufo calamita*) and newt (Smooth Newt, *Triturus vulgaris*). No snakes and only two reptiles can be found in Ireland, the Common Lizard (*Lacerta vivipara)* and the Slow-worm (*Anguis fragilis).*

Ireland's coastal waters off the west coast have been categorised as part of the Boreal-Lusitanian Province due to the fact that more southern marine species inhabit these areas that are under the influence of the warm northeast Atlantic Drift. Areas further offshore are part of the deep-sea province encompassing the deep-water zone to the west of continental Europe. Both areas support a wide variety of fish and shellfish, communities in coastal areas over sandy sediments including juvenile flatfish and sandeels with seasonal influxes of other species such as sprat and herring, compared to rocky shore assemblages that are dominated by gobies and blennies among others. Coastal shellfish species include lobster, crayfish, spider crabs, brown and green crabs, whelks, scallops and many more.

In 2003 the European Commission established a "biologically sensitive area" or Irish Conservation Box (Council Regulation (EC) No 1954/2003) because the shelf and coastal areas off the southwest coast of Ireland support important spawning and nursery grounds for a range of demersal and pelagic species.

Bird migration in spring and autumn is considerable as Ireland lies on the main migratory routes of the east Atlantic. Winter migration brings a number of species from Greenland and Iceland while there is also considerable passage migration from southern birds that nest further north. While Ireland's coastal waters provide a rich source of food for many migratory, breeding and non-breeding species, many seabird species find an ideal breeding habitat in the exposed and inaccessible west coast, whose estuaries, mudflats and sand flats are of major importance to migratory waterfowl in spring and autumn.

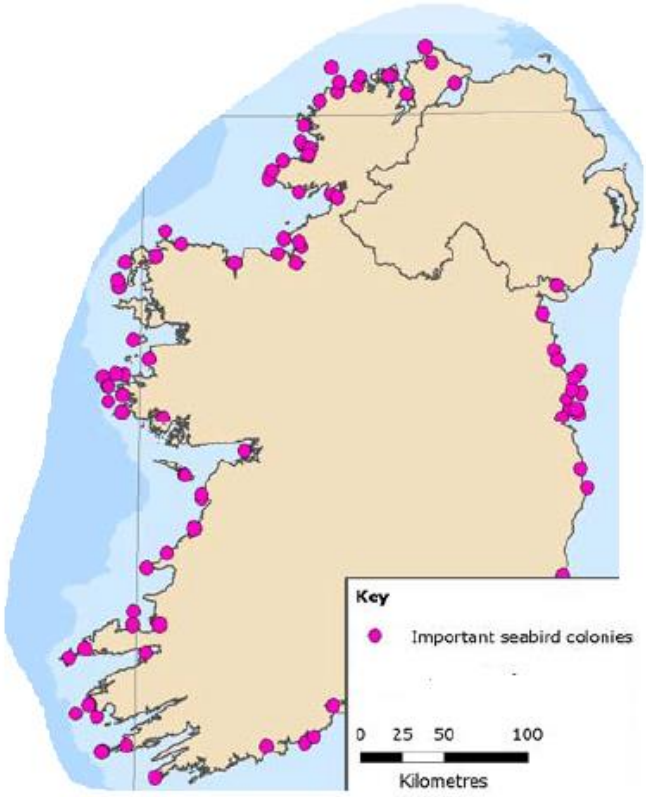


Figure 3.1: important seabird colonies in the west and southwest of Ireland (IOSEA3 Rockall Basin ER 2008)

Of the 67 bird species protected by Statutory Instrument in Ireland, 17 are red listed, 40 amber and 10 green (December 2014). Two of these species occur during breeding season in internationally important numbers, Storm Petrel *(Hydrobates pelagicus)* and Roseate Tern *(Sterna dougalii)*, and six during non-breeding season, Great Northern Diver *(Gavia immer),* Greenland White-fronted Goose *(Anser albifrons flavirostris)*, Barnacle Goose *(Branta leucopsis)*, Light-bellied Brent Goose *(Branta bernicla hrota),* Black-tailed Godwit *(Limosa limosa)* and the Whooper Swan *(Cygnus Cygnus)*. Wetlands International (2012) estimated that these present a significant percentage of the European population for each species, Storm Petrel 22%, Roseate Tern 72%, Great Northern Diver 27%, Greenland White-fronted Goose 55%, Barnacle Goose 22%, Light-bellied Brent Goose 91%, Black-tailed Godwit 30% and Whooper Swan 55%. In 2004 28 of the species protected under S.I. had an unfavourable conservation status in Europe, with 4 species being depleted, 2 rare, 2 endangered, 4 vulnerable and 14 declining. The highest concentrations of breeding seabirds can be found along Ireland's south western and south eastern coasts. Ireland hosts a total of 140 Important Bird Areas (IBAs) as identified by BirdLife International, covering an area of about 4,309 km², equivalent to 6% of the land area. The majority of these IBAs are coastal, with islands and cliffs being particularly important for breeding seabirds, Corncrakes and wintering Barnacle Geese, and estuaries for wintering wildfowl. Nine IBAs along the Irish coast hold at least 1% of the global population of a seabird species for the following species: Storm Petrel *(Hydrobates pelagicus)*, Roseate Tern *(Sterna dougallii)*, Gannet *(Morus bassanus)*, Shag *(Phalacrocorax aristotelis)* and Puffin *(Fratercula arctica)*. Of particular significance for breeding birds in numbers of international importance are various islands including the Blasket Islands, the Skelligs, Puffin Island, Bull and Cow Rocks and Scarrig Island (Heath and Evans 2000).

Table 3.1: Species of European conservation concern and listed on Annex 1 of the EC Birds Directive and qualifying bird species for SPAs with significant breeding populations at IBAs in Ireland (adapted from Heath and Evans 2000)

Species		Minimum national breeding population	Proportion (%) of national population breeding at all IBAs
Manx Shearwater	*Puffinus puffinus*	30000	58
Storm Petrel	*Hydrobates pelagicus*	50000	100
Leach's Petrel	*Oceanodroma leucorhoa*	200	100
Gannet	*Morus bassanus*	25000	100
Shag	*Phalacrocorax aristotelis*	8300	36
Merlin	*Falco columbarius*	200	12
Peregrine	*Falco peregrinus*	350	7
Corncrake	*Crex crex*	183	80
Golden Plover	*Pluvialis apricaria*	300	7
Redshank	*Tringa tetanus*	4000	10
Common Gull	*Larus canus*	3000	14
Lesser Black-backed Gull	*Larus fuscus*	3200	36
Sandwich Tern	*Sterna sandvicensis*	1800	100
Roseate Tern	*Sterna dougalii*		100
Common Tern	*Sterna hirundo*	1700	83
Arctic Tern	*Sterna paradise*	2100	91
Little Tern	*Sterna albifrons*	174	86
Razorbill	*Alca torda*	11000	100
Puffin	*Fratercula arctica*	8000	100
Chough	*Pyrrhocorax pyrrhocorax*	219	100

Current research to extend the knowledge of our environment include the ObSERVE aerial project, funded by the Department of Communications, Energy and Natural Resources (DCENR) in partnership with of the Department of Arts, Heritage and the Gaeltacht (DAHG) This is a three-year programme to undertake extensive aerial surveys and collect data on the distribution and abundance of cetaceans, seabirds and other marine megafauna in Irish offshore waters. Four complete surveys will be conducted in summer and winter 2015 and 2016. The project will provide information on seabird and cetacean abundance and distribution in Irish waters. Surveys will run from Donegal, down the west coast and out to the continental shelf edge, and across the Celtic sea. The first survey recorded sightings of minke whales, porpoise, common dolphins and numerous seabird species including storm petrels, gannets and shearwaters. The project is being led by University College Cork with partners Aerosotravia, IMARES, and ALNILAM. (http://www.observe-aerial.ie/)

Irish waters support a wide range of cetacean species (whales, dolphins and porpoise) all of which are now listed as Annex IV species under the Habitats Directive affording them strict protection. In 1990 the Irish Whale and Dolphin Group (IWDG), an organisation dedicated to the conservation and better understanding of cetaceans, was set up and established an Irish sighting and stranding scheme. In June 1991 the Irish Government declared all Irish waters to be a whale and dolphin sanctuary covering the Irish EEZ which extends up to 200 nmls (350km) offshore. Since its establishment the IWDG has collated data reported from the general public with sightings highest off the northwest and southwest coasts and the majority occurring in May and June. To date 24 cetacean species have been recorded in Irish waters (Berrow, 2001) with some of these breeding, including Common Dolphin *(Delphinus delphis),* Harbour Porpoise *(Phocoena phocoena)* and Bottlenose Dolphin *(Tursiops truncatus)* among others. Under the Habitats Directive these two last species, Bottlenose Dolphin and Harbour Porpoise are Annex II species whose conservation requires the designation of Special Areas of Conservation (SACs).[7]

Key factors in cetacean distribution are availability and distribution of prey, while water temperature and the North Atlantic drift also play an important role. Cetacean species that have been confirmed to breed in Irish waters include:

[7] For the most up to date information on cetacean distribution please refer to the IWDH Atlas of the Distribution of Cetaceans in Ireland's Offshore Waters

- Bottlenose dolphin *(Tursiops truncatus),* found in all coastal waters around Ireland with semi-resident group at the mouth of Cork harbour;
- Common dolphin *(Delphinus delphis),* present in all Irish coastal waters with greatest abundance off the south and southwest coasts;
- Harbour porpoise *(Phocoena phocoena)*, present in all Irish coastal wasters but most abundant in the Irish Sea and off the south and southwest coast of Ireland;
- Risso's dolphin *(Grampus griseus)*, present in all Irish coastal waters and can be regularly observed inshore and in bays along the southwest and southeast coasts;
- White-beaked dolphin *(Lagenorhynchus albirostris)*, offshore species rarely foud in shallow water close to the coast;
- White sided dolphin *(Lagenorhynchus acutus)*, can be seen inshore off the northwest coast in late summer and autumn, also occurs occasionally in the Irish Sea, highest abundance along the edge of the continental shelf, and also in deeper waters; and
- Pilot whale *(Globicephala melas)*, mainly found in deep water off the continental shelf.

Other species may also breed here, e.g.:

- Cuvier's beaked whale *(Ziphius cavirostris),* deep water species occurring off the Atlantic continental shelf; and
- Killer whale *(Orcinus orca),* can be observed off all Irish coasts mainly from offshore island with inshore sightings more frequent during late summer and autumn.

Species that migrate annually along the western seaboard or feed year-round in waters along the south coast and shelf slopes and are not known to breed in Irish waters include:

- Fin whale *(Balaenoptera physalus)*, can be observed inshore mainly off the south and southwest coast;
- Humpback whale *(Megaptera novaeangliae)*, can be found mainly off the south and southeast coast of Ireland;
- Minke whale (*Balaenoptera acutorostrata),* most commonly found off the south and southwest coast of Ireland ; and
- Sperm whale *(Physeter macrocephalus)*, occurs in deep water off the continental shelf.

Other species such as the blue whale *(Balaenoptera musculus)* may over-winter in waters south of Ireland. (DCENR 2015) (see figure 3.1.a and 3.1.b)

The largest fish recorded in Irish waters is the Basking Shark *(Cetorhinus maximus),* however, little is known about its distribution, population size, and biology. IWDG has been reporting data on sightings that concentrate along the east, south-west and northern coasts.

Five species of marine turtle have been recorded in UK and Irish waters though only the Leatherback Turtle *(Dermochelys coriacea)* is reported annually and is considered a regular and normal member of Irish marine fauna as well as being protected under Annex VI of the Habitats Directive, whereas Kemp's Ridley Turtles *(Lepidochelys kempii)* and Loggerhead Turtles *(Caretta caretta)* occur less frequently, and sightings of the Hawksbill Turtle *(Eretmochelys imbricate)* and the Green Turtle *(Chelonia mydas)* are very rare. Sightings, strandings and bycatch records have contributed data on the distribution and abundance of marine turtles and are collated in the TURTLE database (Marine Environmental Monitoring, 2007). (see figure 3.1.c)

Ireland hosts two native seal species, Grey Seal *(Halichoerus grypus)* and Harbour Seal *(Phoca vitulina)*. Both species are protected under the Wildlife Acts, 1976 and 2000 and listed on Annex II of the EU Habitats Directive as species of community interest, whose conservation requires the designation of SACs. Along the Irish coastline there are currently 10 SACs established for Grey Seals and 13 for Harbour Seals covering the terrestrial colonies (haul-outs) where populations of each

species respectively rest, rear young and engage in social activity leaving these areas only when looking for food or to move between areas. Harbour Seals tend to have their haul-out sites among inshore bays and islands, coves and estuaries while Grey Seal breeds on exposed rocky shores, on sand bars or sea caves with ready access to deep water with additional haul-out areas on exposed rocky areas or steeply shelving sandbanks. (see figure 3.1.d)

Harbour seal populations are widespread around the Irish coast with concentrations on south western and western coasts. The Blasket Islands and the Inishkea Island group host the largest populations of Grey Seals in Ireland though populations are widespread with concentrations found on exposed south western, western and northern coasts. (see figure3.1.e)

Another species protected under the Wildlife Acts of 1976 and 2000 is the Otter *(Lutra lutra).* It is also a listed Annex II and Annex IV species under the EU Habitats Directive and on Appendix II of the Berne Convention as well as being red-data book listed as Vulnerable (Whilde, 1993). It is a feature of 45 SACs in Ireland (2014), both inland and coastal, and has a significant presence along the Irish coast where rocky shores provide ideal habitats for breeding and rearing of young.

Current research to extend the knowledge of our environment include the ObSERVE aerial project, funded by the Department of Communications, Energy and Natural Resources (DCENR) in partnership with of the Department of Arts, Heritage and the Gaeltacht (DAHG), is a three-year programme to undertake extensive aerial surveys and collect data on the distribution and abundance of cetaceans, seabirds and other marine megafauna in Irish offshore waters. Four complete surveys will be conducted in summer and winter 2015 and 2016. The project will provide information on seabird and cetacean abundance and distribution in Irish waters. Surveys will run from Donegal, down the west coast and out to the continental shelf edge, and across the Celtic sea. The first survey recorded sightings of minke whales, porpoise, common dolphins and numerous seabird species including storm petrels, gannets and shearwaters. The project is being led by University College Cork with partners Aerosotravia, IMARES, and ALNILAM. (http://www.observe-aerial.ie/)

Distribution maps on all species screened IN can be found in the respective assessments in Section 3.9.

The following maps were taken from the Irish Offshore Strategic Environmental Assessment (IOSEA) 5, DCENR 2015 and present information on

- toothed whale sightings (figure 3.1a);
- baleen whale sightings (figure 3.1b);
- marine turtle records for Ireland and the UK (figure 3.1c);
- grey seal breeding sites (figure 3.1d); and
- harbour seal sites (figure 3.1.e).

Figure 3.1a: Toothed whale sightings

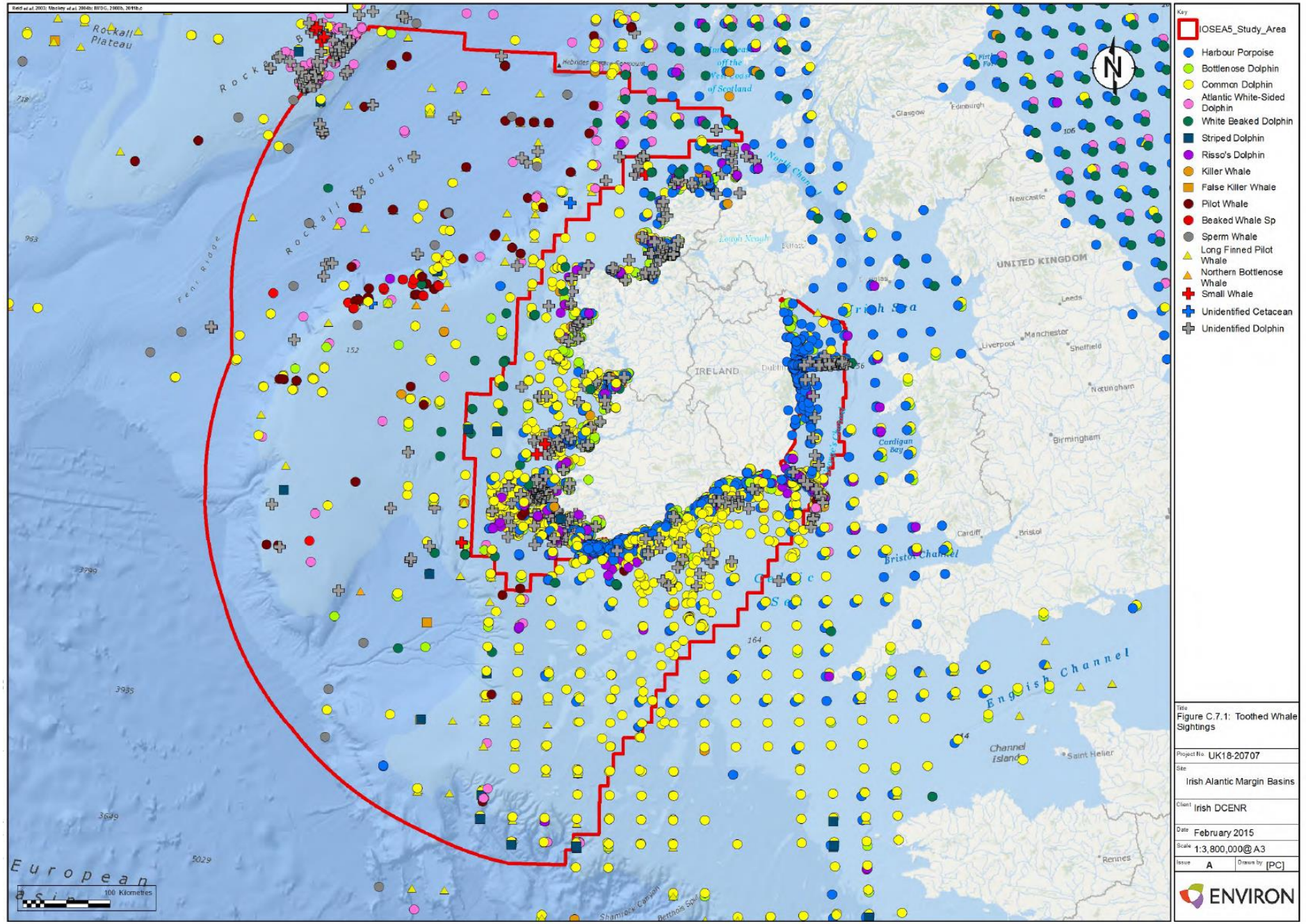


Figure 3.1b: Baleen whale sightings

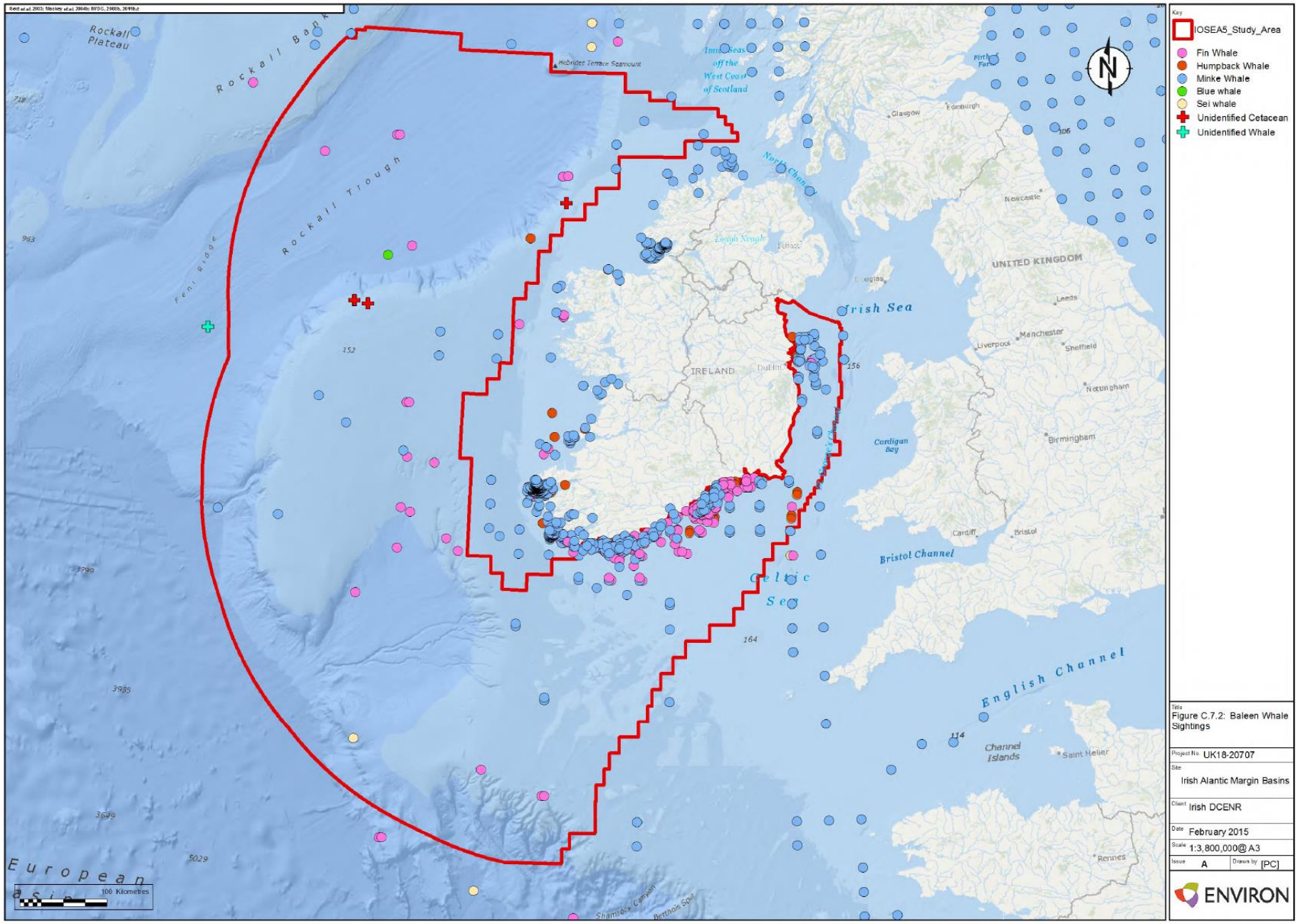


Figure 3.1c: Marine turtle records for Ireland and the UK

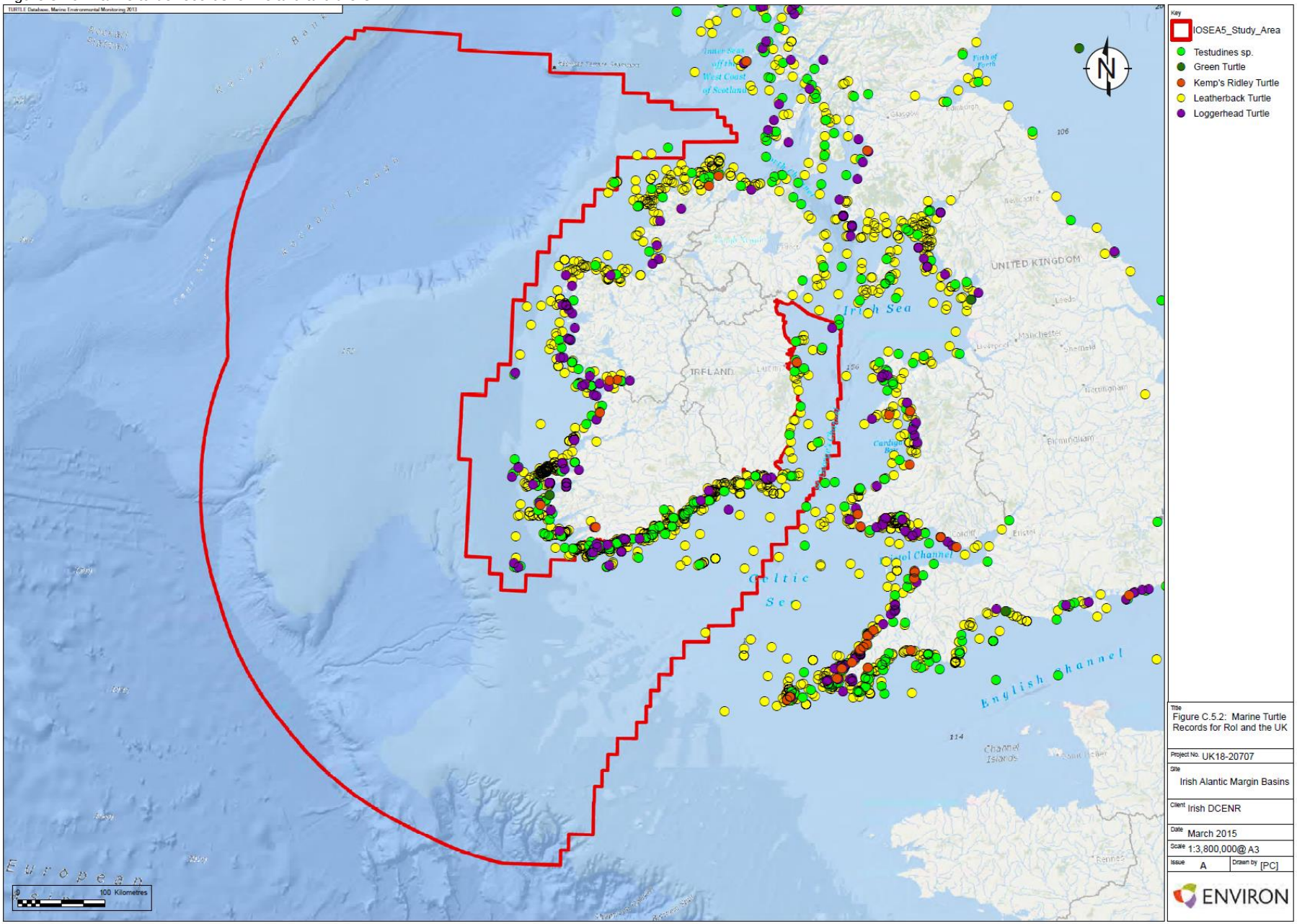


Figure 3.1d: Grey seal breeding sites

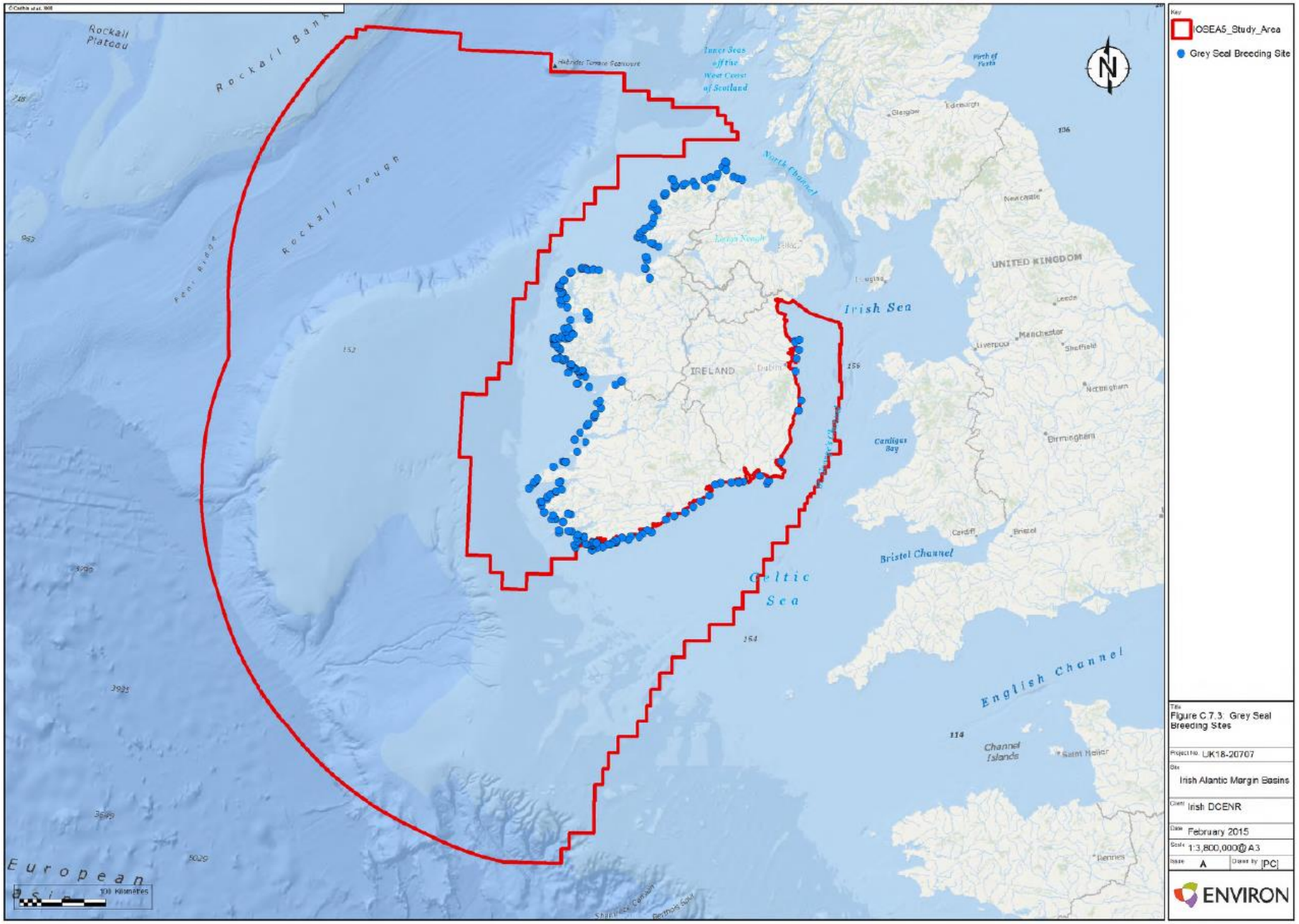
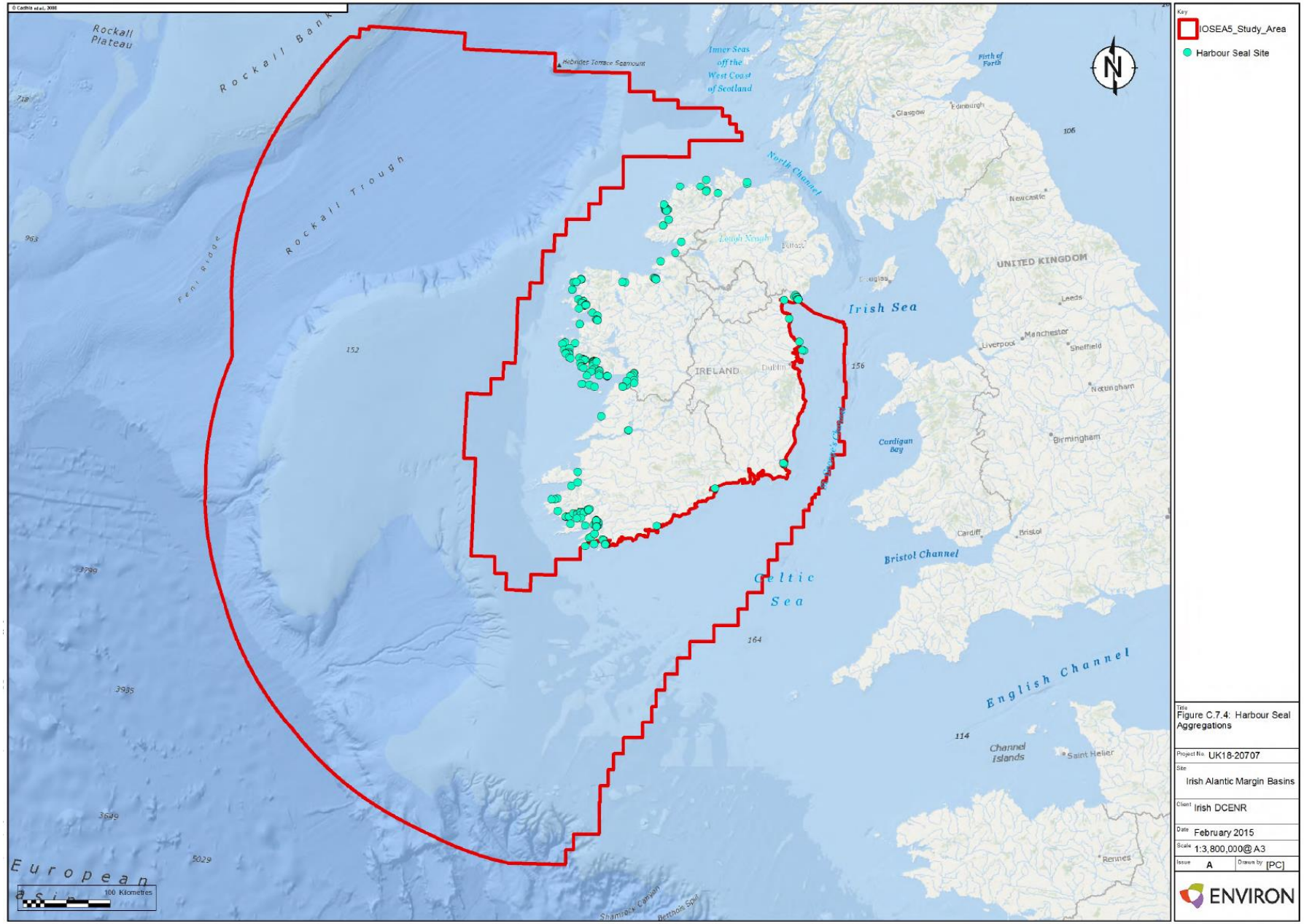


Figure 3.1e: Harbour seal sites



3.2 CONSERVATION OBJECTIVES

The primary measure for achieving the objectives of the Habitats Directive is the implementation of Article 6.1 which introduces positive conservation measures to help maintain or restore habitats and species of Community interest at a favourable conservation status.

The aim of the Habitats Directive is to *"contribute towards ensuring bio-diversity through the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States to which the Treaty applies"* (Art. 2.1). The Directive requires that *"A coherent European ecological network of special areas of conservation shall be set up under the title Natura 2000. This network, composed of sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II, shall enable the natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored at a favourable conservation status in their natural range"* (Art. 3).

Conservation status is defined in Article 1 of the Directive. For a natural habitat, conservation status means "*the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species within the territory referred to in Article 2"* (Article 1e). For a species, the conservation status means "*the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2"* (Article 1i).

The general objective of achieving Favourable Conservation Status (FCS) for all habitat types and species listed in Annexes I and II of the Habitats Directive needs to be translated into site-level conservation objectives, which are a set of specified objectives to be met in a site in order to make sure that the site contributes in the best possible way to achieving FCS at the appropriate level (national or regional level, taking into account the natural range of the respective species or habitat types).

This will involve an assessment at the site level of the degree to which the habitat or species present on the site needs to be maintained, or, where necessary, restored in order to make sure that the site contributes to achieving the overall conservation targets of the Habitats Directive (which may be set at a more strategic level – e.g. at regional, national, biogeographical or EU level).

NPWS are currently at an advanced stage in the process of delivery of conservation objectives for marine and other SACs and SPAs in Ireland. These take the form of comprehensive documents, not only detailing site-specific conservation objectives that aim to define favourable conservation conditions for the particular habitats and/or species upon which the site was designated but also providing a comprehensive analysis of the baseline environment in the supporting documents. The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. At a generic level:

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

Favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and

- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

As the draft National Strategic Plan for Aquaculture is a national plan and this is a national scale assessment covering 188 SACs and 165 SPAs on the basis that they contain habitats or species which have the potential to interact with aquaculture, site specific conservation objectives for each of these sites cannot be consulted. Rather, the assessment will refer to the generic conservation objectives listed above. As all aquaculture licence applications and renewals are undergoing Appropriate Assessment in accordance with the *Roadmap to Compliance*, the detailed site level conservation objectives will be consulted as part of the individual licence assessment but not as part of the draft NSPA assessment.

3.3 OVERVIEW OF POTENTIAL INTERACTIONS

The Food and Agriculture Organization of the United Nations (FAO) defines aquaculture as "the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants. Farming implies some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated" (FAO Technical Guidelines for Responsible Fisheries: Aquaculture Development, 1997).

To inform on potential interactions between aquaculture and the environment following from the implementation of the draft NSPA a Stage 2 assessment will be carried out. This involves the production of a Natura Impact Statement (NIS). The NIS considers whether the draft NSPA, alone or in combination with other projects and plans, will have adverse effects on the integrity of Natura 2000 sites in Ireland and will include any mitigation measures necessary to avoid, reduce or offset negative effects. In this instance and as mentioned in the AA screening, the structure for the Natura Impact Statement has been agreed with NPWS. It is acknowledged that at a national scale, it is difficult to fully assess the impacts of the plan on individual Natura 2000 sites. Instead, the assessment will focus on general aquaculture mitigation in the form of guidance that may inform future site selection decisions and licence conditions in relation to Natura 2000 sites and their qualifying features. Should this guidance be integrated with the implementation of the draft NSPA it will assist with the siting of future aquaculture developments over the course of the plan. This approach fully acknowledges that Appropriate Assessment screening and as necessary full assessment will be carried out for all aquaculture licence applications and renewals as part of the normal administrative process for permitting fish farming activities.

Aquaculture takes place mainly in coastal areas but also occurs in inland freshwater areas and on land based recirculation systems. As such, it provides a vital source of employment and economic activity that contributes to the preservation of viable rural communities on a year-round basis. It is a relatively diverse sector encompassing a substantial shellfish farming element combined with a significant finfish element. There are certain areas within Ireland that have higher concentrations of aquaculture, such as in Donegal, Carlingford Lough, Wexford, Waterford, West Cork, Kerry, Galway and Mayo.

Species grown in freshwater include Rainbow trout, perch and juvenile stages of salmon. Marine aquaculture can be divided into finfish and shellfish farming, species grown in Ireland include Atlantic salmon, Rainbow trout, Arctic char, ornamental fish, oysters, mussels, scallops, clams, abalone, sea urchins, seaweed and microalgae.

Table 3.3: Aquaculture production in Ireland 2013 (BIM)

Species	Amount (tonnes)
Salmon	*c.*15,000
Trout	*c.*728
Rope grown mussels	*c.*10,000
Bottom grown mussels	*c.*5,527
Oyster *(gigas and edulis)*	*c.*8,700
Novel species **Seaweed**	? *c.*50

Currently, aquaculture in Ireland is comprised of 850 licensed operations covering 2,000 sites, primarily consisting of shellfish production. The number of active enterprises engaged in marine aquaculture has remained stable with a total of 292 enterprises. The following table shows aquaculture production by species in 2013.

3.3.1 MARINE CAGE CULTURE

Pen or cage cultivation is used to grow finfish, e.g. salmon *(Salmo salar)* and Rainbow trout *(Oncorhynchus mykiss)*, in the open sea. Pens are either square or circular structures that float in the water. The fish are held in nets that are suspended from a plastic collar on the surface and hang down through the water column. The pens are moored securely at locations where there are strong water flows in order to provide the stock with optimum environmental conditions for growth and welfare.

Figure 3.3.1: Salmon cages off the coast of Ireland

Cage culture can lead to increased sedimentation of particulate organic waste beneath the cages. Mussel and/or polychaete reefs, seagrass beds, sand & mudflats, maerl beds and seaweed beds may be potentially affected by sedimentation from poorly sited cage farms (Huntington et al. 2006, Crowe et al. 2011, Ragot 2009, Wilding and Hughes 2010). Seagrass beds directly beneath or in close proximity to fish cages can be adversely impacted by deposition of solid organic waste. The critical factor causing impacts appears to be solid waste deposition and the consequent high organic loading and deoxygenation of sediments (Wilding and Hughes 2010). The accumulation of organic material on the substrate increases the sediment community's oxygen demand and can have effects on sediment chemistry, which may cause changes in species diversity, abundance and biomass of benthic fauna and flora (Wilding & Hughes, 2010, Holmer et al. 2007, Maldonado et al. 2005, Vezulli et al. 2008, Tomasetti et al. 2009, Vita et al. 2004, Mirto el al 2009).

Appropriate siting of the cages and farm management is particularly important in this kind of aquaculture system. Control and limitation of stock density is used to reduce the possible impacts caused by particulate organic waste. The improvement of feed digestibility, as well as systems to reduce food waste can also mitigate these impacts. The use of extruded and highly digestible feeds, use of modern automatic feed distribution systems, and daily control of the amount of feed aimed at minimizing the feed dispersion and waste in the environment, are some of the mitigation measures that are employed to reduce effects.

Hydrodynamic conditions play an important role in the dispersion of organic waste (Cromey et al., 2002a; Modica et al., 2006; Sara et al., 2006). Monitoring programmes and computer models are available to assist in predicting the extent and degree of organic deposition from aquaculture facilities and are used to identify potential impact from a farm.

Fish excretion and dissolution from feed pellets or faecal particles are a direct source of dissolved compounds into the surrounding water column and include ammonia, nitrate and phosphate together with dissolved organic carbon. The effects of this input into the water column may be rather limited when there is rapid dispersal (Holmer 2010). Studies suggest that organic enrichment by salmon farm nutrients is generally low (Laurent et al. 2006).

In view of the lack of evidence for harmful ecosystem effects of nutrient release from salmon farms, it has been concluded that benthic habitats of biodiversity value in the UK are unlikely to be affected by this form of discharge (Wilding & Hughes, 2010). By moving the farms further offshore to more exposed conditions, the dispersal of nutrients is expected to increase, minimising the pressure on the environment (Wilding and Huges 2010, Pitta et al. 2009).

Other potential risk impacts from marine cages that may be considered include those related to chemical use, especially over sensitive habitats (Ragot 2009, Huntington et al. 2006). Similarly, mud habitats, mussel beds and reefs have low tolerance and resistance to some synthetic compounds used in aquaculture (Crowe et al. 2011, Huntington et al. 2006, Wilding and Hughes 2010). A reduced use of chemicals and other artificial substances in aquaculture has been promoted in recent years together with the development of alternative environmentally friendly substances and methods of treatment, securing favourable conditions for fish. Risks from chemicals can be managed through the application of appropriate Environmental Quality Standards under the Water Framework Directive and through voluntary standards such as Organic Certification.

Cages can attract predators (wild fish, piscivorous birds, aquatic mammals), which may cause damage to the netting (Holmer 2010). In Scotland, the common seal (*Phoca vitulina*) feeds primarily on fish and can, on occasion, predate on salmon farmed in pens. There are no records in Ireland of bottlenose dolphins becoming trapped in cages although salmon cages are widespread in Ireland and occur at sites where bottlenose dolphins are regularly reported. Modern cage design, ensuring that nets are maintained tensile, predator nets and approved acoustic deterrent devices help manage this issue indeed, '*Carefully engineered design considerations and good day to day operational practices*

will mitigate any potential negative effects on marine mammals.' (Berrow 2014) Acoustic deterrent devices can only be used under license from the Minister of Arts, Heritage and the Gaeltacht.

Physical impacts of infrastructure are also possible since cages may be anchored on the seabed risking physical damage to seabed habitat, albeit that individual mooring structures have a small footprint. Again, good siting and design of aquaculture infrastructures, avoiding their location on especially sensitive habitats and adopting best available technology relative to the environment, can help avoid and minimise these potential adverse effects. Large enclosures could also have an effect on current circulation and light penetration.

Disturbance impacts from management activities are usually fairly low and transitory when the cages are in deeper water, away from bird nesting of foraging areas.

The escape of fish from cages may cause undesirable genetic effects in wild populations through interbreeding, and ecological effects through predation, competition and the possible transfer of diseases to wild fish. A recent EU project (Prevent Escape 37) aims to elaborate recommendations and guidelines for aquaculture technologies and operational strategies that reduce escape events.

As mentioned above, benthic impacts can be minimised by siting the farm in highly flushed areas and limiting the biomass and stocking density of the fish to avoid excessive waste. The approach favoured by farm operators in order to minimise adverse effects at their sites incorporates selecting sites with good water exchange, having adequate sites to allow for fallowing, and management practices that minimise food waste and chemical usage. The use of 'high energy' (i.e. resulting in reduced ammonia-N loading) and 'low pollution' diets (i.e. high digestibility, low phosphorus), along with the development of improved feeding management, have reduced the production of wastes. Procedures for the routine removal of dead fish and fouling organisms are also adopted.

3.3.2 SHELLFISH CULTURES

3.3.2.1 Shellfish longlines

Mussel and other shellfish aquaculture as well as seaweed mariculture in deeper waters, through the use of suspended ropes and longlines from floating rafts, has developed to take advantage of spat fall locations as well as areas of good water quality and food availability.

Rope mussel farming is carried out in sheltered Bays from Cork up to Donegal. The majority of production is in the southwest. Mussels are grown on culture ropes suspended at intervals from a horizontal longline on the surface down to a depth of between 6-10m. The long line is kept afloat using purpose built mussel floats and is usually about 100m in length. Culture ropes can be hung as individual droppers or as a continuous line. The average grow out time for rope mussels is about 24 months. Mussel spat is collected on special collector rope in the Spring, usually stripped from that rope within 6 months and restocked onto grow rope until they are ready for harvest.

Figure 3.3.2.1: Mussel longlines in a bay in Ireland

These systems may lead to increased levels of suspended sediments under the farms resulting from the deposition of pseudofaeces. The deposition of faeces and pseudofaeces beneath mussel farms may lead to organic enrichment of sediments (Hargrave et al. 2008b) and cause changes to benthic communities (Danovaro et al. 2004, Ysebaert et al. 2009). The effects of suspended culture depend on local conditions. Impacts of suspended rope culture are mainly limited to sedimentation effects on wild mussel reef communities and other sensitive sublittoral habitats such as polychaete reefs, seagrass beds, sandbanks, maerl beds and seaweed beds (Huntington et al. 2006).

Suspended shellfish culture may also have an impact on the water column, affecting dissolved oxygen levels and nutrient availability. However, the location of this type of system in areas with good water exchange and thus good dispersion of nutrients usually reduces the risk for such effects. In fact, the regeneration of inorganic nutrients through mineralization of biodeposits, either in the water column or on the bottom, stimulates nutrient availability for phytoplankton. This positive feedback by filter feeders is an important mechanism in shallow ecosystems, which eventually stimulates primary production, hence bivalve food production (Smaal & Prins 1993; Dame, 2012). Intensive shellfish farming can strip primary production from the water column and, if a bay is too heavily farmed, the carrying capacity of the body of water in which the farms are located can be exceeded, resulting in adverse conditions for both wild and cultured populations (WWF 2010b). This potential to remove phytoplankton can also be used as a solution to the additional nutrient loading from anthropogenic sources and from other aquaculture. By integrating finfish aquaculture with seaweed and shellfish aquaculture, the wastes of one resource user become a resource (fertiliser or food) for the others (Scottish Executive 2002). There have been several studies investigating the potential benefits of cultivating mussels in order to mitigate nutrient input as part of an integrated multi-trophic aquaculture with farmed fish (Troell et al, 2009).

Disturbance to sensitive species may also occur but the maintenance and harvesting of suspended grown bivalves has little direct impact (OSPAR 2009). Both longlines and rafts can increase both primary and secondary production by providing space for algae and fauna to grow on. Such systems

also act as nursery areas for fish, and this food resource can also provide additional food resources for diving birds (OSPAR, 2009).

The appropriate location of shellfish rafts and longlines in areas with good water exchange, and at a stocking density appropriate to the local environment can help minimise potential impacts of suspended culture.

3.3.2.2 Intertidal shellfish cultures

In Ireland, the Pacific oyster is farmed on the inter tidal zone between the Mean High Water Spring Mark and the Mean Low Water Spring Mark in sheltered bays around the coast.

Oyster spat is purchased mostly from hatcheries in France and, to a lesser extent, Ireland. Stocks are reared in plastic mesh bags secured to steel trestles and are harvested at a commercial size of anything from 75g to 150g, depending on market demand. The growth cycle is between 24 months and 48 months depending on the site. Sites are generally accessed by tractor and trailer or to a lesser extent by a flat bottom boat

Figure 3.3.2.2: Oyster trestles at low tide

Oyster farming is highly labour intensive. Once oysters are stocked on a farm the bags must be turned and/or shaken as often as possible, preferably once on every set of spring tides. They must also be taken on to land and graded two to three times during their growth cycle and moved to different areas of the shore to ensure optimum growth rates. Site maintenance involves the lifting and moving of trestles which sink into the ground over time and replacement of old, broken trestles.

Inter-tidal shellfish systems are generally extensive, although they can be concentrated in estuaries and may have an impact on sensitive habitats or on important bird feeding and fish nursery areas

(Huntington et al. 2006). A potential impact is the smothering of nearby inter-tidal and sub-littoral habitats with faecal and pseudofaecal material, as well as other detritus generated by the culture process, which can affect reefs, sea grasses, sand flats and maerl beds (Huntington et al. 2006, Ragot 2009). Intertidal systems are so dynamic that normally smothering is effectively counteracted by waves and currents.

There is also a potential risk of introducing alien species when culturing non-native species and risks of "hitch hikers" during stock movements. The introduction of alien species for their use in aquaculture, including the possible impacts, is regulated by Council Regulation 708/2007, which includes a permit system with specific procedures and risks assessments.

Accessing and working on inter-tidal facilities may lead to disturbance, especially in important bird foraging and over-wintering areas (Huntington *et al.,* 2006).

3.3.2.3 Bottom shellfish culture

Native oysters

Beds of naturally occurring native oysters (*Ostrea edulis*) are found in a number of shallow coastal and estuarine bays from the northwest to the south coast of Ireland. Eight bays currently support or have in past ten years supported commercial fisheries with an annual production of less than 500 tonnes. These areas are Lough Foyle, Lough Swilly, Blacksod Bay, Achill, Clew Bay, Kilkieran Bay, Inner Galway Bay and Tralee Bay. Cork Harbour had beds managed by a private company up until late 2002 when the beds closed due to viral contamination. There also used to be a fishery in Ballinakill Bay Co. Galway. Almost all of the native oyster beds are either under an Oyster Fishery Order or an aquaculture licence and are managed by local oyster and fishery cooperatives. The presence of *Bonamia* in oyster stock in all of these native oyster beds with the exception of Kilkieran Bay and Tralee Bay was a cause for stock declines particularly in bays such as Inner Galway Bay and Clew Bay. Oyster beds are fished by vessels less than 12 metres using one oyster dredge circa 1.2metre in width. Cooperative management measures vary from Co-op to Co-op and include restrictions on times of fishing, number of days, quota on landings, minimum landing (ring) size (circa 76mm), restocking programmes and bed stock rotation. Most of the production is exported to the EU, e.g. France, Holland and Spain.

Bottom grown mussel culture

There are 6 major production areas for bottom mussel in Ireland: Wexford Harbour, Waterford Estuary, Castlemaine Harbour in County Kerry, Carlingford Lough and in Lough Foyle. There are as well some smaller areas such as Youghal Harbour in County Cork and Lough Swilly in County Donegal.

The production is done directly on the seabed in shallow coastal bays predominantly in subtidal areas. Flat bottom vessels and dredges are used to work the grounds. Young mussels also known as seed mussel are fished in coastal waters and relayed in inshore bays. The main source of juvenile is wild seed mussel from seasonal beds mainly located in the western Irish Sea; local settlements are found in Castlemaine Harbour and periodically in Lough Foyle. The industry is heavily dependent on availability of these wild settlements. Rope mussel seed may be relayed in case of lack of bottom seed. Very little handling is done once the seed has been relayed on licensed ground. Most of the production is exported to Holland and France, to a lesser extent for processing.

Figure 3.3.2.3: Dolphins accompanying an aquaculture vessel

This form of aquaculture is often practised in shallow coastal or estuarine areas where habitats of conservation interest may be present, such as sand and mud flat or seagrass communities, and thus there may be conflicts over use and management of the area (Huntington et al. 2006). The main potential pressures from bottom culture include some degree of sedimentation from both animal excretion and the dredging process used for harvesting, as well as some physical disturbance. The influence of bottom culture on the sedimentary environment and on the macrobenthic community seems to be rather local (Ysebaert et al. 2009).

Sublittoral benthic habitats such as sand/mud flats/banks may be impacted by smothering from sediments generated from excretory products or following harvesting and by actual aquaculture stocks. The introduction of alien species as hitch hikers during stock movements may represent a pressure exerted by bottom culture. There may be also a risk of pathogen transmission from cultured to wild populations, although high pathogen loads from bottom culture are unlikely (OSPAR 2009).

Dredging for seed and the harvesting of on-bottom culture shellfish may have impacts on the target species, the seabed and benthic communities and on non-target commercial species, such as wild scallops and clams.

3.3.3 LAND BASED TANK SYSTEMS

Recirculation systems recycle water, in contrast to conventional flow-through systems that require a constant supply of fresh water passing through a fish tank just once.

Fish and shellfish, e.g. salmon smolts, urchins, lobsters, abalone and seaweed used for ongrowing, are normally raised in tanks where the live, eat, respire and excrete. A primary filtration removes particulate wastes. In an enclosed system (recirculation) the water then passes through a biological filter where excretory wastes are detoxified by bacteria. Toxic ammonia and nitrites are converted to nitrates, which are considered non-toxic, and the water is then returned to the fish holding unit. Since most water is ‘re-circulated’ the systems require relatively small additions of new water. Water is

discharged to remove settled solids. These systems require continuous aeration or oxygenation of both the fish culture and biological filter to function properly.

Figure 3.3.3: Recirculation tanks

Recirculation systems support fish in a *totally* or *partially* enclosed environment.

Full re-circulation

The idea is to recirculate the whole volume of culture water in the indoor land based culture system. As waste matter is treated within the system, a re-circulation unity will have little environmental effect. Only a flow equal to the volume of make-up water will be discharged. Re-circulation systems that wish to retain heat are often run at a rate of 99.5-99.8%.

Partial re-circulation

In Ireland many land-based flow through systems have are designed and operated to enable partial re-circulation. Water in these systems can be re-circulated, up to 50-75%. Partial re-circulation is used during periods of reduced supply of freshwater to provide a more stable environment and ensure good fish welfare, whilst maintaining a high degree of water quality.

Most of these systems are closed and the growing facilities are contained within a site that is separated from the external environment by physical filters and drains. Some farms use recirculation systems, thus reducing the inflow and discharge of water to and from the farm (Huntington et al. 2006).

However, some effects from sedimentation, biogeochemical changes and chemical release can be noticed especially in the downstream vicinity of the discharge from the culture site. All benthic habitats sensitive to these pressures could be potentially affected (Huntington *et al.,* 2006, Ragot 2009). To avoid this, discharge waters can be treated and filtered and or passed through settling tanks to remove solids. Strict controls of discharge waters are stipulated on discharge consent licences and monitoring takes place.

Pressures from infrastructure could impact various habitats depending on the location of the farm. Most intensive land-based farms are well managed to reduce the eventual use of chemotherapeutant

or pathogen load in production systems, and outputs of these to the external environment can also be managed through filtration and water treatment (Huntington *et al.,* 2006, Ragot 2006).

Disturbance from these farms is minimal, as many facilities are either indoors or confined to a small area. Predator control is also likely to be minimal and mostly passive in nature, i.e. netting and screening (Huntington *et al.,* 2006, Ragot 2009).

The introduction of alien species may also have an impact.

3.3.4 FRESHWATER AQUACULTURE

Freshwater aquaculture is carried out mainly for the rearing of Rainbow trout (*Oncorhynchus mykiss*) and salmon smolt production, though the cultivation of perch as a novel species has taken hold in Ireland in recent years. The primary source of water is from surface water abstraction, but can include groundwater sources from borehole or well water. In Ireland trout farms generally operate using quite traditional methods. So far, with the existing production, sophisticated production enhancing technologies have not been introduced. In Ireland, freshwater Rainbow trout are produced using three main systems:

- Earth ponds
- Raceways
- Round tanks

Earth ponds

The first trout farms where constructed as earth pond farms. The basic arrangement consists of a water supply channel at the higher level of the terrain that feeds water into the ponds. The ponds then discharge into what is known as the back channel, which is at the lower end of the terrain. The water from the back channel returns to the river. Each pond has as an individual supply, which can be controlled and each pond can be separately drained. The normal stocking density in an earth pond is around 10-15kg/m^3.

Figure 3.3.4: Earth ponds for Rainbow trout production

Raceways

Raceway channels are usually constructed from concrete and below ground level. They can measure any length, sometimes up to several hundred meters. The raceway channel is normally divided into sections by cross walls and fish screens with common water supply flowing through all sections from one end to the other. It is also common to have a number of parallel raceways. Raceways are more expensive in construction than earth ponds, but take up far less space. Stocking densities are also higher in raceways as they are supplied with more water per given volume. Typical stocking densities in raceways are between 25-50 kg/m^3.

Round tanks

A small volume of Rainbow trout fingerlings for ongrowing are produced in round tanks in land based flow through systems. Round tanks are usually 1-1.5m deep and vary from 2-8 meters in diameter. The stocking densities in round tanks are between 25-50 kg/m^3, probably averaging 35 kg/m^3.

The juvenile stages of salmon occur in freshwater and the salmon farming process mimics this using land-based culture systems. In Ireland, salmon smolts are produced in three main systems:

- Land based round tank units
- Cages in freshwater lakes
- Re-circulation units.

The largest volume of salmon smolts are produced in round tanks in land based flow through systems. Circular tanks are very popular because they tend to be self-cleaning. Tank sizes normally vary from 2-8 meters in diameter and between 1 and 1.5m depth, although they can be larger.

Tanks allow the fish farmer to easily manage stocks and to exert a relatively high degree of environmental control over parameters (e.g. water temperature, pH, DO etc.), that can be adjusted depending on production requirements.

In land based systems the water can flow through the whole installation once or it can be re-used through special recirculation technology.

Pen rearing in freshwater lakes is a relatively minor activity in Ireland. This type of rearing utilises existing water resources while enclosing the fish in floating pens with netting. The fish reared in lake pens rely on oxygen supplied by the water column in the lake. Water exchange takes place through wind and wave activity.

A small amount of smolts are produced in recirculation systems in Ireland. Recirculation systems recycle water, in contrast to conventional flow-through systems that require a constant supply of fresh water passing through a fish tank just once.

The main pressures from freshwater aquaculture are sedimentation, changes in biochemistry and hazardous substances (Huntington *et al.,* 2010). The relative impacts can be avoided or mitigated with different water treatment systems and good management practices. Trout and carp are cultured in land-based pond and raceway systems. Sedimentation risk from land-based tanks and pond culture is moderate for rivers with low flow rates, but this can be minimised with settlement ponds and filtering systems.

There is also a possible risk of eutrophication through effluent discharge to rivers. Many trout farms use modern technologies (low production intensity index, outflow water systems like settling tanks, mechanical aeration systems or liquid oxygen, effluent analysis, etc.) which allow them to exploit water resources efficiently and to offset potential detrimental effects on the receiving water body. The risk of reduced oxygen levels from nutrient enrichment increases in the summer months with higher temperatures and lower flows. Chemical use in freshwater fish farming can present a risk to rivers if poorly managed. However, discharge consent licences set limits which must be adhered to in order to retain the permission.

Currently, aquaculture in Ireland is comprised of 850 licensed operations covering 2,000 sites, primarily consisting of shellfish production. The area covered by aquaculture in Ireland is only 0.001% of the sea area and 0.01% of the land. Aquaculture in Ireland has become synonymous with organic, with 50% of all mussel production and over 80% of all salmon production certified as organic.

The draft National Strategic Plan for Aquaculture is not starting from a zero baseline as the aquaculture sector in Ireland is already highly regulated. Through the support of DAFM and its agencies, and in response to market demands, even higher standards than those required by law are frequently adopted by fish farmers to improve product quality, safety and environmental performance.

3.4 ASPECTS OF THE DRAFT NSPA WHICH MAY INTERACT WITH SITE INTEGRITY AND CONSERVATION OBJECTIVES

A generic assessment of the likely significant effects of different types of aquaculture activity in Ireland on Natura 2000 sites was carried out as part of the Screening (Stage 1) Assessment. As the draft NSPA itself is further developed than it was during AA screening, it is possible at this stage to

determine what effect the different elements of the plan will have on Natura 2000 sites and therefore shifting the focus away simply from the potential significant effects of aquaculture to examining what actual effects the plan might have. The draft NSPA sets out priorities and main intended policy responses to be adopted by Ireland in order to deliver environmentally, socially and economically sustainable aquaculture. Set against the backdrop of strict environmental and food safety standards already in place in Europe and at national level the priority areas focus on how aquaculture development and operation can be better managed and guided by the licensing authority and its agencies, supported by research and representative bodies and carried out by the actual operators growing fish.

Read in conjunction with the draft NSPA, it is clear that the majority of the intended policy responses contained within the plan will have neutral to positive effects on the integrity of Natura 2000 sites. These are set out in Table 4.6. As required by EU strategy and legislation, objectives for building capacity and scale have been set for the growth of the industry in line with the EUs Integrated Maritime Policy. It is essential to bear in mind that the majority of growth (75%) envisaged for the aquaculture industry for the duration of the plan is linked to the optimisation and full efficient use of the current licence portfolio. This essentially means that the industry will strive to achieve meeting the objectives without the need for numerous new licences covering new areas within or outside Natura 2000 designations. Only 25% of the envisaged growth is related to new licenses. Of these, a large number are expected to be associated with enclosed land based systems or organic aquaculture.

Set in the context of the implementation of the plan in its entirety, which will have the overall effect of strengthening and improving the way in which aquaculture is managed in Ireland, the potential negative effects of growing aquaculture can be minimised to a level where site integrity is not compromised. The policy measures contained in the draft NSPA provide for more rigorous controls and a clear system of ensuring potential impacts to the Natura 2000 network are properly assessed thus ensuring that any new licences or changes to existing licences to increase production efficiency are appropriately evaluated.

Key for table 3.4:

++	Strong positive effect associated with the measure
+	Positive effect associated with the measure
0	No or insignificant effect associated with the measure
-	Potential negative effect associated with the measure
- -	Negative effect associated with the measure
?	Effects are uncertain

Table 3.4: Impacts of draft NSPA measures on FCS

	Favourable Conservation Status	
	Habitats	**Species**
Aiming for Growth		
1. Build capacity and scale in the industry.	**0/-**	**0/-**
• *Increased productivity from the existing aquaculture licence portfolio.*	**0**	**0**
• *Establishment of new aquaculture enterprises.*	**-**	**-**
• *Cultivation of novel aquaculture species.*	**0**	**0**
• *Increasing the level of organic and eco-label products.*	**0**	**0**
• *Introduction of multi-trophic aquaculture techniques.*	**+**	**+**
2. Dedicated support to new entrants to the sector.	**0**	**0**
3. Support organic certification of aquaculture production.	**+**	**+**
4. Aid shellfish producers significantly affected by biotoxin closures.	**0**	**0**
Knowledge, Innovation and Technology		
5. Foster knowledge, innovation and technology transfer.	**+**	**+**
• *Development of technical, scientific or organisational knowledge in aquaculture farms.*	**+**	**+**
• *Development or introduction in the market of new aquaculture species with good market potential.*	**0**	**0**
• *Exploration of the technical or economic feasibility of innovative products or processes.*	**0**	**0**
6. Enhance the skills base to foster a knowledge economy.	**0**	**0**
7. Provision of expert advice to improve environmental and business performance and enhanced strategic planning by aquaculture enterprises.	**+**	**+**
8. Support best husbandry and disease management practice.	**+**	**+**
9. Applied research and collaboration between industry, scientific and development bodies.	**+**	**+**
10. Development of commercial scale growing systems for novel species.	**0**	**0**
Ensuring Sustainability		
11. Application of guiding principles recommended by MI.	**++**	**++**
12. Application of scale limits and phasing in relation to the development of individual offshore salmon farms.	**0/+**	**0/+**
13. Development of an industry Code of Practice for Invasive Alien Species.	**++**	**++**
14. Continuation of Invasive Species Ireland Project.	**++**	**++**
15. Quantify the environmental contribution of aquaculture.	**++**	**++**
16. Aquaculture monitoring consistent with MSFD requirements.	**++**	**++**
Co-ordinated Spatial Planning		
17. Develop opportunities and constraints mapping for aquaculture taking specific account of environmental issues, Natura 2000 sites and inshore fisheries.	**++**	**++**
18. Identify marine tourism opportunities from aquaculture.	**+**	**0**
19. Study on integrated multi-trophic aquaculture and possible synergies with offshore wind farms or other marine renewable energy.	**0**	**0**
20. Study on how aquaculture contributes to communities in rural areas.	**0**	**0**
Aquaculture Licensing		
21. Progressively remove the current aquaculture licensing backlog	**0**	**0**
22. Review and revision of the legal framework for aquaculture licencing	**++**	**++**
23. Phased introduction of appropriate timescales for licence determination	**0**	**0**
24. Develop a data management and information system with online application process and tracking functionality, spatial mapping of aquaculture sites and exclusion areas.	**+**	**+**

The following section of the Appropriate Assessment will once again focus on the potential significant effects of aquaculture on Natura 2000 habitats and species that were screened IN for further assessment in the context of the objectives relating to building capacity and scale in the industry and policy responses related to this. If growth in the aquaculture sector in Ireland is to take place, licence applications will only be approved pending a favourable outcome in EIA and AA as appropriate. The impact prediction exercise is intended to act as guidance for potential applicants, agencies and authorities, prior to the more detailed site level assessment being made.

3.5 POTENTIAL IMPACTS OF AQUACULTURE ACTIVITIES ON NATURA 2000 SITES

A generic assessment of the likely significant effects of different types of aquaculture carried out in Ireland on Natura 2000 sites was carried out as part of the Screening (Stage 1) Assessment. However, to enable a consistent approach to the assessment it was decided that the application of pressures and impact tables would be a useful tool. Such tables are widely used to inform Appropriate Assessments. Figures 3.6a and 3.6b have been adapted from a range of tables used in various studies to identify the pressures associated with different aquaculture activities and whether or not these pressures are likely to have an impact on various habitats and species. These tables are used to indicate where impacts have the potential to arise for each of the habitats and species screened IN and enable a consistent approach to the exercise. The main source of information to formulate these tables was adapted from Huntington *et al.,* 2006, as re-published in the 2012 European Guidance document for Aquaculture in Natura 2000 areas. However, the tables were also cross checked with other sources as shown below (Figures 3.6c, 3.6d).

The EU Commission recognises that *"There are numerous examples of sustainable development of aquaculture activities that play an important role in environmental conservation and enhancement of biodiversity, retention of water in the landscape and flood protection. Aquaculture systems can be compatible with sensitive habitats and can provide environmental benefits and services. Aquaculture activities are carried out in Natura 2000 sites and can be fully compliant with the preservation of the sites natural values."* (Guidance on Aquaculture and Natura 2000)

Many of the interactions listed in the tables are regulated under EU or national legislation and do not always appear at every site or with every operation, or might not be relevant for the conservation objectives of a particular site. Actual potential impacts will be identified at project level on a case-by-case basis taking into account environmental and rearing conditions as well as mitigation measures and appropriate management. For a more detailed description of the interactions contained in the tables, please refer to Section 3.3.

On an EU wide basis a recent analysis has shown that current legislation adequately addresses risks of impacts from aquaculture (Huntington *et al.,* (2010)) as seen in Table 3.6.

Table 3.5: Summary of gap analysis, impacts and pressures by aquaculture activities (ENV.D.2/SER/2008/0077)Final

Pressure	What legislation applies	Do the provisions adequately address the risks?	Are there known implementation issues?	Overall assessment
Sedimentation	WFD, Freshwater Fish Directive, EIA Directive	Yes	No	No regulatory gap is identified.
Change in bio-chemistry	WFD and related Directives	Yes	No	No regulatory gap is identified.
Infrastructure impacts	EIA Directive and the Habitats/Wild Bird Directives; local planning regulations, WFD	Yes	(EIA inconsistently applied to aquaculture in Member States.)	No regulatory gap is identified.
Disturbance	EIA Directive and the Habitats/Wild Bird Directives; local planning regulations, WFD	Yes	(EIA inconsistently applied to aquaculture in Member States.)	No regulatory gap is identified.
Predator control	Habitats/Wild Bird Directives; aquaculture licensing authorisations, animal welfare legislation; WFD	Yes	Yes	Although there is no gap in environmental legislation, its proper implementation may be at risk given the difficulties to achieve a broad understanding when conflicts arise.
Hazardous substances	WFD/Dangerous Substances Directive; Biocidal Products Directive	Mostly	Yes (see opposite).	No significant regulatory gap is identified, although the situation will be improved if the proposal for the adoption of a new Biocides Regulation is eventually adopted, so as to extend the scope of protection to articles and materials treated with biocidal products.
Pathogen transmission	Aquatic Animal Health Directive, WFD/MSFD, the Alien Species Regulations, EIA Directive	Yes	No	No regulatory gap is identified.
Inter-breeding with wild animals	Habitats Directive (in relation to deliberate introductions)	Not clear	Yes – lack of data, no common standards	No specific need for legislation can be identified but further efforts are required to improve the state of knowledge. Consideration should be given to developing a common EU standard on escape prevention.
Introduction of alien species	Alien Species Regulations; Aquatic Animal Health Directive, Habitats Directive, WFD	Yes	No	The legislation appears adequate to meet the environmental impacts, but implementation of the relevant provisions needs to be kept under continual review.

Explanatory note for Figure 3.5a:

* Organic and/or Environmental and/or Quality Management System or any combination thereof

** ISGA Code of Practice for the prevention of stock escapes of Irish farmed salmonids

AQUACULTURE SYSTEM	MARINE AND COASTAL							FRESHWATER	
	FINFISH CAGE CULTURE	SUSPENDED SHELLFISH CULTURE	INTER TIDAL SHELLFISH CULTURE	BOTTOM SHELLFISH CULTURE	LANDBASED RECIRCULATION	PIERS	ACCESS ROUTES	FLOW THROUGH SYSTEM	RECIRCULATION SYSTEM
AQUACULTURE PRESSURES									
CONTROLS & VOLUNTARY MEASURES	- project level new aquaculture operations in Natura 2000 areas subject to EIA screening & potentially subject to AA and EIA, all existing covered by MI bay AA 2014								
SEDIMENTATION: smothering, turbidity, suspended solid changes	X	X	X	X				X	
CONTROLS & VOLUNTARY MEASURES	- Licence terms and conditions - benthic monitoring programme - voluntary measures to avoid benthic impact as part of OEQMS*								
BIOGEOCHEMICAL CHANGES: nutrient changes	X	X	X	X				X	
CONTROLS & VOLUNTARY MEASURES	- Licence terms and conditions - WFD monitoring - MSFD monitoring - MI monitoring programmes- OEQMS								
CHEMICAL INPUTS: medicines, antifoulants, disinfectants.	X							X	
CONTROLS & VOLUNTARY MEASURES	- Licence terms and conditions - fish health management plans - ECOPACT - OEQMS								
INFRASTRUCTURE IMPACT: displacement, physical disturbance.	X	X	X	X	X		X	X	X
CONTROLS & VOLUNTARY MEASURES	- Licence terms and conditions - ECOPACT - CLAMS - ISGA Code of Practice**								
DISTURBANCE: noise, visual	X	X	X		X	X	X	X	X
CONTROLS & VOLUNTARY MEASURES	- Licence terms and conditions - ECOPACT - OEQMS – CLAMS – DAFM Guidelines for Landscape and Visual Impact Assessment of Marine Aquaculture – DAHG Guidance to manage the risk to Marine Mammals from Man-made Sound Sources in Irish Waters								
PREDATOR CONTROL	X			X					
CONTROLS & VOLUNTARY MEASURES	- Licence terms and conditions - good management practice - fish health management plans - OEQMS, NPWS licensing - CLAMS – ISGA C of P								
INTERBREEDING: escapes	X							X	
CONTROLS & VOLUNTARY MEASURES	- draft DAFM Protocol for Structural Design of Marine Finfish Farms - ISGA C of P - OEQMS								
PATHOGENS: microbial, parasites incl. sea lice	X								
CONTROLS & VOLUNTARY MEASURES	- sea lice monitoring protocol -DAFM pest control strategy - fish health management plans - OEQMS - CLAMS								
ALIEN SPECIES			X	X					
CONTROLS & VOLUNTARY MEASURES	- Licence terms and conditions - fish health management plans - OEQMS - DAFM risk assessments								

Figure 3.5a: Checklist of issues and controls & voluntary measures (bases on European Commission 2012)

	AQUACULTURE PRESSURES								
	SEDIMENTATION:	BIOGEOCHEMICAL CHANGES:	CHEMICAL INPUTS:	INFRASTRUCTURE IMPACT:	DISTURBANCE:	PREDATOR CONTROL	INTERBREEDING:	PATHOGENS:	ALIEN SPECIES
HABITAT									
Reefs (mussel bed communities)	X	X	X	X				X	
Reefs (Polychaete worm communities)	X	X	?	X				?	
Seagrass Beds on sub littoral sediments	X	X	X	X		X			X
Sandbanks, Mudflats and Sandflats	X	X	X	X		X			X
Maerl Beds	X	X	?	X					X
Kelp and Seaweed communities	X	X	?	X					X
Saltmarsh Communities	X	X	X	X					
Sand Dune Communities	X			X					
Shingle Communities	X			X					
SPECIES									
Cetaceans			X		X	X			
Pinnipeds			X		X	X			
Otters	X		X	X	X	X			
Fish	X	X	X		X	X	X	X	X
Birds	X		X	X	X	X			

Figure 3.5b: Possible classification of key component habitats and species sensitivity guide to risk assessment (based on Huntington *et al.,* 2006)

Appendix C. Activity x Pressure Matrix

Generic Activity x Pressure matrix, the fishing metiers or aquaculture activities within each class are shown above in Appendix A. The cells indicate potential exposure to the pressure as outlined in the key below.

	Mobile gears: Demersal trawls and dredges*	Static gears: Pots/Creels and bottom set nets*	Mobile gears: Pelagic nets and static pelagic nets*	Static gears: Hook and Line Fishing*	Hydraulic Dredges*	Non vessel based: Hand collection/raking and digging	Aquaculture:Substrate ongrowing	Aquaculture: Suspended production Trestles/long-lines/cages
Surface Disturbance								
Shallow Disturbance								
Deep Disturbance								
Trampling - Access by foot[1]								
Trampling - Access by vehicle[1]								
Extraction (Infrastructure)								
Siltation[2]	Wk		Wk		Wk	Wk		OF
Smothering								
Collision Risk								
Underwater Noise								
Visual - Boat/vehicle movements								
Visual - Foot/traffic								
Changes to sediment composition - Increased coarseness[1]	Md				Md	Md		
Changes to sediment composition - Increased fine sediment proportion	Md				Md		OF	OF FF
Changes to water flow								Md Wk
Changes in turbidity/suspended sediment[2]	Wk		Wk		Wk			OF FF
Organic enrichment - Water column[2]	Wk		Wk		Wk			OF FF
Organic enrichment of sediments - Sedimentation[2]							OF	OF FF
Increased removal of primary production - Phytoplankton								
Decrease in oxygen - Sediment[2]								OF
Decrease in oxygen - Water column[2]								OF
Genetic impacts on wild populations and translocation of indigenous populations								
Introduction of non-native species								
Introduction of parasites/pathogens								
Removal of target species								
Removal of non-target species								
Ecosystem Services - Loss of biomass								
Introduction of antifoulants								OF
Introduction of medicines								OF
Introduction of hydrocarbons								Md/OF
Introduction of litter								
Prevention of light reaching seabed/features								
Barrier to species movement								

[1] Pressure may arise through access to facilities or fishing grounds.
[2] Pressure pathway identified in Huntington et al. (2006).
* Activity unlikely to directly overlap with this habitat.

Key to cells

Colour	Exposure
	Pressure occurs within direct footprint of the activity and magnitude/intensity/frequency or duration may be high.
	Pressure occurs within direct footprint of the activity but magnitude/intensity/frequency or duration may be moderate (Md). Or pressure may occur outside of footprint and exposure is mitigated by distance (OF).
	Potential widespread effect, occurring at footprint but effects ramifying beyond this.
	Either a weak pressure (Wk) occurs at low intensities/magnitude/duration or frequency or this is potentially a far-field effect that is considered unlikely to exceed background levels due to distance (FF).
	No pressure pathway or negligible effect.

Figure 3.5c: Generic Activity x Pressure matrix. The cells indicate potential exposure to the pressure as outlined in the key set out beneath the matrix. (Marine Institute, 2013)

	Sector/Pressure	Fisheries		Aquaculture		Sewage discharge	Agricultural discharge	Industrial discharge	Construction/ development	Shipping	Leisure and tourism	Energ
		Active	Passive	Fin	Shellfish							
P	Habitat loss (to land)						■		■		■	
P	Habitat change (to another marine habitat)	■		■	■	■		■	■			
P	Physical disturbance	■	■	■	■	■			■	■	■	■
P	Siltation rate changes	■	■	■	■	■	■	■	■			■
P	Temperature change					■		■				■
P	Salinity change					■		■				■
P	Water flow			■	■			■	■	■		■
P	Emergence regime											
P	Wave exposure changes-local			■	■				■	■	■	
P	Litter	■	■	■	■	■		■	■	■	■	
C	Non-synthetic compounds	■		■	■	■		■	■	■		■
C	Synthetic compounds	■		■		■	■	■	■	■	■	■
C	De-oxygenation			■	■	■	■	■				
C	Inorganic nutrients			■	■	■	■	■				
C	Organic enrichment			■	■	■	■	■				
B	Introduction of microbial pathogens			■	■	■	■			■	■	
B	Introduction/spread of non-indigenous species			■	■					■		■
B	Removal of target and non-target species	■	■		■				■		■	■

□ - no association between sector and pressure ■ - potential association between sector and pressure

Figure 3.5d: A matrix of pressures associated with sectoral activities (P-physical, C-chemical and B-biological). Pressures and sectors are derived from Robinson et al (2008). In this table Aquaculture – Fin is the cultivation in suspended cages of finned fish such as salmon. Aquaculture - Shellfish is the cultivation of bivalves such as oysters and mussel on bottom and suspended substrata. (Crowe et al 2011)

3.6 OVERVIEW OF LICENSING PROCESS

3.6.1 FRAMEWORK LEGISLATION

Aquaculture licensing in Ireland is administered by the Aquaculture Foreshore Management Division of the Department of Agriculture, Food and the Marine on behalf of the Minister. The key pieces of legislation governing aquaculture licensing in Ireland include:

- Fisheries (Amendment) Act 1997, No. 23
- Sections 2,3 and 4 of the Fisheries and Foreshore (Amendment) Act 1998, No. 54
- Section 101 of the Sea-Fisheries and Maritime Jurisdiction Act 2006, No. 8
- Aquaculture (Licence Application) Regulations, 1998 S.I. NO. 236 OF 1998, as amended by S.I. No. 145 of 2001 and S.I. No. 197 of 2006

Under the Birds and Natural Habitats Regulations (S.I. No. 477 of 2011) aquaculture license applications may be subject to environmental assessments if located within or close to Natura 2000 conservation sites. For the purpose of environmental compliance with the EU Habitats/Birds Directives, all applications in 'Natura 2000' areas are required to be appropriately assessed. In addition, if the Minister considers that a proposed aquaculture is likely to have significant effects on the environment, he may require an applicant to submit an Environmental Impact Statement.

The carrying out of aquaculture is regulated by the Fisheries (Amendment) Act 1997. The licensing authority (i.e. the Minister, an officer to whom functions have been delegated by the Minister, or the Aquaculture Licence Appeals Boards) may, if it is satisfied to do so, license a person, at a place or in waters specified in the licence, to engage in aquaculture or such operations in relation to aquaculture, and subject to such conditions, as it thinks fit and specifies in the licence.

In conjunction with the Fisheries Amendment Act, the Foreshore Act of 1933 is also required for the licensing of aquaculture sites in Ireland and allows the Minister to grant leases/ licences and regulates the placement of structures on the foreshore associated with the carrying out of licensed aquaculture.

The Foreshore Acts 1933 - 2011 require that a lease or licence must be obtained from the Minister for Agriculture, Food and the Marine for works undertaken on the foreshore which are deemed to be:

- any function in relation to a fishery harbour centre;
- any function in respect of—
    (i) an activity which is wholly or primarily for the use, development or support of aquaculture, or

    (ii) an activity which is wholly or primarily for the use, development or support of sea-fishing including the processing and sale of sea-fish and manufacture of products derived from sea-fish.

The foreshore is classed as the land and seabed between the high water of ordinary or medium tides (shown HWM on Ordnance Survey maps) and the twelve mile limit (12 nautical miles equals approximately 22.24 kilometres).

The Foreshore Acts 1933 to 2011 include the following.

- Foreshore Act 1933
- Foreshore (Amendment) Act 1992.
- Section 5 of the Fisheries and Foreshore (Amendment) Act 1998
- Fisheries (Amendment) Act 2003 (Part 5)
- Maritime Safety Act 2005 No. 11 (Part 6)
- Foyle and Carlingford Fisheries Act 2007
- Foreshore and Dumping at Sea (Amendment) Act 2009
- Foreshore (Amendment) Act 2011

The Minister for Agriculture, Food and the Marine has two distinct roles in respect of aquaculture:

(i) A general policy role – the Minister can issue general policy directives under section 62 of the Fisheries (Amendment) Act, 1997.

(ii) A regulatory role – making determinations in respect of aquaculture licence applications.

In accordance with regulation 5.2 of S.I. No. 236 of 1998 the Minister may require the applicant, in relation to each individual aquaculture licence application, to submit an Environmental Impact Statement (EIS) if the Minister considers that the proposed aquaculture is likely to have significant effects on the environment. The Minister's determination as to whether or not an EIS is required is published on the Department's website.

The Foreshore Act 1933, for which the Minister has power to grant leases / licences, regulates the placement of structures on the foreshore associated with the carrying out of licenced aquaculture.

3.6.2 PROCEDURES OPERATED IN RELATION TO AQUACULTURE LICENSING

The procedural steps relating to aquaculture licensing, including public and statutory consultation, are set out in S.I. No. 236 of 1998 – Aquaculture (Licence Application) Regulations, 1998. Notice of aquaculture licence applications are published in a newspaper circulating in the vicinity of the

proposed aquaculture. This notice specifies where the documentation relating to the application may be inspected. A person may make written submissions or observations within a prescribed time period (as set out in the Statutory Instrument). In addition, aquaculture licence applications are sent to statutory consultees (as prescribed in Regulation 10 of S.I. No. 236 of 1998).

In relation to aquaculture licensing Section 61 of the Fisheries (Amendment Act) 1997 specifies that:

"The licensing authority, in considering an application for an aquaculture licence or an appeal against a decision on an application for a licence or a revocation or amendment of a licence, shall take account, as may be appropriate in the circumstances of the particular case, of—

(a) the suitability of the place or waters at or in which the aquaculture is or is proposed to be carried on for the activity in question,

(b) other beneficial uses, existing or potential, of the place or waters concerned,

(c) the particular statutory status, if any, (including the provisions of any development plan, within the meaning of the Local Government (Planning and Development) Act, 1963 as amended) of the place or waters,

(d) the likely effects of the proposed aquaculture, revocation or amendment on the economy of the area in which the aquaculture is or is proposed to be carried on,

(e) the likely ecological effects of the aquaculture or proposed aquaculture on wild fisheries, natural habitats and flora and fauna, and

(f) the effect or likely effect on the environment generally in the vicinity of the place or water on or in which that aquaculture is or is proposed to be carried on—

(i) on the foreshore, or

(ii) at any other place, if there is or would be no discharge of trade or sewage effluent within the meaning of, and requiring a licence under section 4 of the Local Government (Water Pollution) Act, 1977 , and

(g) the effect or likely effect on the man-made environment of heritage value in the vicinity of the place or waters."

The next step in the process is the carrying out of Environmental Impact Screening. The only aquaculture development that currently includes a full mandatory EIA relates to *"Seawater fish breeding installations with an output which would exceed 100 tonnes per annum; all fish breeding installations consisting of cage rearing in lakes; all fish breeding installations upstream of drinking water intakes; other freshwater fish breeding installations which would exceed 1 million smolts and with less than 1 cubic metre per second per 1 million smolts low flow diluting water."* (SI 600 of 2001). The Minister may require applicants to submit an Environmental Impact Statement if he/she considers that the proposed aquaculture activity is likely to have significant effects on the environment. The Ministerial determination, on whether an EIS is required or not, is published. This requirement (under EU EIA Directives) is separate from the requirements of the Habitats Directive. Each application goes to public and statutory consultation. Specific draft licence conditions are prepared taking account of the Appropriate Assessment (AA) carried out by the Marine Institute at bay scale and other information such as that received in the public/statutory consultation phase, as well as additional technical observations. Licences contain a clear reference to the AA and the Natura 2000 interests. A Conclusion Statement is prepared by the 'Licensing Authority' (i.e. Minister for Agriculture, Food and the Marine) which outlines how aquaculture activities in the Natura 2000 site are being licensed in compliance with the Birds and Habitats Directives and, following Ministerial approval, is published on the Department's website. The Licensing Authority has to be satisfied, given the conclusions and recommendations of the Appropriate Assessment process, along with the implementation of measures that will mitigate certain pressures on Natura 2000 features, that the proposed aquaculture licensed

activities are not likely to have a significant effect on the integrity of the relevant Natura 2000 site. The Conclusion Statement outlines the timescale and mechanisms through which mitigation measures, as required, will be secured, implemented and monitored.

Notwithstanding that the AA takes place on a bay/Natura 2000 site basis, each aquaculture application is the subject of an individual recommendation to the Minister. In the case of a positive recommendation to the Minister, the draft licence incorporating the specific conditions is also sent for Ministerial approval. The Ministerial decisions are published in the local newspaper/s circulating in the area of the proposed aquaculture activity. A Task Force has been set up to expedite the process of placing decisions, including draft licence conditions accompanying the decision, on the Department's website having regard to overall policy on utilisation of IT systems for the dissemination of information to the public. It is the intention that when the Ministerial decision is published in a local newspaper a link to the Department's website will be included in the notice where the conditions applicable to that decision can be inspected.

The Ministerial decision may be appealed to the Aquaculture Licensing Appeals Board (ALAB). The function of the Board is to provide an independent authority for the determination of appeals against decisions of the Minister for Agriculture, Food and the Marine on aquaculture licence applications. A person aggrieved by a decision of the Minister on an aquaculture licence application, or by the revocation or amendment of an aquaculture licence, may make an appeal within one month of publication (in the case of a decision) or notification (in the case of revocation / amendment). Decisions are notified to appellants and published on the Board's website.

Step 1	Aquaculture licence application received.
Step 2	The application form is checked to determine if the proposed area is located within a 'Natura 2000' site - if so, an Appropriate Assessment needs to be carried out.
Step 3	Appropriate Assessment carried out, which involves: • Detailed analysis of raw data collected (this is substantially complete in all bays) • The setting of Conservation Objectives by the National Parks and Wildlife Service (NPWS) • Preparation of shape files by DAFM and BIM (including profiling of aquaculture activity in the relevant Natura site) to allow the Marine Institute to spatially overlap the aquaculture activity over the protected habitats in the Natura site • Appropriate Assessment carried out by the Marine Institute Broad agreement between the Marine Institute and NPWS on the outcomes of the Appropriate Assessment
Step 4	DAFM meets with its scientific and technical advisors to discuss the findings of the Appropriate Assessment, with particular reference to ensuring scientific agreement and translating the findings into practical licensing decisions - this can

	include an informal meeting with NPWS (who are also Statutory Consultees).
Step 5	If DAFM has a serviceable Appropriate Assessment, it can proceed to carry out Environmental Impact Assessment (EIA) pre-screening on all licence applications to ensure compliance with EU Environmental Directives.
Step 6	Submission to Minister on requirement for Environmental Impact Statement (EIS) for each application.
Step 7	Submission of set of policy recommendations for entire bay or Natura site for Ministerial approval.
Step 8	All applications accompanied by the Appropriate Assessment and EIA pre-screening (or EIS) are sent to Statutory Consultees (this includes NPWS, An Taisce, County Councils, Department of Environment etc.).
Step 9	All applications accompanied by the Appropriate Assessment and EIA pre-screening (or EIS) are sent to Public consultation - allowing members of the public to comment.
Step 10	All information received is evaluated by DAFM. An Appropriate Assessment Conclusion Statement is finalised indicating how the bay will be licensed in accordance with Natura requirements. Individual recommendations are prepared and sent for Ministerial approval.
Step 11	Ministerial Decision to either grant or refuse the application.
Step 12	Publication of Ministerial Decision and the reasons for such determinations are placed on DAFM website.
Step 13	Decision may be appealed to the Aquaculture Licences Appeals Board (ALAB) - the independent appeals body.

Figure 3.6.2: Current licence application procedure

The steps involved in the licensing of aquaculture activities in Ireland at the time of this report are laid out in Figure 3.6.2 above. Every single application is screened for the requirement of an Appropriate Assessment, which effectively ensures that all aquaculture activities in Ireland proceed with no significant effects on the receiving environment in designated Natura 2000 sites. Indeed, through individual licensing conditions as well as a variety of voluntary measures embraced by the sector, e.g. organic certification, environmental management plans and various monitoring programmes, the Irish aquaculture industry contributes to the safeguarding of the quality of the environment and maintaining a healthy environment for healthy, high quality seafood.

3.7 EXISTING CONTROLS AND MANAGEMENT MEASURES FOR THE PREVENTION OF ENVIRONMENTAL IMPACTS OF AQUACULTURE ACTIVITIES

3.7.1 LICENCE APPLICATION & APPEALS PROCESS

From the outset the most important control for preventing impacts of aquaculture activities on the environment lies in the Irish licensing system. Any licence application received by DAFM for a proposed activity in a Natura 2000 area is sent for an Appropriate Assessment that is carried out by the Marine Institute following the setting out of the conservation objectives by NPWS. On receipt of the AA DAFM in conjunction with its scientific and technical advisors then carry out an Environmental Impact Assessment (EIA) pre-screening to ensure compliance with EU Environmental Directives. Full mandatory EIA is required for "Seawater fish breeding installations with an output which would exceed 100 tonnes per annum; all fish breeding installations consisting of cage rearing in lakes; all fish breeding installations upstream of drinking water intakes; other freshwater fish breeding installations which would exceed 1 million smolts and with less than 1 cubic metre per second per 1 million smolts low flow diluting water." (SI 600 of 2001) All applications and the accompanying AA and EIA pre-screening (or EIS) are sent to Statutory Consultees as per S.I. 236/1998 that include:

- Board Iascaigh Mhara;
- Marine Institute;
- Údarás na Gaeltachta, if the proposed aquaculture is to take place in, or contiguous to, its functional area;
- The Minister for Arts, Heritage, Gaeltacht and the Islands (and consequently NPWS);
- The local authority, within whose functional area, or contiguous to whose functional area, the proposed aquaculture is to take place;
- Bord Fáilte Éireann;
- The Central Fisheries Board;
- The Regional Fisheries Board within whose functional area, or contiguous to whose functional area, the proposed aquaculture is to take place;
- The Commissioners of Irish Lights;
- An Taisce — The National Trust for Ireland;
- A harbour authority within the meaning of the Harbours Act, 1946 , or a company established under the Harbours Act, 1996, as appropriate, if the proposed aquaculture is to take place in, or contiguous to, its functional area.

The same documents are also set out for public consultation, giving members of the general public the opportunity to comment. Following this consultation period all information that has been received is evaluated by DAFM officials and a recommendation to the Minister is made. The Minister then decides either to grant or refuse the application and his decision is published. This decision can then be appealed through the Aquaculture Licences Appeals Board (ALAB) which is the independent appeals body. ALAB review the information provided along with an independent technical advisors report and also make a decision that can be subject to a judicial review if necessary.

3.7.2 LICENCE TERMS & CONDITIONS

Licence terms and conditions are specific to each licence and site. The following section aims to give an overview of standard licence conditions that may be included in aquaculture licences in Ireland.

3.7.2.1: Marine finfish

Licence conditions include but are not limited to provisions regarding:

- Design, arrangement and maintenance of structures.
- Operational conduct (incl. Natura 2000).
- Waste management to avoid litter and debris.
- Containment of stock incl. compliance with NASCO *Guidelines on Containment of Farm Salmon, CNL (01)5* (http://www.nasco.int/aquaculture.html).
- Navigation and safety.
- Environmental monitoring/requirements:
    - Monitoring Protocol No. 1 for Offshore Finfish Farms – Benthic Monitoring
    - Monitoring Protocol No. 2 for Offshore Finfish Farms – Water Column Monitoring
    - Protocol for Fallowing at Offshore Finfish Farms
- Fish health, mortality management, sea lice monitoring, movement of fish.
    - Monitoring Protocol No. 3 for Offshore Finfish Farms – Sea Lice Monitoring and Control
- Animal remedies and dangerous substances to avoid deleterious effect on the environment (incl. record keeping and storage).
- Emergency plan.
- Inspection by an authorised person (within the meaning of Section 292 of the Fisheries (Consolidation) Act 1959) (No. 14 of 1959) (as amended by Fisheries Act 1980) (No. 1 of 1980), a Sea Fisheries Protection Officer (within the meaning of Sea Fisheries and Maritime Jurisdiction Act 2006) (No. 8 of 2006) or any other person appointed in that regard by the Minister or other competent State authority.
- Monitoring programmes can be found under this link: http://www.agriculture.gov.ie/fisheries/aquacultureforeshoremanagement/monitoringprotocols/

3.7.2.2: Marine shellfish

Inter / sub- tidal marine shellfish

Licence conditions include but are not limited to provisions regarding:

- Design, arrangement and maintenance of structures.
- Operational conduct (incl. Natura 2000).
- Vehicle access, frequency and related noise to keep disturbance to a minimum.
- Maintenance of vehicles to prevent leakages, e.g. of oil, lubricants, grease.
- Waste management to avoid litter and debris.
- Navigation and safety.
- Monitoring, fish health, disposal of mortalities, movement of fish.
- Inspection by an authorised person (within the meaning of Section 292 of the Fisheries (Consolidation) Act 1959) (No. 14 of 1959) (as amended by Fisheries Act 1980) (No. 1 of 1980), a Sea Fisheries Protection Officer (within the meaning of Sea Fisheries and Maritime Jurisdiction Act 2006) (No. 8 of 2006) or any other person appointed in that regard by the Minister or other competent State authority.

A specific condition contained in this licence is aimed directly at minimising disruption to bird life: “The Licensee shall ensure that when carrying out aquaculture work on the foreshore, dogs owned or under the control of the Licensee shall not be present, in order to minimise disturbance to the birdlife in the area.”

Marine shellfish (longlines)

Licence conditions include but are not limited to provisions regarding:

- Design, arrangement and maintenance of structures.
- Operational conduct (incl. Natura 2000).
- Waste management to avoid litter and debris.
- Navigation and safety.
- Monitoring.
- Fish health, mortality management, movement of fish.
- Inspection by an authorised person (within the meaning of Section 292 of the Fisheries (Consolidation) Act 1959) (No. 14 of 1959) (as amended by Fisheries Act 1980) (No. 1 of 1980), a Sea Fisheries Protection Officer (within the meaning of Sea Fisheries and Maritime Jurisdiction Act 2006) (No. 8 of 2006) or any other person appointed in that regard by the Minister or other competent State authority.

Marine shellfish sea-bed culture/bottom culture

Licence conditions include but are not limited to provisions regarding:

- Design, arrangement and maintenance of structures.
- Operational conduct (incl. Natura 2000).
- Waste management to avoid litter and debris.
- Navigation and safety.
- Monitoring.
- Fish health, mortality management, movement of fish.
- Inspection by an authorised person (within the meaning of Section 292 of the Fisheries (Consolidation) Act 1959) (No. 14 of 1959) (as amended by Fisheries Act 1980) (No. 1 of 1980), a Sea Fisheries Protection Officer (within the meaning of Sea Fisheries and Maritime Jurisdiction Act 2006) (No. 8 of 2006) or any other person appointed in that regard by the Minister or other competent State authority.

3.7.2.3 Land based finfish (freshwater)

Licence conditions include but are not limited to provisions regarding:

- Design, arrangement and maintenance of structures.
- Operational conduct (incl. Natura 2000).
- Waste management to avoid litter and debris.
- Containment of stock to avoid escapes or intake of wild fish.
- Environmental monitoring.
- Fish health, mortality management, movement of fish.
- Animal remedies and dangerous substances to avoid deleterious effect on the environment (incl. record keeping and storage).
- Emergency plan.
- Inspection by an authorised person (within the meaning of Section 292 of the Fisheries (Consolidation) Act 1959) (No. 14 of 1959) (as amended by Fisheries Act 1980) (No. 1 of 1980), a Sea Fisheries Protection Officer (within the meaning of Sea Fisheries and Maritime Jurisdiction Act 2006) (No. 8 of 2006) or any other person appointed in that regard by the Minister or other competent State authority.

Effluent discharge Licence as per each County Council: Sampling takes place on a monthly basis and includes: BOD, COD, suspended solids, pH, total phosphorus, orthophosphates, ammonia, nitrates, chlorides, temperature etc.

3.7.2.4 Marine Multi-Method/Species

Licence conditions include but are not limited to provisions regarding:

- Design, arrangement and maintenance of structures.
- Operational conduct (incl. Natura 2000).
- Vehicle access, frequency and related noise to keep disturbance to a minimum.
- Maintenance of vehicles to prevent leakages, e.g. of oil, lubricants, grease.
- Waste management to avoid litter and debris.
- Navigation and safety.
- Monitoring.
- Fish health, mortality management, movement of fish.
- Inspection by an authorised person (within the meaning of Section 292 of the Fisheries (Consolidation) Act 1959) (No. 14 of 1959) (as amended by Fisheries Act 1980) (No. 1 of 1980), a Sea Fisheries Protection Officer (within the meaning of Sea Fisheries and Maritime Jurisdiction Act 2006) (No. 8 of 2006) or any other person appointed in that regard by the Minister or other competent State authority.

A specific condition contained in this Licence is aimed directly at minimising disruption to bird life: "The Licensee shall ensure that when carrying out aquaculture work on the foreshore, dogs owned or under the control of the Licensee shall not be present, in order to minimise disturbance to the birdlife in the area."

3.7.2.5 Land-based shellfish (freshwater/seawater) and other invertebrates (seawater)

Licence conditions include but are not limited to provisions regarding:

- Design, arrangement and maintenance of structures.
- Operational conduct (incl. Natura 2000).
- Waste management to avoid litter and debris.
- Containment of stock to avoid escapes or intake of wild fish.
- Navigation and safety.
- Monitoring incl. regular water quality monitoring.
- Fish health, mortality management, movement of fish.
- Inspection by an authorised person (within the meaning of Section 292 of the Fisheries (Consolidation) Act 1959) (No. 14 of 1959) (as amended by Fisheries Act 1980) (No. 1 of 1980), a Sea Fisheries Protection Officer (within the meaning of Sea Fisheries and Maritime Jurisdiction Act 2006) (No. 8 of 2006) or any other person appointed in that regard by the Minister or other competent State authority.

3.7.2.6 Marine aquatic plants / fish food (longlines)

Licence conditions include but are not limited to provisions regarding:

- Design, arrangement and maintenance of structures.
- Operational conduct (incl. Natura 2000).
- Waste management to avoid litter and debris.
- Navigation and safety.
- Monitoring.
- Inspection by an authorised person (within the meaning of Section 292 of the Fisheries (Consolidation) Act 1959) (No. 14 of 1959) (as amended by Fisheries Act 1980) (No. 1 of 1980), a Sea Fisheries Protection Officer (within the meaning of Sea Fisheries and Maritime Jurisdiction Act 2006) (No. 8 of 2006) or any other person appointed in that regard by the Minister or other competent State authority.

3.7.3 ENHANCED REGULATORY MONITORING

A dedicated Monitoring and Compliance Unit has been established within the DAFM to strengthen the adherence to the terms and conditions of all aquaculture licences. The Unit brings greater coherence to the existing monitoring system leading to enhanced monitoring and regulatory standards, practices and procedures. A structure for the systematic audit of licence conditions has been put in place. This is a very substantial enhancement of the existing regulatory procedure and supplements all other inspections of sites.

The Unit avails of services provided by representatives of DAFM, MI, Engineering Division (DAFM), SFPA, MSO and BIM as necessary.

The areas targeted for audit include the following:-

Site**:**

- Navigational marking
- Location (within licenced boundaries)
- Cleanliness/redundant structures
- Access routes
- Planning permissions (if appropriate)

Structures

- Type of structure
- Alignment
- Moorings (if appropriate)
- Spacing

Stocking and Records

- Species and source
- Stocking density
- Stock movements
- Fish health
- Predator control
- Chemical usage
- Disposal of mortalities
- Fallowing
- Escapes

Environmental Monitoring

- Water quality
- Effluent discharge (if appropriate)
- Chemical discharge
- Benthic monitoring
- Waste management
- Emergency action plan

3.7.4 APPROPRIATE ASSESSMENT AT BAY SCALE

DAFM together with its agencies the Marine Institute and BIM have been working with DAHG and the National Parks and Wildlife Service to deliver Appropriate Assessments for all aquaculture and fishing activities and in combination effects in or adjacent to Natura 2000 sites across Ireland. The programme of work is guided by the *Roadmap to Compliance* which was agreed with DG Environment of the European Commission in 2009 and involved the collection of extensive baseline data to inform the compilation of site specific conservation objectives for Natura 2000 sites hosting aquaculture and fishing activities, a task which is now largely complete. These conservation objectives are required to enable the appropriate assessment of new and existing aquaculture activities.

From an aquaculture perspective, the AA is based on a list of licensed aquaculture activities and applications on a bay-by-bay basis. Profiling of aquaculture activities is carried out by BIM and the compilation of Natura Impacts statement by the Marine Institute. Formal and informal consultation takes place with technical and scientific advisors and National Parks and Wildlife Service with a view to transferring the AA findings into specific licence conditions. This is followed by submitting a detailed set of policy recommendations for the entire bay, based on the AA findings, EIA screening, scientific advice and the requirements of the National Parks and Wildlife Service (NPWS) for Ministerial approval.

Following from the Appropriate Assessment currently being carried out at bay scale, DAFM together with the Marine Institute are actively identifying specific monitoring requirements in the context of the AA conclusions and licence conditions for Natura 2000 sites over and above ongoing monitoring. This is to ensure that issues of special priority identified in the AA are the subject of enhanced post-licensing monitoring and controls.
Monitoring that is recommended in the Appropriate Assessment will take the form of a licence condition and will have the primary goal to provide additional certainty relating to the assessment conclusions. Monitoring is considered a mitigation measure as long as it is allied with specific and clear management measures. Any such monitoring protocols will be tailored to the specific issue at hand and will focus upon the likely interaction between the feature of interest (e.g. wading birds) and the activity licensed (e.g. oyster trestle culture). Furthermore, monitoring may take the form of capture of additional baseline information in order to provide a more robust data with which to estimate likely interactions (e.g. species displacement).
A list of AAs completed to date can be found under the following link:

http://www.agriculture.gov.ie/fisheries/aquacultureforeshoremanagement/aquaculturelicensing/appropriateassessmentscarriedout/

3.7.5 BENTHIC MONITORING PROGRAMME

The seafloor is a very suitable indicator of stresses on the marine environment and can act as an early warning system. These stresses can originate from natural and/or anthropogenic sources. The condition of the seafloor (physical, chemical and biological) has been shown to modify in response to external influences. For example, organic matter falling to the seafloor may increase oxygen demand in the vicinity and stress and/or kill organisms located therein. Surveys using a variety of tools have been used to assess natural conditions prior to development or to assess the conservation status of an area. The Marine Environment and Food Safety Services Benthic Monitoring Unit is responsible for the review and assessment of existing and proposed activities that may have an influence on the marine environment. In May 2000, the Department of Marine and Natural Resources implemented a series of Protocols to monitor fish farming activities in Ireland. An annual benthic monitoring survey forms a part of these protocols. In the event of a breach of the allowable impact levels, suitable management modifications are implemented to reduce the impact and allow a suitable degree of recovery of the benthic environment. There are a number of tools utilised to monitor the benthic environment. These range from observational (qualitative) surveys carried out by divers or Remotely Operated Vehicles (ROVs) to more quantitative surveys carried out using a variety of grabs and cores or some *in-situ* sediment profiling equipment (Sediment Profiling Imagery - SPI) whose images can be interrogated using a variety of investigative software.

http://www.marine.ie/Home/site-area/areas-activity/marine-environment/benthos-ecology-group

3.7.6 DAFM STRATEGY FOR IMPROVED PEST CONTROL ON IRISH SALMON FARMS

Published in 2008 by the then Department of Agriculture, Fisheries & Food this strategy reflects the high priority afforded to the control of sea lice by the State since 1991. Irish salmon farms are subject to a rigorous and transparent inspection regime carried out by the Marine Institute on behalf of the Government that is backed up by mandatory licensing requirements imposed on fin-fish farmers through a protocol on management and control. This strategy outlines a comprehensive range of measures to provide for enhanced sea lice control via adherence to the National Integrated Pest Control Plan (Monitoring Protocol No. 3 for Offshore Finfish Farms – Sea Lice Monitoring and Control. May 2000).

The Marine Institute carries out regular inspection of sea lice levels on all fish farms in Ireland in accordance with the Department of Agriculture, Food and the Marine's sea lice Monitoring Protocol (2000) and Strategy (2008). All stocks of fish are inspected by Marine Institute Inspectors on 14 occasions throughout the year. Results from the programme are reported each month to stakeholders and all the data are published on an annual basis. This monitoring programme has been in operation since 1991 and is widely regarded as international best practice. Detailed information regarding this is available on the Marine Institute's web site under www.marine.ie/home/services/operational/sealice/.
In 2012 Minister for Agriculture, Food and the Marine Simon Coveney said in the Dail debate that *'In Ireland the control protocols in respect of sea lice are operated by the Marine Institute on behalf of the State and are more advanced than those operated in other jurisdictions for the following reasons: the inspection regime is totally independent of the industry; data obtained as a result of inspections is published; and treatment trigger levels are set at a low level. These controls are widely accepted as representing best practice internationally'*. (Dail debate, 27 Nov 2012, written answer no. 551)

Table 3.7.6: Licensed medicinal products and methods used in sea lice control on Irish fish farms (Marine Institute 2015)

2015							
Animal medicines							
Compound	***Trade Name***	***Licensing status***	***Delivery Method***	***Group***	***Mode of action***	***Stages targeted***	***Withdrawal period***
Deltamethrin	AMX® Alpha Max®	Full MA	Bath	Pyrethroid	Interferes with nerve transmission by blocking sodium channels in nerve cells	Adults, Preadults. Chalimus unknown	5 degree-days
Emamectin benzoate	Slice®	Full MA	In-feed	Avermectin	Interferes with neurotransmission disrupting nerve cells causing paralysis and death. Effective at 3- 15°C. Protects fish for up to 11 weeks post treatment.	All stages	Zero
Teflubenzuron	Calicide®	Full MA	In-feed	Insect Growth Regulator	Inhibits chitin synthesis preventing moulting and growth. Limited efficacy beyond medication period. Not authorized for use below 9°C	Moulting stages - Chalimus, Preadults only	45 degree-days
Hydrogen peroxide	Paramove 50®	Full MA	Bath	Oxidizer	Gas embolism	Adults, Preadults	Zero
Others							
Wrasse	N/A	N/A	In cage	Biological	Cleaner fish	Adults, Preadults	N/A

In 2013 the Marine Institute published the 'Report on Sea Lice Epidemiology and Management in Ireland in Particular Reference to Potential Interactions with Wild Salmon (*Salmo salar*) and Freshwater Pearl Mussel (*Margaritifera margaritifera*) Populations' following a legal complaint by two Non-Governmental Organisations to the EU in 2009 (EU Pilot Case 764/09/ENV1).

This report captured information available from long term research and specifically commissioned studies and their data to provide an accurate and comprehensive response based on best available scientific data and information. It stated that *'Based on the evidence from the peer reviewed studies, the information collected as part of the National Sea Lice Monitoring and Control Programme, the scientific reports published by the Marine Institute, the National Parks and Wildlife and international experts, and in-line with expert advice provided by several Government Departments and agencies the authors concluded that there was a robust and effective management programme in place to control sea lice infestation on farmed fish, and that there was no evidence to support any suggestion that the three names fisheries were being adversely affected by unusual levels of sea lice infestations, whether of farmed origin or from other source…. The studies on the impacts of lice infestations on smolts suggest that while sea lice induced mortality on outwardly migrating smolts can be significant, it is a minor and irregular component of marine mortality in the stocks studied and is unlikely to be a significant factor influencing conservation status of salmon stock… This conclusion is further supported by the findings of Jackson* et al. *(2013b) which found no correlation between the*

presence of aquaculture and the performance of adjacent wild salmon stocks.' On the 11th of October 2012 the complaint was closed in favour of the State.

Based on the above it may be seen that the State is adopting the precautionary approach with regard to the control of sea lice levels on Irish marine salmon farms. Whilst the science demonstrated that there is no linkage, nevertheless a very strict and rigorously enforced regime is in place to keep numbers of sea lice on salmon farms at an extremely low level.

3.7.7 DAFM PROGRAMME FOR IMPLEMENTATION OF THE DANGEROUS SUBSTANCES DIRECTIVE 2006/11/EC IN MARINE FINFISH AQUACULTURE

The Dangerous Substances Directive (76/464/EEC) was passed into Irish law as S.I. No. 12 of 2001 and aims to eliminate or reduce pollution of surface waters by certain listed dangerous substances. Two lists of substances are provided. List I substances include Atrazine, Dichlormethane, Simazine, Toulene Tributyltin, and Xylenes and should be eliminated from discharge. List II substances include Arsenic, Chromium, Copper, Cyanide, Fluoride, Lead, Nickel and Zinc and should be reduced. Member States must set emission standards, establish a system of prior authorisation and implement programmes to prevent or reduce pollution through a process of planning, regulation, monitoring, consultation and reporting.

Dangerous substances in aquaculture are further legislated for in the European Communities (Control of Dangerous Substances in Aquaculture) Regulations 2008. The following Environmental Quality Standards apply to substances used in the treatment of marine finfish during the operation of aquaculture facilities on the foreshore in Ireland.

Table 3.7.7: Regulatory limits for dangerous substances in aquaculture (DAFM 2008)

The following standards shall apply 24 hours post treatment at 100m from site	
Cybermethrin (Excis)	0.5 ng/l
Teflubenzuron	30 ng/l
Emamectin benzoate (Slice)	0.22 ng/l
Alphamax	2 ng/l
Azamethipos	150 ng/l

These levels are below the documented toxicity level for marine vertebrates and invertebrates and modelling results at standard dosing rates have shown that any treatments proposed will comply with these regulations (BIM 2012).

Treatments will only be carried out when monitoring under the National Integrated Pest Control Strategy has shown them to be necessary. Treatments are further supervised by a veterinary advisor.

3.7.8 DAFM NATIONAL RESIDUE CONTROL PLAN

The National Residue Control Plan, which was approved by the European Commission, is an important component of DAFM's food safety controls and is implemented under a service contract with the Food Safety Authority of Ireland (FSAI). Since 1999 the Marine Institute has implemented

the National Residues Monitoring Programme for aquaculture. This is carried out on behalf of the Sea Fisheries Protection Authority (SFPA), which is the responsible organisation for residue controls on farmed finfish.

In 2012 as monitored by the Marine Institute in accordance with the NRCP in excess of 759 tests for 1,596 substance determinations were carried out on 169 samples of farmed finfish for a range of residues, including banned and unauthorised substances, various authorised veterinary treatments, and environmental contaminants (see Table 3.7.8). No non-compliant results were reported from the national monitoring programme for farmed finfish in 2012 for the seventh year running.

Table 3.7.8: Substances for which farmed finfish are tested in Ireland

Group A	**(Prohibited Substances) Substances having anabolic effect and unauthorised substances**
A3	Steroids
A6	Compounds included in Annex IV to Council Regulation (EEC) No. 2377/90 of 26 June 1990 (i.e. for which no maximum residue level could be set
Group B	**Veterinary Drugs and Contaminants**
Group B 1	**Anribacterial Substances, including sulphonamides, quinolones**
Group B 2	**Other veterinary drugs**
B2a	Anthelmintics
B2b	Anticoccidials
B2c	Carbamates and pyrethroids
B2f	Other pharmacologically active substances
Group B 3	**Other substances and environmental contaminants**
B3a	Organochlorine compounds
B3c	Chemical elements
B3d	Mycotoxins
B3e	Others

3.7.9 DAFM GUIDELINES FOR LANDSCAPE AND VISUAL IMPACT ASSESSMENT OF MARINE AQUACULTURE

Published in 2001 these Guidelines are aimed at marine and foreshore installations related to licensed aquaculture activities with certain attention also given to associated onshore development, e.g. access tracks, feed store and new services, the latter being subject to separate controls by local authorities under the Planning Acts. Their specific objective is to *'offer advice on how to assess and deal with the landscape and visual impacts of marine aquaculture developments… They aim to ensure that all those involved in aquaculture developments are well informed on landscape and visual amenity issues, and have a clear framework for making positive decisions about the siting, design and management of aquaculture facilities.'* (DAFM 2001)

The document contains good practice guidelines in relation to siting, layout, design and site management of both new and existing operations that are intended to help integrate aquaculture into

the landscape and minimise visual intrusion stating that *'Aquaculture developments should respect the character and diversity of their landscape setting and help sustain the qualities which lend a distinctive sense of place to Ireland's coastal landscapes.'* It contains both generic guidelines covering all types of aquaculture installations and specific guidelines for salmon, shellfish longlines, shellfish rafts and oyster operations.

3.7.10 FISH HEALTH MANAGEMENT PLANS

In order to provide Ireland with a national strategic plan for the management of finfish health the project *AQUAPLAN: Health Management for Finfish Aquaculture* was developed in 2008 led by the Marine Institute together with Vet-Aqua International, Global Trust Certification Ltd and the Irish Salmon Growers Association. In 2000, the Marine Institute set up and chaired the *Irish Fish Health Advisory Group* and worked together with the Irish Salmon Growers Association in the development of the *Fish Health Code of Practice for Salmonid Aquaculture in Ireland* which is accompanied by *The Farmed Salmonid Health Handbook* containing technical annexes and information. The development and implementation of these documents is central to the strategic health management plan and the sustainable development of the Irish finfish aquaculture industry. For further information please see http://www.marine.ie/home/services/operational/fishhealth/AquaPlan.htm.

3.7.11 WFD MONITORING

Monitoring according to the Water Framework Directive Monitoring Programme by the EPA covers rivers, lakes, groundwater plus transitional and coastal waters. The EPA regularly publishes the results of the monitoring programme following its inception in December 2006, with reporting sheets on the monitoring programme design sent to Brussels by 22 March 2007. A review of the monitoring programme is currently ongoing. Under the WFD two primary monitoring programmes are established: the Surveillance Monitoring (SM) and the Operational Monitoring (OM) networks for surface waters and groundwater. The four water categories: river, lakes, groundwater, transitional and coastal waters come under the EU Water Framework Directive (WFD), Directive 2000/60/EC.

The objective of the WFD is to prevent any further deterioration in status of surface waters, groundwater and water dependent ecosystems and to restore polluted water bodies to at least "good status" by 2015.

Under the EPA's WFD Phytoplankton Monitoring Programme for estuarine and coastal waters, transitional water bodies are sampled once a month in summer over a 3 month period, while coastal water bodies are sampled on a monthly basis throughout the year. This programme is co-ordinated by the EPA. It began in 1990 for nutrients, but was expanded in 2007 to accommodate additional data for WFD reporting and presently constitutes a total of approximately 251 coastal sampling stations within eight river basin districts. The parameters measured, along with the spatial coverage and frequency, vary and depend on the type of monitoring programme undertaken, i.e. surveillance, operational (compliance) or investigative (establishment of the cause of an effect).

Field measurements include water depth, temperature, salinity, dissolved oxygen, secchi transparency and fluorescence (beginning 2002). Samples are analysed for pH, ammonia (NH3), total oxidised nitrogen (NO2 + NO3), Molybdate Reactive Phosphate (~PO4), dissolved inorganic silicate (SiO2), biochemical oxygen demand (BOD) and chlorophyll. The collection of samples for phytoplankton was initiated in 2002. Results are used in the EPA reports "Water Status in Ireland" which are delivered every 3 years, the "State of the Environment" reports, issued every four years and Environment in Focus (Key Environmental Indicators for Ireland) reports, issued every four years. (EPA 2014)

Further information on Ireland's WFD monitoring programme is available at:

http://www.epa.ie/pubs/reports/water/other/wfd/EPA_water_WFD_monitoring_programme_main_report.pdf

3.7.12 MSFD MONITORING

Under the Marine Strategy Framework Directive EU Member States are required to produce a marine strategy, implement monitoring programmes for ongoing assessment and develop and implement Programmes of Measures to achieve or maintain Good Environmental Status in the marine environment by 2020. The DECLG is charged with the implementation of this Directive and has set up a MSFD Technical Working Group which published the Art 11 MSFD Monitoring Public Consultation document. Deadline for submissions and comments was September 2014. As the MSFD monitoring will be based on work carried out for various related programmes that overlap but address different objectives, it is proposed to review monitoring with a view to establishing coherent and efficient national monitoring programmes to fulfil MSFD requirements as well as WFD and OSPAR. This would align with the next WFD operational cycle for transitional and coastal waters due to commence in 2016. The review will take into account the outcome of WFD monitoring during the 2009-2015 cycle, the requirements of new priority substance legislation (Directive 2013/39), any developments within OSPAR and any outputs from the Expert Group on MSFD Descriptor 8 Contaminants and Descriptor 9 Contaminants in Seafood. The full draft report for public consultation can be found under this link:

http://www.environ.ie/en/Environment/Water/WaterQuality/Marine/PublicConsultations/

3.8 REVIEW OF CURRENT PROJECTS AND INITIATIVES ADOPTED BY THE AQUACULTURE SECTOR IN IRELAND

The aquaculture sector in Ireland is already highly regulated. Through the support of DAFM and its agencies, and in response to market demands, even higher standards than those required by law are frequently adopted by fish farmers to improve product quality, safety and environmental performance.

The following short summaries give a snapshot of the current projects and initiatives in the aquaculture industry in Ireland that contribute to both the knowledge base for ongoing development of the sector as well as to improved environmental performance of operations. This section does not describe in detail projects that relate directly to the four priority areas of the draft NSPA as these are discussed in the draft NSPA.

3.8.1 CLAMS (CO-ORDINATED AQUACULTURE MANAGEMENT SYSTEMS)

The unique Co-ordinated Local Aquaculture Management Systems (CLAMS) process is a nationwide initiative to manage the development of aquaculture in bays and inshore waters throughout Ireland at a local level. In each case, the plan fully integrates aquaculture interests with relevant national policies, as well as:

1) Single Bay Management (S.B.M.) practices, which were initially introduced by salmon farmers to co-operatively tackle a range of issues and have now been extended to all aquaculture species,

2) Interests of other groups using the bays and inshore waters,
3) Integrated Coastal Zone Management (I.C.Z.M.) plans, and
4) County Development plans.

The process has been widely adopted in bays and inshore waters where fish farming is practiced around the Irish coast as a further proactive step by fish and shellfish farmers, to encourage public consultation on their current operations and their future plans. The logical management approach is a locally based and all-embracing system designed to maximise production and environmental management through the integration of production goals with minimal conflict with other resource users. Ireland is leading the way in the development of such a unique and progressive approach to bay/inshore waters management. Because CLAMS is designed to treat each bay/region as a separate entity, the process involves an individual plan being drawn up for each area. This management plan lays out clearly what fish and shellfish farmers are currently doing in the bay, how they operate and what their future plans are. The plan involves an in depth consultation process with many interested parties in the relevant area. On a practical level BIM assists with funding and organisation of beach clean ups and the recycling of aquaculture equipment, e.g. metal trestles from oyster cultivation and plastic barrels.

Since the CLAMS initiative provides a locally based management approach at bay/inshore water level for aquaculture development that integrates with single bay management, Integrated Coastal Zone Management (I.C.Z.M.), County Council Development Plans, and interest of other user groups, the development of each plan involves a long consultation process with many interested parties in the relevant area and includes

- A detailed description of the bay/area in terms of physical characteristics, history, aquaculture operations, future potential, problems etc.
- The integration of a series of codes of practice for current aquaculture operations and translation of those national codes to the specific circumstances of each bay or coastal region.
- The expansion of the concept of S.B.M. to species other than salmon.
- The formation of a development plan for aquaculture in the bay.
- The compilation of information on other activities in the bay.
- The establishment of a local and national communication network with ‘bottom up’ and ‘top down’ dialogue capacity.

Each plan also contains a management and development plan specific to the local area covering specific issues as identified during the consultation process. These may include provisions regarding wildlife & ecology, environmental management, archaeological preservation, visual impact, management of sites, navigation and many more.

CLAMS groups have been set up and are active in the following areas:

Killmacalogue	Killary Harbour
Roaringwater Bay	Clew Bay
Ardgroom	North Shannon
Dungarvan	South Shannon
Bannow Bay	Kilkeran Bay
Castlemaine Harbour	Donegal Bay
Trawbreaga Bay	Mulroy Bay
Lough Swilly	Carlingford Lough

Within these groups the Regional Officers co-ordinate and manage projects, including:

- Navigation Plans;
- Deployment of navigation markers;
- Beach and pier clean-ups;
- Schools Projects;
- Re-alignment and rationalisation of mussel lines;
- Oyster trestle recycling;
- Improvement of mussel training areas.

http://www.bim.ie/clams/

3.8.2 ECOPACT (ENVIRONMENTAL CODE OF PRACTICE FOR IRISH AQUACULTURE COMPANIES AND TRADERS)

ECOPACT has been developed to help Irish fish farmers to set up and operate an Environmental Management System for their farms. Supported by BIM and tailored specifically to aquaculture primary producers, it is free to set up but contains all the elements of the internationally accredited ISO14001 standard, such as an Environmental Policy, involvement by top management and setting of targets to enable continual improvement. It is therefore effective in improving environmental performance at farm level but is also a useful stepping stone to a higher level of independent certification be it ISO14001, Organic Certification, one of BIM's independently accredited standards or other seafood standards which are increasingly being demanded by retailers and consumers.

Integrating ECOPACT implementation into the business involves a number of specific steps, starting with the drawing up and agreeing of an implementation time table, the development of an environmental policy and its adoption by management. This is followed by a detailed assessment of the company's current practices and their environmental impacts and the setting of baselines for impacts using ECOPACT environmental aspects which include:

- ✓ Management & Organisation
- ✓ Cleaning agents, fuels and lubricants
- ✓ Environmental Monitoring
- ✓ Equipment Operation and Maintenance
- ✓ Nature Conservation
- ✓ Navigation and Light
- ✓ Noise
- ✓ Odour
- ✓ Oil Spills
- ✓ Site Management
- ✓ Stock Health Management
- ✓ Underwater Archaeology
- ✓ Use of Public Access Piers
- ✓ Visual Impact

Once all practices have been assessed and a baseline set, companies have to set measurable targets to achieve recommended actions using key objectives, as well as develop and agree a strategy for meeting targets. A member of staff has to be designated for self-assessing the company

against the commitments of the environmental policy. Further agreements include progress monitoring, audit intervals and record keeping.

ECOPACT is a flexible and constantly developing system that changes according to developing issues and amendments in the legislative context. The key aspects that have become even more important since its inception in 2004 are Environmental Monitoring and Nature Conservation. All ECOPACT systems established since 2014 therefore include specific information on designations in the area, especially SAC and/or SPA, and operators have to provide information on designations, conservation objectives and species information as part of their ECOPACT manual. Further to this, BIM in conjunction with the National Biodiversity Data Centre are currently developing a site specific risk assessment for invasive alien species to identify species, vectors and pathways. This assessment is a key objective for all primary producers who have implemented ECOPACT and will be carried out as soon as a method is available.

An important part of the process is a staff education and awareness day where the targets and the implementation strategy are explained. In addition, aspects relating to nature conservation, especially designations, conservation objectives and species information, are presented so that all staff gain a basic knowledge regarding the environment they work it. An overview of invasive alien species including possible management options is also presented on the day.

ECOPACT is an effective environmental management approach suited to even the smallest primary aquaculture producer operations. Its implementation is linked closely with Bord Bia's Origin Green initiative, which is applied across all food producing sectors, thereby ensuring that targets and actions are specific and relevant to primary aquaculture production. Certification to ECOPACT effectively and efficiently underpins the Origin Green sustainability certification.

http://www.bim.ie/ecopact/

3.8.3 ORIGIN GREEN

The seafood industry in Ireland has embraced the Origin Green sustainability initiative led by Bord Bia with the first processing company certified in December 2012. In 2015 the first primary aquaculture producers have received their certification under this scheme with interest and involvement spreading across all sectors.

Origin Green is a Bord Bia (the Irish Food Board) programme designed to market Ireland internationally as a sustainable source of food and drink products. It is the only sustainability programme in the world that operates on a national scale, uniting government, the private sector and food producers through Bord Bia.

Independently verified, it enables Ireland's farmers and producers to set and achieve measurable sustainability targets – reducing environmental impact, serving local communities more effectively and protecting the extraordinarily rich natural resources that our country enjoys.

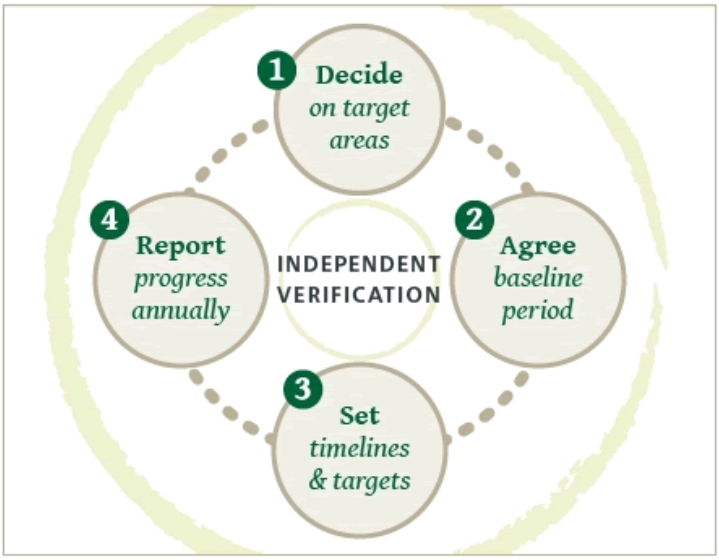


Figure 3.8.3: Origin Green plan development

At the heart of the Origin Green programme is the Origin Green charter, a guideline document to the workings of the Origin Green programme. Once a producer has signed up to the Origin Green Charter, clear objectives are agreed across three key areas: Raw Material Sourcing, Manufacturing Processes and Social Sustainability. A comprehensive and challenging five-year plan is agreed committing to sustainability improvements that are relevant to the individual business. These plans are independently verified by a third party agency and monitored on an annual basis.

Raw Material Sourcing	Manufacturing Process	Social Sustainability
Supplier Certification	Energy	Health & Nutrition
Sustainability Initiatives	Emissions	Community Initiatives
	Waste	Employee Wellbeing
	Water	
	Biodiversity	

Figure 3.8.3a: Origin Green target areas

3.8.4 MARINE STEWARDSHIP COUNCIL

The Marine Stewardship Council (MSC) is an international non-profit organisation set up to help transform the seafood market to a sustainable basis. The MSC runs the only certification and ecolabelling programme for wild-capture fisheries consistent with the ISEAL Code of Good Practice for Setting Social and Environmental Standards and the United Nations Food and Agricultural Organisation Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries.

In July 2013 the Bottom Grown Mussel Sector in IRL received MSC certification. The certification covers all sections of the culture activity including seed fishing and ongrowing;

A certified fishery is defined as one that is conducted in such a way that:

- it can be continued indefinitely at a reasonable level;
- it maintains and seeks to maximise, ecological health and abundance,
- it maintains the diversity, structure and function of the ecosystem on which it depends as well as the quality of its habitat, minimising the adverse effects that it causes;
- it is managed and operated in a responsible manner, in conformity with local, national and international laws and regulations;
- it maintains present and future economic and social options and benefits;
- it is conducted in a socially and economically fair and responsible manner.

The MSC standard has 3 overarching principles that every fishery must prove that it meets:

Principle 1: Sustainable fish stocks
The fishing activity must be at a level which is sustainable for the fish population. Any certified fishery must operate so that fishing can continue indefinitely and is not overexploiting the resources.

Principle 2: Minimising environmental impact
Fishing operations should be managed to maintain the structure, productivity, function and diversity of the ecosystem on which the fishery depends.

Principle 3: Effective management
The fishery must meet all local, national and international laws and must have a management system in place to respond to changing circumstances and maintain sustainability.

http://www.msc.org/

3.8.5 AQUACULTURE STEWARDSHIP COUNCIL

The Aquaculture Stewardship Council (ASC) is an independent not for profit organisation with global influence that was founded in 2010 by the World Wide Fund for Nature (WWF) and The Sustainable Trade Initiative (IDH Netherlands). In its aim to be the world's leading certification and labelling programme for responsibly farmed seafood, the ASC's primary role is to manage the global standards for responsible aquaculture, which it does by working with aquaculture producers, seafood processors, retail and foodservice companies, scientists, conservation groups and consumers to:

- *Recognise and reward responsible aquaculture through the ASC aquaculture certification programme and seafood label.*
- *Promote best environmental and social choice when buying seafood.*
- *Contribute to transforming seafood markets towards sustainability.*

This ambitious programme is run by ASC and its partners aiming at transforming the world's seafood markets and promoting best environmental and social aquaculture performance through minimisation of the environmental and social footprint of commercial aquaculture.

"To achieve this, the ASC programme is:

***Credible**: ASC standards are developed and implemented according to ISEAL guidelines - multi-stakeholder, transparent, incorporating science-based performance metrics.*

***Meaningful**: Including science-based performance metrics, the requirements in the standards are realistic, measurable and auditable.*

***Effective**: A globally recognised, market-oriented programme that aims to promote meaningful improvements in aquaculture production in a credible and cost efficient way that adds real value to producers and buyers of certified products."* (ASC 2015)

In spring 2015 the first salmon farm in Ireland at Deenish Island in Ballinskelligs Bay, Co. Kerry was awarded this internationally recognised certificate.

http://www.asc-aqua.org/

3.8.6 FOOD SAFETY MANAGEMENT SYSTEM

A Food Safety Management System is the system of controls used by a food business to ensure that the food it produces is safe to eat, when prepared and/or eaten according to its intended use. Food Hygiene Legislation places the responsibility of producing Safe Food on Food Business Operators (FBOs). Food Safety and Hygiene practices are an essential component of any food business in order to protect consumers' health. Under General Food Law (Regulation (EC) No. 178/2002), all food business operators have a legal obligation to produce Safe Food. In addition, Regulation (EC) No. 852/2004 on the hygiene of foodstuffs requires manufacturers and processors to adopt hygiene measures and to put in place, implement and maintain a permanent procedure or set of procedures based on HACCP principles. Regulation (EC) No. 853/2004 lays down additional hygiene rules.

To operate legally a business must:

- Comply with the relevant food law
- Be registered or approved by the Competent Authority
- Have a set of controls in place to ensure Safe Food – formally known as a Food Safety Management System
- Have an effective traceability system in place, which will allow for the withdrawal or recall of food from the market if a Food Safety issue arises
- Ensure that everyone handling food in the business has received adequate Food Safety Training

BIM has developed a Food Safety Management System manual to assist fishery product establishments implement an Integrated Food Safety Management System incorporating HACCP that meets the requirements of the Competent Authority in order to achieve or maintain compliance with the Food Safety Legislation.

BIM also delivers a variety of training courses and workshops to assist and train in the implementation and maintenance of Integrated Food Safety Management Systems.

http://www.bim.ie/trade/

3.8.7 QUALITY SEAFOOD PROGRAMME

Quality-labelled products are highly sought after by seafood retailers, food service buyers and consumers. BIM in conjunction with industry stakeholders developed the Irish Quality Seafood Programme. The programme consists of a suite of quality assurance schemes, for both aquaculture and wild caught fish which, by ensuring that the highest quality product is made available, promotes and authenticates the reputation and quality of Irish aquaculture and fishery products. BIM's independently accredited EN45011/ISO-65 quality assurance schemes for mussels, oysters, salmon, trout, arctic char, turbot and perch support the production of world class farmed seafood, enhancing consumer confidence through traceability to best

http://www.bim.ie/our-services/grow-your-business/farmedfishqualitylabelling/qualityassurancelabellingschemes/

3.8.8 ORGANIC AQUACULTURE

Organic aquaculture began with the certification of a salmon farm off Clare Island over 25 years ago. Since then organic aquaculture has developed to be the mainstay of the Irish salmon industry. In 2013 over 80% of farmed salmon was produced in accordance with organic standards. In the last few years the market for organic shellfish has developed and there are now a number of rope and bottom grown mussel farms producing organically. The expansion of organic farming has been a positive development for the industry as it focuses on production of a high quality, environmentally sustainable product and fosters a respect for nature. Organic certification is carried out in accordance to strict standards, e.g. Naturland, Organic Trust or IOFGA, which all must meet the requirements of the EU organic regulations.

BIMs Irish Quality Organic standard is a further development of the existing Quality Standard, and assists the industry to differentiate their product in the market place as organic labelled through BIMs independently accredited EN45011/ISO-65 quality assurance schemes. It is available for both salmon and rope grown mussel aquaculture.

Ireland is a leader in organic salmon, accounting for 83% of total annual salmon production. Specific requirements for organic salmon production include;

- Diet containing organic and natural ingredients free from GMOs.
- Protection of fish welfare and promotion of fish health with low stocking densities of less than 10kg/m^3.
- The use of feed from sustainable sources.
- The use of natural over synthetic products and processes.
- A respect of nature, the environment and a commitment to recycling, reuse and recovery.
- Maintenance of a healthy and sustainable aquatic ecosystem.

As mussels access their feed naturally from the marine environment, the organic requirements are centred on environmental friendly management practises:

- Sustainable management plan following the principles of organic production.
- Appropriate waste management planning.
- Responsible sourcing of seed from sustainable stock.
- Respect for nature and biodiversity.
- Removal of bio-fouling only by hand or physical means.

http://www.bim.ie/our-services/grow-your-business/farmedfishqualitylabelling/organicassurancelabellingschemes/

3.8.9 BIM ECO-STANDARD

BIM together with a Technical Advisory Committee and Certification Body (SAI Global) developed and supports the implementation of a range of Eco-Standards accredited to EN45011/ISO65 for the aquaculture sector. The BIM Eco-standard exist as an annex to the existing accredited Quality Standards and aim to assist members of the Irish Quality Mussel (IQM) and Irish Quality Salmon (IQS) schemes to demonstrate and prove their commitment to environmental sustainable development and conservation through independent audit. Certification is awarded to aquaculture producers and processors achieving the highest levels of quality and environmental performance over and above what is required by legislation. The independent international accreditation is globally recognised.

The Standard requires that farms are managed in an environmentally sensitive and sustainable manner. Farmers must keep waste to an absolute minimum and dispose of it responsibly and use re-cycling schemes and use re-cycled materials where available. Only biodegradable lubricants can be used on boats and equipment. All sites and shared facilities such as piers and slipways must be kept clean, neat and tidy. Ultimately, the Standard aims to ensure that Eco-labelled Irish seafood continues to be produced from a pristine quality environment in a sustainable and responsible manner.

http://www.bim.ie/our-services/grow-your-business/farmedfishqualitylabelling/ecoassurancelabellingschemes/

3.8.10 ISGA CODE OF PRACTICE FOR THE PREVENTION OF STOCK ESCAPES OF IRISH FARMED SALMONIDS

This Code of Practice from the Irish Salmon Growers' Association shows their commitment to best environmental and husbandry practice in accordance with the principles of sound, sustainable development. It specifically addresses:

- Site selection and location
- Pen structures and tank systems
- Pen nets
- Preventative measures

The above section clearly shows the regulations and voluntary measures in place for the aquaculture industry in Ireland that help prevent, minimise or mitigate any potential interactions between aquaculture activities and the environment. From the outset, any application for a proposed aquaculture activity has to pass through a rigorous application procedures which in itself and in conjunction with associated requirements at project level prevents any significant effect on the environment. The specific measures included in the licence application process, e.g. AA, EIA, consultation with statutory consultees, public consultation etc., allow changes to be made to any licence application and site development plan prior to the activity being carried out, incl. location operational limits, site specific mitigation etc. In addition to following voluntary guidelines for the production of quality seafood, the Irish aquaculture industry has embraced environmental initiatives a

long time ago, starting with the mussel float replacement scheme in 2000. This was followed in 2003 with the publication of ECOPACT, the first aquaculture specific environmental management system based on EN 45011. Following from that BIM developed further independently certified standards, incl. the ECO-Standard and the Organic Standard. All of these standards are aimed at improving not only the quality of seafood produced in Ireland, but also at the continued environmental sustainability of the industry. High quality seafood can only be produced in a high quality environment so it is in the industry's own interest to protect and conserve Ireland's marine and freshwater environments.

3.8.11 S.U.M.S. (SPECIAL UNIFIED MARKING SCHEMES)

These are group marking schemes for aquaculture sites that are used in bays or inshore areas where there is more than one aquaculture operation, i.e. the establishment of a S.U.M. will only be considered where there are clusters of sites and where the S.U.M. approach makes more navigational sense than having each site individually lit. All S.U.M.S. must be planned and deployed with the full approval and prior knowledge of the CIL Commissioner of Irish Lights (CIL) and the Marine Survey Office (MSO). As all aquaculture marine sites are required to have their sites marked these schemes facilitate the producers in that a reduced number of markers are required per area which in turn reduce the cost of maintenance. Fewer markers have a reduced visual impact and are less confusing to other marine users in the marked area and assist with navigation.

http://www.bim.ie/sums/

3.8.12 BARREL REPLACEMENT SCHEME

The barrel replacement scheme is an initiative to encourage mussel longline farmers to replace non-standard bright blue barrels, with visually neutral grey barrels. These customised weather resistant (UV treated) battleship grey floats are environmentally compliant in visual terms and easier to manoeuvre from a site management perspective. The ergonomic floats are designed specifically for mussel longline farming and are made from HDPE (high density polyethylene) which is ultimately recyclable in the future. The grey barrels are specifically developed for longline farming and are intended to blend with the marine environment and reduce visual impact. The lifespan of these floats is also extendable through repair which is not possible with the blue barrels that have been traditionally used. The initiative also promotes the removal and recycling of redundant barrels, thus further reducing environmental impact.

3.8.13 MARINE INVASIVE SPECIES: DIDEMNUM VEXILLUM AND MARINE PATHWAYS PROJECT

BIM is a partner in a UK/Ireland project called Marine Pathways examining the management of a range of marine non-native species. The BIM project work focuses on the control of *Didemnum vexillum* in Irish aquaculture and is being carried out in partnership with University College Dublin. *Didemnum vexillum* is a colonial sea-squirt (tunicate) native to Japan, which over the past decade has spread rapidly outside of its native range. Once established this species can grow rapidly, extensively coating living and non-living underwater surfaces with the potential to alter marine ecosystems and in the case of aquaculture, smother and kill stocks. It was first documented in Ireland in June 2005 where it was discovered fouling immersed man-made structures within Malahide marina and since then it has been found in Carlingford Marina, then Clew Bay, Galway Bay and most recently in

Strangford Lough. The project actions include research, raising awareness within the aquaculture sector, and control experiments which aim to develop environmentally sustainable, cost effective and time efficient methods for managing *Didemnum vexillum* in aquaculture that protects stock and reduces the potential future spread of *Didemnum vexillum* in the natural environment. BIM is also part of the Celtic Seas Non-Indigenous Species Task Group and supporting its work towards achieving Good Environmental Status in Europe's seas.[8]

http://www.nonnativespecies.org/index.cfm?sectionid=105

3.8.14 NEW ZEALAND SYSTEM

BIM first assisted in the transfer and modification of rope mussel technology from New Zealand in the late 1990s. The aim was to develop more environmentally sustainable practices as well as cutting down on labour costs. Reusable seed collector ropes and grow ropes are deployed as continuous droppers allowing mechanisation of husbandry and harvesting. The outcome has been a reduction in waste from industry, a rate of uptake such that over 60% of Irish rope mussel production is now harvested from New Zealand rope and further innovation and adaptation by industry through the trial and introduction of an automatic harvesting system and the establishment of a cotton manufacturing business to supply indigenous producers as well as for export.

http://www.bim.ie/our-work/projects/innovative-mussel-farming-technology%20-%20new-zealand/

3.8.15 OYSTER HATCHERY

BIM has been working with the industry and the Marine Institute to secure a supply of disease free triploid oysters of Irish origin. The programme has primarily focused on producing a supply of tetraploid oysters, using patented technology, which may then be crossed with diploid broodstock to produce triploids. The successful application of this technology will be central to any future broodstock selection programme for the Irish oyster sector. In tandem with this work BIM has identified a need for increased nursery capacity within Ireland to bring seed from a 3mm size to 8-10mm. Trials have been run using both land and sea based technology and there are plans to expand on the results of this work.

3.8.16 ABALONE AND SEA URCHINS

In Ireland, two species of the molluscan shellfish Abalone are cultured, the non-native European ormer *Haliotis tuberculata* and the Japanese abalone *Haliotis discus hannai*. The culture of both species typically begins in land-based hatcheries where broodstock are spawned and subsequent larvae are settled onto growing medium. The animals can be grown to market size in two different ways, in seabased cages or in tanks in land-based facilities. When grown in land-based facilities the use of water recirculation technology is often employed and temperature is controlled to maximise growth rates. The animals can be fed on seaweed or on artificially prepared diets.

Sea urchin culture in Ireland is based on a single species, *Paracentrotus lividus*. This species is spawned in land based hatcheries and resultant larvae settled onto growing medium where they feed on microalgae. Water flow requirements at this stage are small but recirculation technology is still

[8] http://celticseaspartnership.eu/

employed in some instances. Ongrowing takes place at sea, although small cohorts of animals have been grown to market size in land based facilities. In these pump-ashore facilities, recirculation technology is employed. At sea, animals are typically ranched in rock pools that once would have been populated by sea urchins but which are now under aquaculture licence.

3.8.17 MUSSEL SEED WORK

Seed mussel surveys have taken place around the coast since the early 1970s. For the past seven years, the surveys have been carried out using the BIM coastal survey boat MV T.Burke, covering an area going from Dunany Point (south of Dundalk Bay) to Dingle Bay including the east coast of County Wexford and the Wicklow coast. The number of survey days per year varies from 40 to 70 days and is highly dependent on weather conditions. Every survey is followed by a report available to the industry; these reports give detailed accounts of settlement locations, tonnage estimation, seed quality (size, waste, etc.) as well as recommendations concerning the fishing. This task is essential for the management of the seed mussel fishery. In the past, the surveys were carried out with an on-board seabed classification system covering only a small surface on the seabed and giving a very rough estimation of the type of substrate, resulting in more ground truthing using dredges and smaller surveyed area. In 2010, this equipment was partially replaced by side scan sonar allowing far greater survey range (up to 150 meters each side of the boat) and much greater definition of the feature on the seabed. This resulted in a more targeted and less intrusive way to survey; indeed the analysis of the acoustic imagery from the sonar on GIS contribute to better estimation of the settlement borders resulting in less survey dredging. Finally, the combinations of side scan sonar, GIS and extensive grab sampling on the seed mussel beds increased the accuracy in tonnage estimation. Since 2009, a large amount of data has been collected including thousands of hectares of side scan sonar imagery, over 1300 dredge tows detailing position, water depth, content, tide, sea conditions, etc., hundreds of grabs and hours of underwater footage, all of which contribute to the sustainable management of the fishery.

http://www.bim.ie/our-publications/aquaculture/

3.8.18 PERCH CULTURE

BIM has been assisting in the development of rural freshwater farming since its inception. In the 1990s preliminary work was carried out to assess the suitability of marginalised land for perch farming. Following the establishment of a number of enterprises in the early 2000s, perch farming in Ireland has developed into a modern high tech sector. Ireland is at the forefront in perch culture with advanced multi season spawning and genetic development. Irish perch are sold into niche markets in Switzerland and are highly sought after. BIM is currently involved in a number of projects to develop the sector further. A genetic broodstock programme has commenced in partnership with Integrated Aquatic Resource Management between Ireland, Northern Ireland and Scotland (IBIS) and Queen's University Belfast. The process involves the mapping and streamlining of existing broodstock and parental stocks from around Europe. Such work will deliver improved genetic traits such as disease resistance and faster growth rates. In tandem with this work BIM is involved in an ambitious new project to develop Split Pond Culture in Ireland. The project has the potential to open up large areas of marginalised land to freshwater pond culture. The first step in the process is a trial farm based in Co. Sligo.

3.8.19 DEEP SEA PROJECT

BIM in association with the Marine Institute has been tasked by the government under its *Food Harvest 2020* food production strategy to develop licence applications for off shore salmon farms. The process will involve, if successful, BIM, holding the aquaculture licence in trust for the State. BIM will source and select, via an open and transparent tendering process, a suitably qualified and financed private sector entity to develop and operate the fish farm on a commercial basis. BIM submitted an application for the first of these farms, an organic salmon farm located off the west coast of Ireland, in the lee of Inis Oírr, the most southerly of the Aran Islands, in the summer of 2012. The application is currently being assessed by DAFM and if approval is obtained it is envisaged that the proposed final production output will be achieved by an incremental stocking approach over a three year period. BIM has recently begun site investigations for a second organic farm. This will be located between Mayo's Inishturk and Galway's Inishbofin islands. Once site investigations and environmental assessment is complete, a licence application will be submitted to the Department of Agriculture Food and Marine.

http://www.bim.ie/our-work/projects/deep-sea-organic-salmon-farming/

3.8.20 SEAWEED

BIM's recent technical work on seaweed has focused on developing and perfecting culture techniques for brown seaweeds for human consumption, *Alaria esculenta* (Atlantic wakame) and *Saccharina latissima* (Kombu) which are the varieties currently demanded by the sea-site operators. The techniques to manipulate these species in the marine hatchery are now relatively well understood and mastered. BIM is now in a position to produce seeded collector string on demand in large amounts (up to 20kms) in a year and it is possible to stagger production to allow for staged deployments to sea which is helpful from a logistics point of view, and in the event of adverse weather conditions in autumn. Currently there are six licensed aquaculture grow-out sites and of the order of 23 applications for seaweed grow-out sites with the Department of Agriculture, Food and the Marine. The other species of interest are the red varieties *Palmaria palmata* (Dulse) and *Porphyra* (Nori). These species are more technically challenging and progress is slower in the marine hatchery. These species have a more complex lifecycle requiring delicate manipulation. BIM is linking up with other agencies in an effort to side step some of the challenges presenting. The four species Atlantic Wakame, Kombu, Dulse and Nori are of interest because of their importance for human food in Europe. A recent report commissioned by BIM on the EU market for these four species shows a favourable niche market opportunity (Sahota 2014, in preparation).

As can be seen from the above, by continuous technology upgrades, implementation of voluntary management schemes for both environmental and quality aspects, and by further research and development across all aquaculture species and activities, the aquaculture industry in Ireland has already vastly improved its environmental performance since its inception in the 1960s with the various changes becoming self-mitigating in relation to any interactions on Natura 2000.

3.9 IMPACT PREDICTIONS AND MITIGATION MEASURES – HABITATS & SPECIES

Each of the habitats and species screened IN for further assessment is subject to a strategic level assessment. The following section of the NIS provides a table for each of the Habitats and Species screened IN during the Stage 1 Assessment. Using the 2013 Status of EU protected habitats and species in Ireland reports (Article 17 assessments) background information and details of the current conservation status of the species / habitats together with information about whether or not aquaculture is considered a pressure or threat is set out before assessing how that species / habitat may interact with aquaculture. Potential impacts are identified by reference primarily to Figures 3.6a and 3.6b. While useful for a strategic level assessment, it must be acknowledged that actual impacts are dependent on the scale of the operation and the nature of the receiving environment. The habitats and species assessments included are a generic indicator and do not replace the need for site level assessment where the proposed activities are examined in the context of the conservation objectives of the specific site where the activities are to take place. This information has been tabulated in the format illustrated by the master table in Figure 3.9 below.

Habitat/Species name (code)		
Habitat/Species information	Brief description of habitat in Ireland.	
Conservation status and trend in Ireland	Range, area, structure and function. Overall assessment and future prospects extracted from Article 17 report.	
SACs where it is a feature (Name, NPWS Site Code,*SAC contains existing aquaculture)	List of SACs	
Pressures & threats related to aquaculture	Main pressures: H - High Importance M - Medium Importance L - Low Importance extracted from Article 17 report	Main threats: H - High Importance M - Medium Importance L - Low Importance extracted from Article 17 report
Potential interactions with aquaculture (by species and culture method)	Identify aquaculture species and culture methods likely to interact with the habitat.	
Potential significant effects from aquaculture activities	Using Aquaculture and Pressures Tables (3.5a & 3.5b) in NIS report: Sedimentation changes; biogeochemical changes; chemical inputs; infrastructure impacts incl. physical disturbance; noise& visual disturbance; predator control; interbreeding risks; pathogen risks; alien species risks.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts		

Figure 3.9: Master table for generic habitat and species assessments

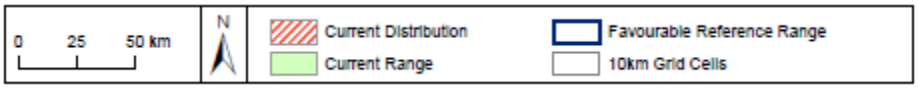


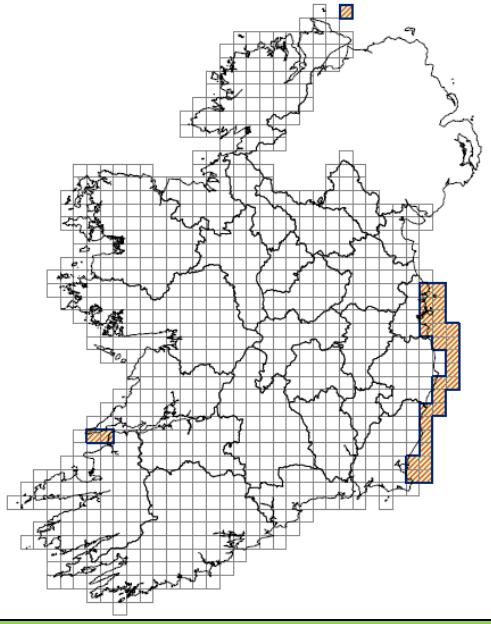
Figure: 3.9a: Key to distribution maps, both NPWS 2013

Overall Conservation Status: FAVOURABLE

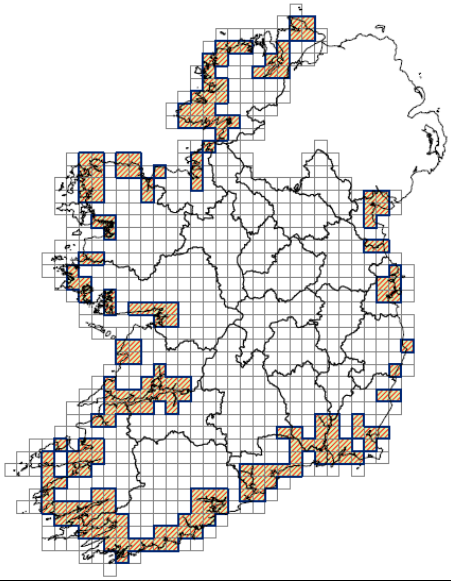
Overall Conservation Status: DECLINING

Overall Conservation Status: BAD

3.9.1 SANDBANKS WHICH ARE SLIGHTLY COVERED BY SEAWATER ALL OF THE TIME

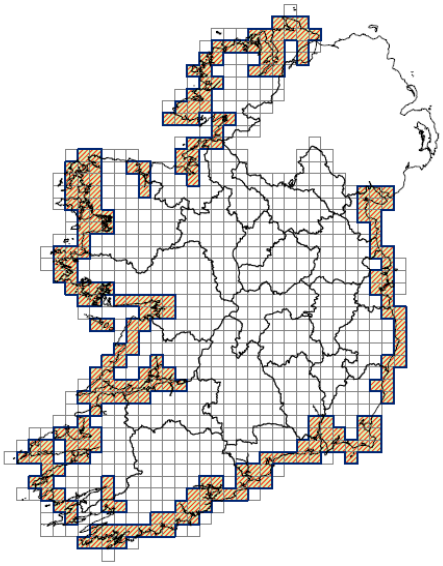
Habitat name (code)	**Sandbanks which are slightly covered by seawater all of the time (1110)**	
Habitat information 	Form distinct banks comprising sediments from gravel to fine sands but predominantly composed of sand. Occur at depths down to 20m with biological communities determined by the sediment type. The range of species tend to be ones adapted to mobile substrates and there is some indication that mobile predators such as bird and marine mammals aggregate around sandbanks. This habitat is more frequently encompassed as part of the Large Shallow Inlet and Bays habitat.	
Conservation status and trend in Ireland	Favourable in range, area, structure & function and future prospects giving an overall Conservation Status of Favourable.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	002161	Long Bank
	002165	Lower River Shannon*
Pressures & threats related to aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to Sandbanks	No pressure	No threat
Fishing and harvesting aquatic resources	M	M
Potential interactions with aquaculture (by species and culture method)	Potential spatial overlap with bottom cultured shellfish species, most likely only seed mussel fishing.	
Potential significant effects from aquaculture activities	Sedimentation changes; biogeochemical changes; infrastructure impacts incl. physical disturbance; predator control impacts; alien species impacts.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Sandbanks are high energy and mobile environments and therefore unlikely to be suited to aquaculture apart from seed mussel fishing should it settle within the environment.	

3.9.2 ESTUARIES

<table>
<tr><th>Habitat name (code)</th><th colspan="3">Estuaries (1130)</th></tr>
<tr><td>Habitat information
  </td><td colspan="3">An estuary is the downstream part of a river valley, subject to the tide and extending from the limit of brackish waters. In Ireland estuaries host a wide variety of biological communities, the most prevalent of these being mud to fine sand communities. The biological communities tend to be characterised by physical grain size of sediments and constituent species. More details of these are provided in the Conservation Objectives for individual sites. Estuarine habitats form a significant resource for various bird and mammal species for feeding resting and breeding. Noted pressures including reduced water quality (N & P enrichment, accelerated growth of algae and reduced dissolved oxygen concentrations), and fishing / aquaculture activities which could be occurring over a wide area thus compromising structure and function especially where there are highly sensitive biological communities such as Zostera beds.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Favourable in area, range and future prospects. Inadequate but improving in structure & function. Overall inadequate with a future trend towards improvement.</td></tr>
<tr><td rowspan="19">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>000077</td><td colspan="2">Ballymacoda (Clonpriest and Pillmore), Ballyness*</td></tr>
<tr><td>001090</td><td colspan="2">Ballyness Bay*</td></tr>
<tr><td>000019</td><td colspan="2">Ballysadare Bay</td></tr>
<tr><td>000696</td><td colspan="2">Ballyteige Burrow</td></tr>
<tr><td>000697</td><td colspan="2">Bannow Bay</td></tr>
<tr><td>002170</td><td colspan="2">Blackwater River (Cork/Waterford)*</td></tr>
<tr><td>001957</td><td colspan="2">Boyne Coast and Estuary</td></tr>
<tr><td>000343</td><td colspan="2">Castlemaine Harbour*</td></tr>
<tr><td>001230</td><td colspan="2">Courtmacsherry Estuary</td></tr>
<tr><td>000627</td><td colspan="2">Cummeen Strand/Drumcliff Bay (Sligo Bay)</td></tr>
<tr><td>000455</td><td colspan="2">Dundalk Bay*</td></tr>
<tr><td>000458</td><td colspan="2">Killala Bay/Moy Estuary</td></tr>
<tr><td>002287</td><td colspan="2">Lough Swilly*</td></tr>
<tr><td>002165</td><td colspan="2">Lower River Shannon*</td></tr>
<tr><td>002162</td><td colspan="2">River Barrow and River Nore*</td></tr>
<tr><td>000208</td><td colspan="2">Rogerstown Estuary</td></tr>
<tr><td>000781</td><td colspan="2">Slaney River Valley*</td></tr>
<tr><td>002070</td><td colspan="2">Tralee Bay and Magharees Peninsula, West to Cloghane</td></tr>
<tr><td>000197</td><td colspan="2">West of Ardara/Maas Road*</td></tr>
<tr><td>Pressures & threats related to aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Bottom culture</td><td colspan="2">H</td><td>L</td></tr>
<tr><td>Suspended culture</td><td colspan="2">M</td><td>L</td></tr>
<tr><td>Fishing and harvesting of aquatic resources</td><td colspan="2">H</td><td>L</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">All types of aquaculture can take place in estuarine habitats.</td></tr>
</table>

Potential significant effects from aquaculture activities	Sedimentation changes; biogeochemical changes; chemical inputs; infrastructure impacts incl. physical disturbance; noise & visual disturbance; predator control; interbreeding risks; pathogen risks; alien species risks.
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Cumulative effects present the greatest risk of impact on estuarine habitats. Controls, mitigation & management as outlined in Section 3.6 & 3.7. Possibility that aquaculture together with other activities can exceed the spatial threshold of 15% needs to be considered. Special attention should be paid to possible siting in or adjacent to highly sensitive biological communities such as Zostera and Maerl. As estuaries comprise a number of different biological communities and species which range in sensitivity and resilience it is necessary to consult the relevant conservation objectives for the area to assist with site selection in this instance.

3.9.3 MUDFLATS AND SANDFLATS NOT COVERED BY SEAWATER AT LOW TIDE

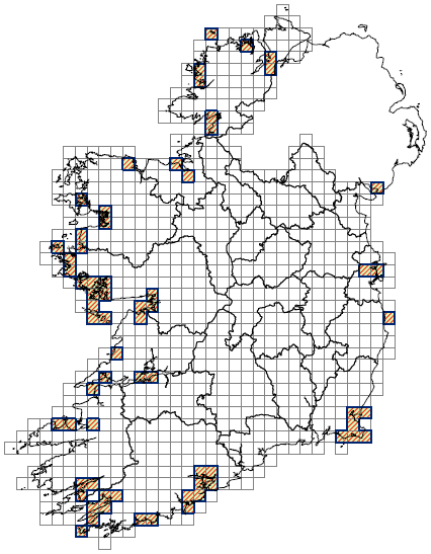
Habitat Name (code)	**Mudflats and sandflats not covered by seawater at low tide (1140)**	
Habitat Information 	Occurring exclusively between the low water and mean high water mark this is a dynamic habitat and is often characterised as a subset of the Large Shallow Inlets and Bays habitats. Characterised by a wide range of distinct biological communities including but not limited to: Estuarine fine sands dominated by polychaetes and oligochaetes community complex; Intertidal muddy sand to sand dominated by polychaetes, bivalves and crustaceans community complex; and subtidal fine sand with polychaetes and bivalves community complex. The habitat forms a significant resource for various bird and mammal species for feeding, breeding and resting.	
Conservation status and trend in Ireland	Favourable in range, area and future prospects. Inadequate but improving in specific structures and functions (incl. species) giving an overall Conservation Status of Inadequate with a potential trend towards improvement in the future.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	002268	Achill Head
	000199	Baldoyle Bay
	000077	Ballymacoda (Clonpriest and Pillmore)*
	000109	Ballyness Bay*
	000622	Ballysadare Bay
	000696	Ballyteige Burrow
	000697	Bannow Bay

	001040	Barley Cove to Ballyrisode Point*
	002170	Blackwater River (Cork/Waterford)*
	001957	Boyne Coast and Estuary
	000472	Broadhaven Bay*
	000625	Bunduff Lough and Machair/Trawalua/Mullaghmore
	002269	Carnsore Point
	000343	Castlemaine Harbour*
	001482	Clew Bay Complex*
	000091	Clonakilty Bay
	001230	Courtmacsherry Estuary
	000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)
	000133	Donegal Bay (Murvagh)*
	000133	Dundalk Bay*
	000268	Galway Bay Complex*
	001058	Great Island Channel*
	002111	Kilkieran Bay and Islands*
	000458	Killala Bay/Moy Estuary
	002165	Lower River Shannon*
	000205	Malahide Estuary
	000470	Mullet/Blacksod Bay Complex
	000206	North Dublin Bay
	002012	North Inishowen Coast*
	000710	Raven Point Nature Reserve*
	002162	River Barrow and River Nore*
	000208	Rogerstown Estuary
	000707	Saltee Islands
	001190	Sheephaven*
	000781	Slaney River Valley*
	000210	South Dublin Bay
	001680	Streedagh Point Dunes
	002070	Tralee Bay and Magharees Peninsula, West to Cloghane
	000671	Tramore Dunes and Backstrand
	000194	Tranarossan and Melmore Lough
	002262	Valencia Harbour/Portmagee Channel*
	000197	West of Ardara/Maas Road*

Pressures & threats related to aquaculture	Main pressures	Main threats
Bottom Culture	H	L
Suspended Culture	M	No threat
Fishing and harvesting aquatic resources	H	L

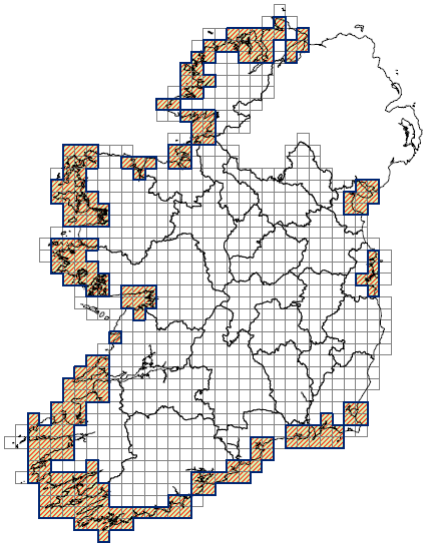
Potential interactions with aquaculture (by species and culture method)	Spatial overlap with intertidal culture of shellfish, mainly oysters. Overlap also with bottom cultured mussels.
Potential significant effects from aquaculture activities	Sedimentation changes; biogeochemical changes; infrastructure impacts incl. physical disturbance; noise& visual disturbance; alien species risks.
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Cumulative effects present the greatest risk of impact on tidal mudflats. Possibility that aquaculture together with other activities can exceed the spatial threshold of 15% needs to be considered. Controls, mitigation & management as outlined in Section 3.6 & 3.7.

3.9.4 COASTAL LAGOONS

<table>
<tr><th>Habitat Name (code)</th><th colspan="3">Coastal lagoons (1150) (priority habitat)</th></tr>
<tr><td>Habitat Information
  </td><td colspan="3">Defined in Ireland on biological communities present rather than morphology with the great majority having Ruppia Sp. present and salinity > 1 psu. There are five morphological types defines in Ireland: 1 Classic "sedimentary" lagoons, 2. Artificial Lagoons, 3. Rock / Peat lagoons found on the west coast, 4. "Karst" lagoons and 5. Saltmarsh lagoons. Eutrophication is the greatest future threat to lagoons.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Favourable in range and area. Bad but stable in structure & function and future prospects giving an overall Conservation Status of Bad but Stable.</td></tr>
<tr><td rowspan="25">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>000696</td><td colspan="2">Ballyteige Burrow</td></tr>
<tr><td>001021</td><td colspan="2">Carrowmore Point to Spanish Point and Islands</td></tr>
<tr><td>001482</td><td colspan="2">Clew Bay Complex*</td></tr>
<tr><td>002034</td><td colspan="2">Connemara Bog Complex*</td></tr>
<tr><td>002187</td><td colspan="2">Drongawn Lough</td></tr>
<tr><td>000138</td><td colspan="2">Durnesh Lough</td></tr>
<tr><td>002189</td><td colspan="2">Farranamanagh Lough</td></tr>
<tr><td>000268</td><td colspan="2">Galway Bay Complex*</td></tr>
<tr><td>001141</td><td colspan="2">Gweedore Bay and Islands*</td></tr>
<tr><td>000278</td><td colspan="2">Inishbofin and Inishshark</td></tr>
<tr><td>001275</td><td colspan="2">Inisheer Island</td></tr>
<tr><td>000213</td><td colspan="2">Inishmore Island*</td></tr>
<tr><td>001061</td><td colspan="2">Kilkeran Lake and Castlefreke Dunes</td></tr>
<tr><td>002111</td><td colspan="2">Kilkieran Bay and Islands*</td></tr>
<tr><td>000704</td><td colspan="2">Lady's Island Lake</td></tr>
<tr><td>001529</td><td colspan="2">Lough Cahasy, Lough Baun and Roonah Lough</td></tr>
<tr><td>002287</td><td colspan="2">Lough Swilly*</td></tr>
<tr><td>002165</td><td colspan="2">Lower River Shannon*</td></tr>
<tr><td>001932</td><td colspan="2">Mweelrea/Sheeffry/Erriff Complex</td></tr>
<tr><td>002283</td><td colspan="2">Rutland Island and Sound*</td></tr>
<tr><td>002074</td><td colspan="2">Slyne Head Peninsula*</td></tr>
<tr><td>000709</td><td colspan="2">Tacumshin Lake</td></tr>
<tr><td>001195</td><td colspan="2">Termon Strand</td></tr>
<tr><td>002259</td><td colspan="2">Tory Island Coast</td></tr>
<tr><td>002070</td><td colspan="2">Tralee Bay and Magharees Peninsula, West to Cloghane</td></tr>
<tr><td>Pressures & threats related to aquaculture</td><td colspan="2">Main Pressures</td><td>Main threats</td></tr>
<tr><td>Marine and freshwater aquaculture</td><td colspan="2">L</td><td>L</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">Potential abstraction of water for landbased recirculation systems.
Potential for other types only aquaculture only if the salinity is suitable.</td></tr>
</table>

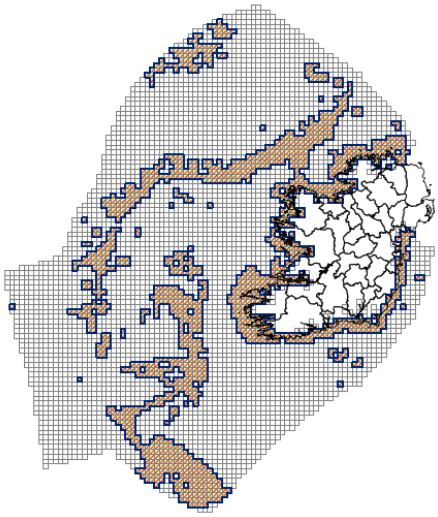
Potential significant effects from aquaculture activities	Loss of water volume through abstraction. Changes in nutrients through subsequent discharge
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Site level assessment is important in this instance. Controls, mitigation & management as outlined in Section 3.6 & 3.7.

3.9.5 LARGE SHALLOW INLETS AND BAYS

Habitat Name (code)	**Large shallow inlets and bays (1160)**	
Habitat Information 	Described as indentations of the coast, where in contrast to estuaries, the influence of freshwater is generally limited. The habitats are generally shallower and more sheltered than open coasts, variously compose of find sediments to bedrock and are typified to a large extent by their constituent sub habitats which are highly product and diverse in terms of both species and communities. Typical sub habitats include sandbanks, sediment and reef communities. A significant proportion of the less frequently encountered species in Ireland are found within large shallow inlets and bays including maerl and eel grass beds. The habitat also forms an important resource for various bird and mammal (Annex II mammals) species for feeding, breeding and resting.	
Conservation status and trend in Ireland	Favourable range, area and future prospects. Unfavourable, inadequate in structure & function, giving an overall conservation status of Inadequate but improving.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	002268	Achill Head
	000472	Broadhaven Bay*
	000625	Bunduff Lough and Machair/Trawalua/Mullaghmore
	001482	Clew Bay Complex*
	000268	Galway Bay Complex*
	000764	Hook Head
	002158	Kenmare River*
	002264	Kilkee Reefs
	002111	Kilkieran Bay and Islands*
	002265	Kingstown Bay*
	000097	Lough Hyne Nature Reserve and Environs
	002165	Lower River Shannon*
	000470	Mullet/Blacksod Bay Complex
	002159	Mulroy Bay*
	000101	Roaringwater Bay and Islands*
	00283	Rutland Island and Sound*
	00707	Saltee Islands
	002074	Slyne Head Peninsula*
	000191	St. John's Point
	002070	Tralee Bay and Magharees Peninsula, West to Cloghane
	002262	Valencia Harbour/Portmagee Channel*

	000197	West of Ardara/Maas Road*
Pressures & threats related to aquaculture	Main pressures	Main threats
Bottom culture	M	L
Suspended culture	M	L
Intensive fish farming, intensification	L	No threat
Fishing and harvesting aquatic resources	H	H
Potential interactions with aquaculture (by species and culture method)	Spatial overlap with all types of aquaculture.	
Potential significant effects from aquaculture activities	Sedimentation changes; biogeochemical changes; chemical inputs; infrastructures impacts incl. physical disturbance; noise& visual disturbance; predator control; interbreeding risks; pathogen risks; alien species risks.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Cumulative effects present the greatest risk of impact on large shallow inlets and bays. Possibility that aquaculture together with other activities can exceed the spatial threshold of 15% therefore needs to be considered. Special attention should be paid to possible siting in or adjacent to highly sensitive biological communities such as Zostera and Maerl which can form part of this habitat. Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

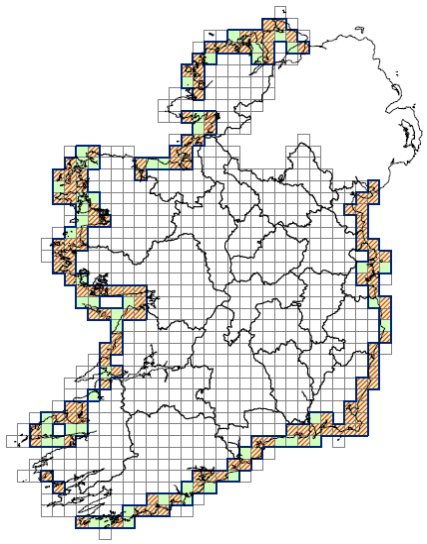
3.9.6 REEFS

Habitat Name (code)	**Reefs (1170)**	
Habitat Information 	Widespread marine features with immobile hard substrate available for colonisation by epifauna. In Irish waters they range from the intertidal to 4500m below and surface and as far as 400km offshore. Intertidal reefs are familiar and widespread habitats characterised by hard rock washed by the tide. Subtidal reefs are most often found in exposed areas with little influence of freshwater. Intertidal and subtidal reefs are often dominated by algal species. Near shore reefs commonly include the invertebrate species of poriferans, cnidarians, polycheates, molluscs, bryzoans and tunicates. The Offshore reefs are hard rock structures occurring intermittently between soft sediment mostly along the shelf margin.	
Conservation status and trend in Ireland	Favourable Range and Area. Unfavourable, bad in structure & function and future prospects giving an overall Conservation Status of Bad and declining.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	002268	Achill Head
	002327	Belgica Mound Province
	000020	Black Head-Poulsallagh Complex

	002172	Blasket Islands
	000472	Broadhaven Bay*
	000625	Bunduff Lough and Machair/Trawalua/Mullaghmore
	002269	Carnsore Point
	002250	Carrowmore Dunes
	001021	Carrowmore Point to Spanish Point and Islands
	002034	Connemara Bog Complex*
	000495	Duvillaun Islands
	000268	Galway Bay Complex*
	001141	Gweedore Bay and Islands*
	000764	Hook Head
	002328	Hovland Mound Province
	001275	Inisheer Island
	000212	Inishmaan Island
	000213	Inishmore Island*
	002158	Kenmare River*
	002263	Kerry Head Shoal
	002264	Kilkee Reefs
	002111	Kilkieran Bay and Islands*
	000704	Lady's Island Lake
	000097	Lough Hyne Nature Reserve and Environs
	002165	Lower River Shannon*
	002261	Magharee Islands
	000470	Mullet/Blacksod Bay Complex
	002159	Mulroy Bay*
	002330	North-West Porcupine Bank
	000181	Rathlin O'Birne Island
	000101	Roaringwater Bay and Islands*
	003000	Rockabill to Dalkey Island
	002283	Rutland Island and Sound*
	000707	Saltee Islands
	000189	Slieve League
	000328	Slyne Head Islands*
	002074	Slyne Head Peninsula*
	002329	South-West Porcupine Bank
	000191	St. John's Point
	002259	Tory Island Coast
	002070	Tralee Bay and Magharees Peninsula, West to Cloghane
	002262	Valencia Harbour/Portmagee Channel*
	002274	Wicklow Reef
Pressures & threats related to aquaculture	Main pressures	Main threats
Bottom culture	M	L
Suspended culture	M	L
Intensive fish farming, intensification	L	L
Fishing and harvesting aquatic resources	H	H
Potential interactions with aquaculture (by species and culture method)	Suspended culture and finfish cage culture	
Potential significant effects from aquaculture activities	Sedimentation changes; biogeochemical changes; chemical inputs; infrastructure impacts incl. physical disturbance; noise & visual disturbance; predator control; interbreeding risks; pathogen risks.	

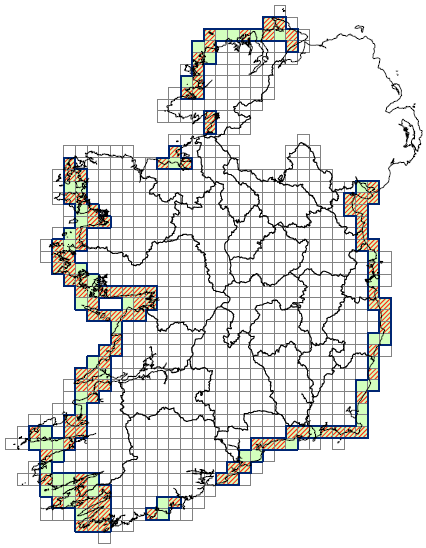
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Cumulative effects present the greatest risk of impact on reef habitats. Given the variety of reef types it is essential that assessment is carried out at the higher resolution of project scale AA. Controls, mitigation & management as outlined in Section 3.6 & 3.7.

3.9.7 ANNUAL VEGETATION OF DRIFT LINES

Habitat Name (code)	**Annual vegetation of drift lines (1210)**	
Habitat Information 	Vegetation which occurs on sandy, shingle or stony substrate around the high tide mark. Organic material deposited by the sea provides nutrients and seed source for vegetation which consists predominantly of annual species specialised to deal with harsh conditions of high salinity, wind exposure and drought.	
Conservation status and trend in Ireland	Favourable range. Inadequate declining area and structure & function. Inadequate, stable future prospects. Overall Conservation Status is Inadequate and Declining.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	000332	Akeragh, Banna and Barrow Harbour
	000696	Ballyteige Burrow
	000697	Bannow Bay
	000729	Buckroney-Brittas Dunes and Fen
	000700	Cahore Polders and Dunes
	002306	Carlingford Shore*
	000343	Castlemaine Harbour*
	001482	Clew Bay Complex*
	000091	Clonakilty Bay
	001230	Courtmacsherry Estuary
	001257	Dog's Bay
	000458	Killala Bay/Moy Estuary
	001742	Kilpatrick Sandhills
	001766	Magherabeg Dunes
	001932	Mweelrea/Sheeffry/Erriff Complex
	000206	North Dublin Bay
	000710	Raven Point Nature Reserve*
	002283	Rutland Island and Sound*
	002074	Slyne Head Peninsula*
	000709	Tacumshin Lake
	002249	The Murrough Wetlands
	002070	Tralee Bay and Magharees Peninsula, West to Cloghane
	000671	Tramore Dunes and Backstrand
	000194	Tranarossan and Melmore Lough
Pressures & threats related to	Main pressures	Main threats

aquaculture		
Aquaculture not identified as a direct pressure or threat to Annual vegetation of drift lines	No pressures	No threats
off road motorised driving	M	M
trampling, overuse	M	M
reduction or loss of specific habitat features	M	M
Potential interactions with aquaculture (by species and culture method)	Spatial overlap with access routes to intertidal culture sites.	
Potential significant effects from aquaculture activities	Infrastructure impacts incl. physical disturbance. Removal of vegetation through erosion and compaction of sediments by tractor traffic.	
Considerations for Site Selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic.	

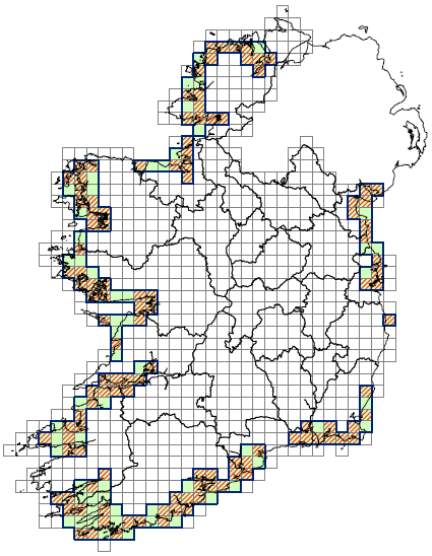
3.9.8 PERENNIAL VEGETATION OF STONY BANKS

Habitat Name (code)	**Perennial vegetation of stony banks (1220)**	
Habitat Information 	Occurs along the coast where shingle (cobbles and pebbles <250mm diameter) have accumulated to form elevated ridges or banks above the high tide mark. Vegetation tends to be dominated by perennial species with the presence of lichens an indicator of long term stability.	
Conservation status and trend in Ireland	Favourable range, Inadequate but Stable in area, structure & function and future prospects with an overall Conservation Status of Inadequate but Stable.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	000696	Ballyteige Burrow
	000697	Bannow Bay
	001040	Barley Cove to Ballyrisode Point*
	000020	Black Head-Poulsallagh Complex
	002170	Blackwater River (Cork/Waterford)*

	000729	Buckroney-Brittas Dunes and Fen
	002306	Carlingford Shore*
	001021	Carrowmore Point to Spanish Point and Islands
	000343	Castlemaine Harbour*
	001482	Clew Bay Complex*
	001230	Courtmacsherry Estuary
	000484	Cross Lough (Killadoon)
	002280	Dunbeacon Shingle*
	000133	Dundalk Bay*
	002189	Farranamanagh Lough
	000268	Galway Bay Complex*
	001141	Gweedore Bay and Islands*
	000212	Inishmaan Island
	000213	Inishmore Island*
	002193	Ireland's Eye
	001513	Keel Machair/Menaun Cliffs
	002158	Kenmare River*
	000704	Lady's Island Lake
	001529	Lough Cahasy, Lough Baun and Roonah Lough
	002165	Lower River Shannon*
	002012	North Inishowen Coast*
	002281	Reen Point Shingle
	002074	Slyne Head Peninsula*
	001680	Streedagh Point Dunes
	000709	Tacumshin Lake
	002249	The Murrough Wetlands
	002259	Tory Island Coast
	002070	Tralee Bay and Magharees Peninsula, West to Cloghane
	000671	Tramore Dunes and Backstrand
	000194	Tranarossan and Melmore Lough

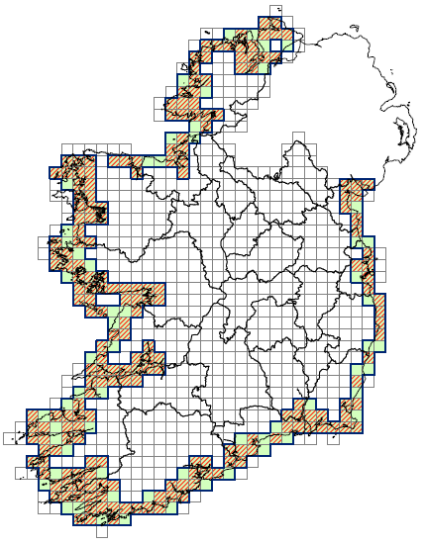
Pressures & threats from Aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to perennial vegetation of stony banks.	No pressure	No threat
Trampling, overuse	M	M
Potential interactions with aquaculture (by species and culture method)	Spatial overlap with service facilities for and access routes to intertidal culture sites.	
Potential significant effects from aquaculture activities	Infrastructure impacts incl. physical disturbance. Removal of vegetation through erosion and compaction of sediments by tractor traffic. Destruction through service facility construction.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic.	

3.9.9 SALICORNIA AND OTHER ANNUAL COLONIZING MUD AND SAND

<table>
<tr><th>Habitat Name (code)</th><th colspan="3">Salicornia and other annuals colonizing mud and sand (1310)</th></tr>
<tr><td>Habitat Information
  </td><td colspan="3">A pioneer saltmarsh community that may occur on muddy sediment seaward of established saltmarsh or form patches within other saltmarsh communities. It is dominated by annuals and can be ephemeral or transient in nature. It is highly susceptible to erosion. Distribution can vary considerably from year to year and it can move in response to changing conditions e.g. shifting river channels in estuaries.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Favourable range and area. Inadequate declining structure & function and future prospects, overall Inadequate.</td></tr>
<tr><td rowspan="25">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>000332</td><td colspan="2">Akeragh, Banna and Barrow Harbour</td></tr>
<tr><td>000199</td><td colspan="2">Baldoyle Bay</td></tr>
<tr><td>000077</td><td colspan="2">Ballymacoda (Clonpriest and Pillmore)*</td></tr>
<tr><td>000696</td><td colspan="2">Ballyteige Burrow</td></tr>
<tr><td>000697</td><td colspan="2">Bannow Bay</td></tr>
<tr><td>001040</td><td colspan="2">Barley Cove to Ballyrisode Point*</td></tr>
<tr><td>002170</td><td colspan="2">Blackwater River (Cork/Waterford)*</td></tr>
<tr><td>001957</td><td colspan="2">Boyne Coast and Estuary</td></tr>
<tr><td>000343</td><td colspan="2">Castlemaine Harbour*</td></tr>
<tr><td>001230</td><td colspan="2">Courtmacsherry Estuary</td></tr>
<tr><td>000133</td><td colspan="2">Dundalk Bay*</td></tr>
<tr><td>000268</td><td colspan="2">Galway Bay Complex*</td></tr>
<tr><td>000036</td><td colspan="2">Inagh River Estuary</td></tr>
<tr><td>000458</td><td colspan="2">Killala Bay/Moy Estuary</td></tr>
<tr><td>000516</td><td colspan="2">Lackan Saltmarsh and Kilcummin Head</td></tr>
<tr><td>002165</td><td colspan="2">Lower River Shannon*</td></tr>
<tr><td>000205</td><td colspan="2">Malahide Estuary</td></tr>
<tr><td>000470</td><td colspan="2">Mullet/Blacksod Bay Complex</td></tr>
<tr><td>000206</td><td colspan="2">North Dublin Bay</td></tr>
<tr><td>002162</td><td colspan="2">River Barrow and River Nore*</td></tr>
<tr><td>000208</td><td colspan="2">Rogerstown Estuary</td></tr>
<tr><td>002070</td><td colspan="2">Tralee Bay and Magharees Peninsula, West to Cloghane</td></tr>
<tr><td>000671</td><td colspan="2">Tramore Dunes and Backstrand</td></tr>
<tr><td>Pressures & threats from aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a direct pressure or threat to Salicornia and other annual colonizing mud and sand</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">Spatial overlap with service facilities and access routes to intertidal culture sites.</td></tr>
</table>

Potential significant effects from aquaculture activities	Infrastructure impacts incl. physical disturbance. Removal of vegetation through erosion and compaction of sediments by tractor traffic. Destruction through service facility construction. Also sensitive to biogeochemical changes.
Considerations for Site Selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic.

3.9.10 ATLANTIC SALT MEADOWS

Habitat Name (code)	**Atlantic salt meadows (1330)**	
Habitat Information 	Occupy the widest part of the saltmarsh gradient and contain a distinctive topography with an intricate network of creeks and saltpans. The habitats is characterised by several distinctive zones related to elevation and submergence frequency. It is an important habitat for wildlife including wintering waters and wildfowl.	
Conservation status and trend in Ireland	Favourable range and area. Inadequate but stable in structure & function and future prospects. Overall Conservation Status is Inadequate but Stable.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	000332	Akeragh, Banna and Barrow Harbour
	000199	Baldoyle Bay
	000335	Ballinskelligs Bay and Inny Estuary
	000077	Ballymacoda (Clonpriest and Pillmore)*
	000696	Ballyteige Burrow
	000697	Bannow Bay
	001040	Barley Cove to Ballyrisode Point*
	002005	Bellacragher Saltmarsh
	002170	Blackwater River (Cork/Waterford)*
	001957	Boyne Coast and Estuary
	000472	Broadhaven Bay*
	000343	Castlemaine Harbour*
	001482	Clew Bay Complex*
	001230	Courtmacsherry Estuary
	000133	Dundalk Bay*
	000268	Galway Bay Complex*
	001058	Great Island Channel*
	000036	Inagh River Estuary
	002158	Kenmare River*

	002111	Kilkieran Bay and Islands*
	000458	Killala Bay/Moy Estuary
	000516	Lackan Saltmarsh and Kilcummin Head
	002287	Lough Swilly*
	002165	Lower River Shannon*
	002137	Lower River Suir
	000205	Malahide Estuary
	001932	Mweelrea/Sheeffry/Erriff Complex
	000206	North Dublin Bay
	000710	Raven Point Nature Reserve*
	002162	River Barrow and River Nore*
	000208	Rogerstown Estuary
	001190	Sheephaven*
	002074	Slyne Head Peninsula*
	001680	Streedagh Point Dunes
	002249	The Murrough Wetlands
	002070	Tralee Bay and Magharees Peninsula, West to Cloghane
	000671	Tramore Dunes and Backstrand
	000197	West of Ardara/Maas Road*

Pressures & threats from aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to Atlantic salt meadows	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Spatial overlap with service facilities and access routes to intertidal culture sites. Due to the muddy nature of saltmarsh habitats and the risk that they pose it is frequently undesirable to cross them using vehicular traffic which could easily become stuck.	
Potential significant effects from aquaculture activities	Infrastructure impacts incl. physical disturbance. Removal of vegetation through erosion and compaction of sediments by tractor traffic. Destruction through service facility construction. Also sensitive to biogeochemical changes.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic.	

3.9.11A DUNE HABITATS

Habitat Name (code)	**Embryonic shifting dunes (2110)**	
	Shifting dunes along the shoreline with Ammophila arenaria (white dunes) (2120)	
	Fixed Coastal Dunes with herbaceous vegetation (grey dunes) (2130) (priority habitat)	
	Decalcified fixed dunes with Empetrum nigrum (2140) (priority habitat)	
	Atlantic decalcified fixed dunes (Calluno-Ulicetea) (2150) (Priority habitat)	
	Dunes with Salix repens ssp. argentea (Salix arenariae) (2170)	
	Humid dune slacks (2190)	
Habitat Information	Embryonic shifting dunes are low sand mounds generally less than 1m high occurring just above the high tide mark and representing the initial phase of dune formation, and are very vulnerable to storms and high tides causing natural erosion. Shifting dunes or white dunes occur next and are partially stabilised by *Ammophila arenaria* which traps the sand. White dunes can build and erode quickly. Fixed/ Grey dunes are more mature and stable, located further inland from the white dunes away from tidal inundation and saltspray, meaning they have more shelter and allow for the colonisation of more "fixed" vegetation. Decalcified fixed dunes and Atlantic decalcified fixed dunes (priority habitats) are found on the landward edge of dune systems where the surface layers of sand have been leached of their calcium content meaning it is characterised by different vegetation. Dunes with *Salix repens ssp.* are typically found within dune slacks on sandy hummocks or on the sides of dune ridges. The *Salix repens* forms dense cover. Dune Slacks are wet, nutrient enriched depressions between dune ridges and characterised by the occurrence of a water table and plays host to a wide range of vegetation communities.	
Conservation status and trend in Ireland	All Favourable in range and area apart from Humid Dune Slacks which are inadequate. Inadequate structure & function and future prospects for all types apart from Grey Dunes which are Bad. Inadequate Stable overall Conservation Status for all except Grey Dunes which are Bad, Stable and Humid Dune slacks which are Inadequate, Declining.	
SACs where it is a feature (Name, Site Code,*SAC contains existing Aquaculture)	Refer to separate table Figure 4.9.11b.	
Pressures & threats from aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to Dunes Habitats	No pressure	No threat
Trampling, overuse	M (H White Dunes)	M (H White dunes)
Storage of materials	L	L
Potential interactions with aquaculture (by species and culture method)	Spatial overlap with service facilities for and access routes to intertidal culture sites.	

Potential significant effects from aquaculture	Infrastructure impacts incl. physical disturbance. Removal of vegetation through erosion and compaction of sediments by tractor traffic. Destruction through service facility construction.
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic.

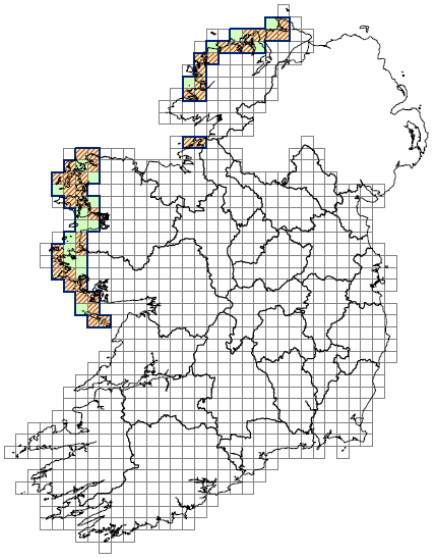
3.9.11B DUNE HABITATS AND SACS WHERE THEY ARE A QUALIFYING FEATURE.

Atlantic decalcified fixed dunes	Decalcified fixed dunes	Dunes with Salix repens ssp. argentea (Salix arenariae	Embryonic shifting dunes	Fixed Coastal dunes with herbaceous vegetation	Humid dune slacks	Shifting dunes along shoreline with Ammophila arenaria
Ballyteige Burrow	Gweedore Bay and Islands*	Buckroney-Brittas Dunes and Fen	Akeragh, Banna and Barrow Harbour	Akeragh, Banna and Barrow Harbour	Akeragh, Banna and Barrow Harbour	Akeragh, Banna and Barrow Harbour
Buckroney-Brittas Dunes and Fen	Lough Nagreany Dunes	Castlemaine Harbour*	Ballyness Bay*	Ballyness Bay*	Ballyness Bay*	Ballyness Bay*
Clonakilty Bay	Slieve Tooey/Tormore Island/Loughros Beg Bay*	Gweedore Bay and Islands*	Ballysadare Bay	Ballysadare Bay	Ballysadare Bay	Ballysadare Bay
Gweedore Bay and Islands*	Tranarossan and Melmore Lough	Horn Head and Rinclevan	Ballyteige Burrow	Ballyteige Burrow	Buckroney-Brittas Dunes and Fen	Ballyteige Burrow
Kilpatrick Sandhills	West of Ardara/Maas Road*	Inishmore Island*	Bannow Bay	Bannow Bay	Castlemaine Harbour*	Bannow Bay
Lough Nagreany Dunes		Lough Nagreany Dunes	Boyne Coast and Estuary	Barley Cove to Ballyrisode Point*	Donegal Bay (Murvagh)*	Barley Cove to Ballyrisode Point*
Magherabeg Dunes		Mweelrea/Sheeffry/Erriff Complex	Buckroney-Brittas Dunes and Fen	Boyne Coast and Estuary	Gweedore Bay and Islands*	Boyne Coast and Estuary
Mullet/Blacksod Bay Complex		Raven Point Nature Reserve*	Cahore Polders and Dunes	Buckroney-Brittas Dunes and Fen	Horn Head and Rinclevan	Buckroney-Brittas Dunes and Fen
Mweelrea/Sheeffry/Erriff Complex		Tralee Bay and Magharees Peninsula, West to Cloghane	Carrowmore Dunes	Bunduff Lough and Machair/Trawalua/Mullaghmore	Inishmore Island*	Bunduff Lough and Machair/Trawalua/Mullaghmore
Slieve Tooey/Tormore Island/Loughros Beg Bay*		Tranarossan and Melmore Lough	Castlemaine Harbour*	Cahore Polders and Dunes	Killala Bay/Moy Estuary	Cahore Polders and Dunes
West of Ardara/Maas Road*		West of Ardara/Maas Road*	Clew Bay Complex	Carrowmore Dunes	North Dublin Bay	Carrowmore Dunes
			Clonakilty Bay	Castlemaine Harbour*	Raven Point Nature Reserve*	Castlemaine Harbour*
			Courtmacsherry Estuary	Clonakilty Bay	Rutland Island and Sound*	Clew Bay Complex

Atlantic decalcified fixed dunes	Decalcified fixed dunes	Dunes with Salix repens ssp. argentea (Salix arenariae	Embryonic shifting dunes	Fixed Coastal dunes with herbaceous vegetation	Humid dune slacks	Shifting dunes along shoreline with Ammophila arenaria
			Cummeen Strand/Drumcliff Bay (Sligo Bay)	Courtmacsherry Estuary	Tralee Bay and Magharees Peninsula, West to Cloghane	Clonakilty Bay
			Dog's Bay	Cummeen Strand/Drumcliff Bay (Sligo Bay)	West of Ardara/Maas Road*	Courtmacsherry Estuary
			Gweedore Bay and Islands*	Dog's Bay		Cummeen Strand/Drumcliff Bay (Sligo Bay)
			Horn Head and Rinclevan	Donegal Bay (Murvagh)*		Dog's Bay
			Inishmaan Island	Gweedore Bay and Islands*		Gweedore Bay and Islands*
			Inishmore Island*	Horn Head and Rinclevan		Horn Head and Rinclevan
			Kilkeran Lake and Castlefreke Dunes	Inagh River Estuary		Inagh River Estuary
			Killala Bay/Moy Estuary	Inishmore Island*		Inishmaan Island
			Kilpatrick Sandhills	Kenmare River*		Inishmore Island*
			Lough Nagreany Dunes	Kilkeran Lake and Castlefreke Dunes		Kenmare River*
			Magherabeg Dunes	Killala Bay/Moy Estuary		Kilkeran Lake and Castlefreke Dunes
			Mweelrea/Sheeffry/Erriff Complex	Kilmuckridge-Tinnaberna Sandhills		Killala Bay/Moy Estuary
			North Dublin Bay	Kilpatrick Sandhills		Kilmuckridge-Tinnaberna Sandhills
			Raven Point Nature Reserve*	Lackan Saltmarsh and Kilcummin Head		Kilpatrick Sandhills
			Rutland Island and Sound*	Lough Nagreany Dunes		Lackan Saltmarsh and Kilcummin Head
			Slieve Tooey/Tormore Island/Loughros Beg Bay*	Lough Yganavan and Lough Nambrackdarrig		Lough Cahasy, Lough Baun and Roonah Lough

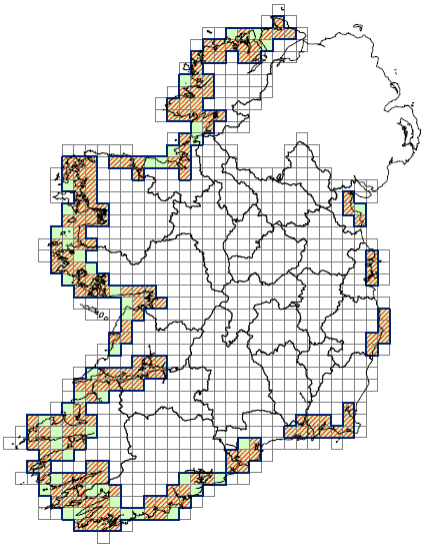
Atlantic decalcified fixed dunes	Decalcified fixed dunes	Dunes with Salix repens ssp. argentea (Salix arenariae	Embryonic shifting dunes	Fixed Coastal dunes with herbaceous vegetation	Humid dune slacks	Shifting dunes along shoreline with Ammophila arenaria
			Slyne Head Peninsula*	Magherabeg Dunes		Magherabeg Dunes
			Tacumshin Lake	Malahide Estuary		Malahide Estuary
			Tramore Dunes and Backstrand	Mullet/Blackso d Bay Complex		Mullet/Blackso d Bay Complex
			Tranarossan and Melmore Lough	North Dublin Bay		Mweelrea/She effry/Erriff Complex
				North Inishowen Coast*		North Dublin Bay
				Raven Point Nature Reserve*		Raven Point Nature Reserve*
				Rogerstown Estuary		Rogerstown Estuary
				Rutland Island and Sound*		Rutland Island and Sound*
				Sheephaven*		Sheephaven*
				Streedagh Point Dunes		Slieve Tooey/Tormore Island/Loughro s Beg Bay*
				Tralee Bay and Magharees Peninsula, West to Cloghane		Slyne Head Peninsula*
				Tramore Dunes and Backstrand		Streedagh Point Dunes
				Tranarossan and Melmore Lough		Tacumshin Lake
				West of Ardara/Maas Road*		Tralee Bay and Magharees Peninsula, West to Cloghane
						Tramore Dunes and Backstrand
						Tranarossan and Melmore Lough
						West of Ardara/Maas Road*

3.9.12 MACHAIR

<table>
<tr><th>Habitat Name (code)</th><th colspan="3">Machair 21A0 (Priority habitat in Ireland)</th></tr>
<tr><td>Habitat Information
  </td><td colspan="3">Complex and dynamic systems which are considered natural landforms that are the product of both wind erosion and cultural activities. Globally restricted to the NW coasts of Ireland (Galway Bay to Malin Head) and Scotland. Typically a flat, sandy coastal plain in an oceanic location with a cool moist climate. The sandy substrate should have a significant percentage of sand derived material producing a lime rich soil and the vegetation should be herb rich. The habitats is also characterised by a history of human interference principally from grazing.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Favourable range. Inadequate but Stable area, Bad but Stable in structure, function and future prospects giving an overall Conservation Status of Bad but Stable.</td></tr>
<tr><td rowspan="18">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>000625</td><td colspan="2">Bunduff Lough and Machair/Trawalua/Mullaghmore</td></tr>
<tr><td>001497</td><td colspan="2">Doogort Machair/Lough Doo</td></tr>
<tr><td>000500</td><td colspan="2">Glenamoy Bog Complex*</td></tr>
<tr><td>001141</td><td colspan="2">Gweedore Bay and Islands*</td></tr>
<tr><td>000147</td><td colspan="2">Horn Head and Rinclevan</td></tr>
<tr><td>000507</td><td colspan="2">Inishkea Islands</td></tr>
<tr><td>000212</td><td colspan="2">Inishmaan Island</td></tr>
<tr><td>000213</td><td colspan="2">Inishmore Island*</td></tr>
<tr><td>001513</td><td colspan="2">Keel Machair/Menaun Cliffs</td></tr>
<tr><td>002111</td><td colspan="2">Kilkieran Bay and Islands*</td></tr>
<tr><td>000470</td><td colspan="2">Mullet/Blacksod Bay Complex</td></tr>
<tr><td>002129</td><td colspan="2">Murvey Machair</td></tr>
<tr><td>001932</td><td colspan="2">Mweelrea/Sheeffry/Erriff Complex</td></tr>
<tr><td>002012</td><td colspan="2">North Inishowen Coast*</td></tr>
<tr><td>001309</td><td colspan="2">Omey Island Machair</td></tr>
<tr><td>001190</td><td colspan="2">Sheephaven*</td></tr>
<tr><td>002074</td><td colspan="2">Slyne Head Peninsula*</td></tr>
<tr><td>000194</td><td colspan="2">Tranarossan and Melmore Lough</td></tr>
<tr><td>000197</td><td colspan="2">West of Ardara/Maas Road*</td></tr>
<tr><td>Pressures & threats from aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a direct pressure or threat to Machair</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">Spatial overlap with service facilities for and access routes to intertidal culture sites.</td></tr>
<tr><td>Potential significant effects from aquaculture</td><td colspan="3">Infrastructure impacts incl. physical disturbance. Removal of vegetation through erosion and compaction of sediments by tractor traffic. Destruction through service facility construction.</td></tr>
</table>

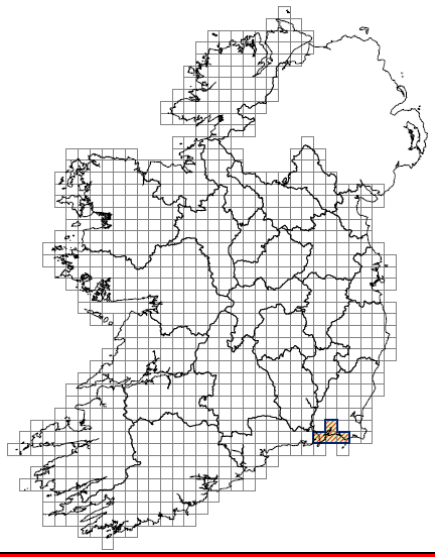
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic.

3.9.13 MEDITERRANEAN SALT MEADOWS

Habitat Name (code)	Mediterranean salt meadows (1410)
Habitat Information 	Found widespread on the Irish coastline. Occupy the upper zone of saltmarshes and usually occur adjacent to the boundary with terrestrial habitats. Distinguished from Atlantic Salt meadows by the presence of rushes such as sea rush and / or sharp rush.
Conservation status and trend in Ireland	Favourable in range and area. Inadequate but Stable in specific structure and functions and future prospects. Overall Conservation Status of Inadequate but Stable.
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	000332 Akeragh, Banna and Barrow Harbour 000199 Baldoyle Bay 000335 Ballinskelligs Bay and Inny Estuary 000696 Ballyteige Burrow 000697 Bannow Bay 001040 Barley Cove to Ballyrisode Point* 002005 Bellacragher Saltmarsh 002170 Blackwater River (Cork/Waterford)* 001957 Boyne Coast and Estuary 000729 Buckroney-Brittas Dunes and Fen 000343 Castlemaine Harbour* 001230 Courtmacsherry Estuary 000133 Dundalk Bay* 000268 Galway Bay Complex* 001141 Gweedore Bay and Islands* 000036 Inagh River Estuary 002158 Kenmare River* 002111 Kilkieran Bay and Islands* 000516 Lackan Saltmarsh and Kilcummin Head 002165 Lower River Shannon* 002137 Lower River Suir 000205 Malahide Estuary 001932 Mweelrea/Sheeffry/Erriff Complex 000206 North Dublin Bay 002162 River Barrow and River Nore* 000208 Rogerstown Estuary 001190 Sheephaven* 002074 Slyne Head Peninsula* 001680 Streedagh Point Dunes 002249 The Murrough Wetlands 002070 Tralee Bay and Magharees Peninsula, West to Cloghane 000671 Tramore Dunes and Backstrand 000197 West of Ardara/Maas Road*

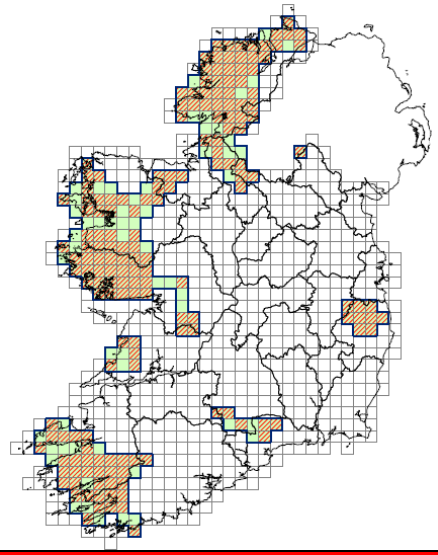
Pressures & threats from aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to Mediterranean salt meadows	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Spatial overlap with service facilities and access routes to intertidal culture sites.	
Potential significant effects from aquaculture	Infrastructure impacts incl. physical disturbance. Removal of vegetation through erosion and compaction of sediments by tractor traffic. Destruction through service facility construction. Also sensitive to biogeochemical changes.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic.	

3.9.14 MEDITERRANEAN AND THERMO-ATLANTIC HALOPHILOUS SCRUB

Habitat Name (code)	**Mediterranean and thermo-atlantic Halophilous scrub (1420)**	
Habitat Information 	Perennial vegetation of saline muds characterised in Ireland by the presence of a single species, the Perennial Glasswort *(Sarcocornia perennis)* The species is very rare in Ireland and is listed on the flora protection order. It is generally found in the mid-lower saltmarsh zone.	
Conservation status and trend in Ireland	Favourable in range and specific structure & functions. Bad and declining in area and future prospects giving an overall Conservation Status of Bad and Declining.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	000696	Ballyteige Burrow
	000697	Bannow Bay
Pressures & threats from aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to halophilous scrub	No pressure	No threat

Potential interactions with aquaculture (by species and culture method)	Spatial overlap with service facilities and access routes to intertidal culture sites. Due to its presence in the mid to lower zone of saltmarsh habitats and given the muddy nature of saltmarsh habitats and the risk that they pose it is frequently undesirable to cross them using vehicular traffic which could easily become stuck.
Potential significant effects from aquaculture	Infrastructure impacts incl. physical disturbance. Removal of vegetation through erosion and compaction of sediments by tractor traffic. Destruction through service facility construction. Also sensitive to biogeochemical changes.
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic.

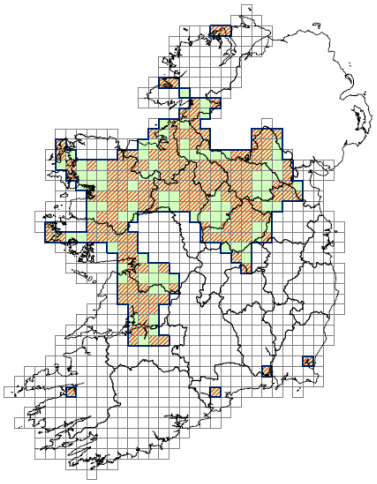
3.9.15 OLIGOTROPHIC WATERS CONTAINING VERY FEW MINERALS OF SANDY PLAINS

Habitat Name (code)	**Oligotrophic waters containing very few mineral of sandy plains (3110)**	
Habitat Information 	Occurs in soft water, nutrient poor lakes frequently associated with acid bedrock (Granite and old red sandstone) overlain by peatland. Ireland is a stronghold for the habitats given the large number of lakes in which it occurs and its widespread distribution. Under significant pressure from eutrophication, peatland drainage and acidification.	
Conservation status and trend in Ireland	Favourable in range and areas. Bad and Declining in specific structure & function and future prospects. Overall Conservation Status of Bad and Declining.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	001228	Aughrusbeg Machair and Lake
	001975	Ballyhoorisky Point to Fanad Head*
	002118	Barnahallia Lough
	002047	Cloghernagore Bog and Glenveagh National Park*
	001342	Cloonee and Inchiquin Loughs, Uragh Wood
	002034	Connemara Bog Complex*
	000142	Gannivegil Bog
	001879	Glanmore Bog
	001141	Gweedore Bay and Islands*
	000278	Inishbofin and Inishshark
	000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment

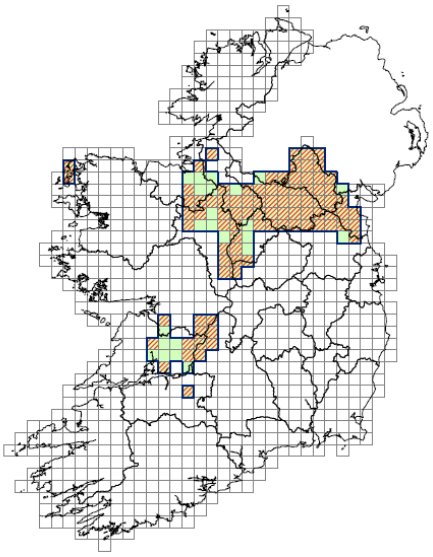
	001151	Kindrum Lough
	002176	Leannan River*
	001774	Lough Carra/Mask Complex
	000297	Lough Corrib
	000163	Lough Eske and Ardnamona Wood*
	000633	Lough Hoe Bog
	002119	Lough Nageeron
	000165	Lough Nillan Bog (Carrickatlieve)
	000370	Lough Yganavan and Lough Nambrackdarrig
	002008	Maumturk Mountains
	001932	Mweelrea/Sheeffry/Erriff Complex
	000534	Owenduff/Nephin Complex
	002006	Ox Mountains Bogs
	002301	River Finn*
	001311	Rusheenduff Lough
	000708	Screen Hills
	000185	Sessiagh Lough
	002074	Slyne Head Peninsula*
	002031	The Twelve Bens/Garraun Complex*
	002130	Tully Lough
	000197	West of Ardara/Maas Road*

Pressures & threats from aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to lowland oligotrophic lakes	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Potential interaction with freshwater finfish installations and freshwater recirculation facilities	
Potential significant effects from aquaculture	Increased nutrient loading from faeces and uneaten food or from recirculation facility discharges, resulting in changes to the nutrient poor status of the lakes.	
Considerations for Site Selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Individual site assessment required. Any discharges should specify limits which will not impact the overall nutrient status of the lake. Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

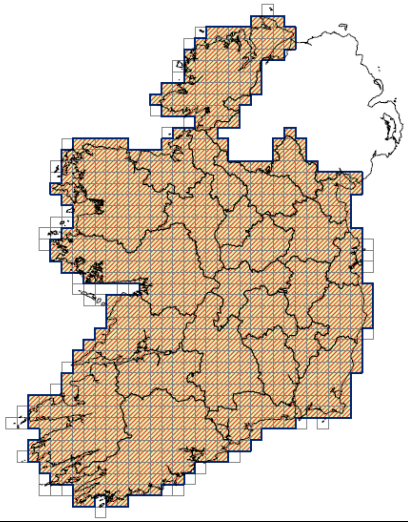
3.9.16 HARD OLIGO-MESOTROPHIC WATERS WITH BENTHIC VEGETATION OF CHARA SPP

<table>
<tr><td>Habitat Name (code)</td><td colspan="3">Hard Oligomesotrophic waters with benthic vegetation of Chara Spp. (3140)</td></tr>
<tr><td>Habitat Information
  </td><td colspan="3">Strongly associated with lakes over limestone bedrock and also found on calcareous sand at the landward side of Machair plains. Dominated by algae, particularly Chara species. The high alkalinity and calcium and magnesium concentrations in hard water lakes are the result of the significant groundwater contributions to these lakes. Significant pressures arising from eutrophication the primary sources being agriculture and municipal and industrial waste waters directly to the lake and also via groundwater.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Favourable in range and area. Bad and Declining in specific structure & function and future prospects. Overall conservation status is Bad and Declining.</td></tr>
<tr><td rowspan="18">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>001975</td><td colspan="2">Ballyhoorisky Point to Fanad Head*</td></tr>
<tr><td>001926</td><td colspan="2">East Burren Complex</td></tr>
<tr><td>000607</td><td colspan="2">Errit Lough</td></tr>
<tr><td>001786</td><td colspan="2">Kilroosky Lough Cluster</td></tr>
<tr><td>001673</td><td colspan="2">Lough Arrow</td></tr>
<tr><td>002120</td><td colspan="2">Lough Bane and Lough Glass</td></tr>
<tr><td>001774</td><td colspan="2">Lough Carra/Mask Complex</td></tr>
<tr><td>000297</td><td colspan="2">Lough Corrib</td></tr>
<tr><td>002121</td><td colspan="2">Lough Lene</td></tr>
<tr><td>000688</td><td colspan="2">Lough Owel</td></tr>
<tr><td>000304</td><td colspan="2">Lough Rea</td></tr>
<tr><td>001309</td><td colspan="2">Omey Island Machair</td></tr>
<tr><td>001312</td><td colspan="2">Ross Lake and Woods</td></tr>
<tr><td>002074</td><td colspan="2">Slyne Head Peninsula*</td></tr>
<tr><td>000636</td><td colspan="2">Templehouse and Cloonacleigha Loughs</td></tr>
<tr><td>000194</td><td colspan="2">Tranarossan and Melmore Lough</td></tr>
<tr><td>001571</td><td colspan="2">Urlaur Lakes</td></tr>
<tr><td>001810</td><td colspan="2">White Lough, Ben Loughs and Lough Doo</td></tr>
<tr><td>Pressures & threats from aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a direct pressure or threat to hard water lakes</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">Potential interaction with freshwater finfish installations and recirculation facilities</td></tr>
<tr><td>Potential significant effects from aquaculture</td><td colspan="3">Increased nutrient loading from faeces and uneaten food or from recirculation facility discharges, resulting in changes to the nutrient poor status of the lakes.</td></tr>
<tr><td>Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts</td><td colspan="3">Individual site assessment required. Any discharges should specify limits which will not impact the overall nutrient status of the lake.</td></tr>
</table>

3.9.17 NATURAL EUTROPHIC LAKES

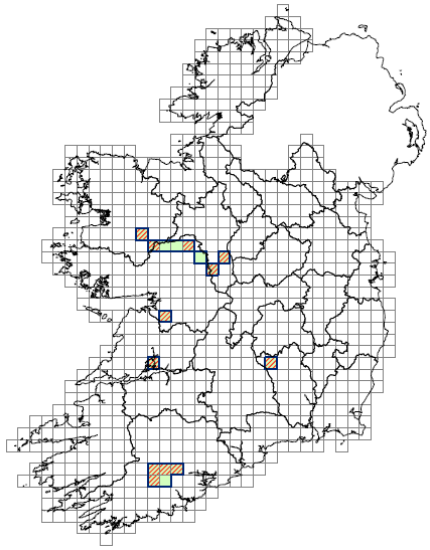
<table>
<tr><th>Habitat Name (code)</th><th colspan="3">Natural eutrophic lakes with Magnopotamion or Hydrocharition type vegetation (3150)</th></tr>
<tr><td>Habitat Information
  </td><td colspan="3">Occurs in lowland, base rich lakes in the midlands and north east of Ireland. Habitat is generally associated with large lakes such as those of the Shannon system and with small naturally productive lakes such as those in the drumlin belt of Cavan, Monaghan and Leitrim. Associated with catchments dominated by mineral soils and hence some of the most intensive agricultural lands in Ireland. Consequently, the habitats have been under significant pressure from eutrophication since the 1970s at least.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Favourable in range and area. Inadequate but Stable in specific structure & function and future prospects. Overall Conservation Status of Inadequate but Stable.</td></tr>
<tr><td rowspan="9">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>000014</td><td colspan="2">Ballyallia Lake</td></tr>
<tr><td>000252</td><td colspan="2">Coole-Garryland Complex</td></tr>
<tr><td>000032</td><td colspan="2">Dromore Woods and Loughs</td></tr>
<tr><td>001919</td><td colspan="2">Glenade Lough</td></tr>
<tr><td>001818</td><td colspan="2">Lough Forbes Complex</td></tr>
<tr><td>001976</td><td colspan="2">Lough Gill</td></tr>
<tr><td>000007</td><td colspan="2">Lough Oughter and Associated Loughs</td></tr>
<tr><td>000440</td><td colspan="2">Lough Ree</td></tr>
<tr><td>000470</td><td colspan="2">Mullet/Blacksod Bay Complex</td></tr>
<tr><td>Pressures & threats from aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a direct pressure or threat to natural eutrophic lakes</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">Potential interaction with freshwater finfish installations and freshwater recirculation facilities</td></tr>
<tr><td>Potential significant effects from aquaculture</td><td colspan="3">Increased nutrient loading from faeces and uneaten food or from recirculation facility discharges, resulting in changes to the nutrient poor status of the lakes.</td></tr>
<tr><td>Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts</td><td colspan="3">Individual site assessment required. Any discharges should specify limits which will not impact the overall nutrient status of the lake.</td></tr>
</table>

3.9.18 FLOATING RIVER VEGETATION

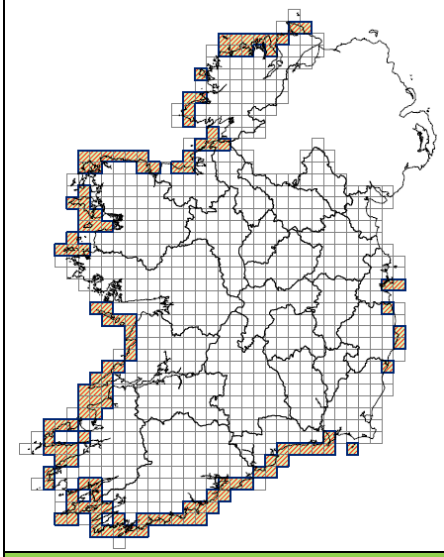
<table>
<tr><td>Habitat Name (code)</td><td colspan="3">Water courses of plain to montane levels with Ranunculion fluitantis and Callitricho-Batrachion vegetation (3260)</td></tr>
<tr><td>Habitat Information
  </td><td colspan="3">Habitat description considered too broad for a single set of conservation guidelines to cover it. Includes rivers from upland bryophyte and macroalgal dominated stretches to lowland depositing rivers with pondweeds and starworts.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Favourable in Range and Area. Inadequate and Declining in specific structure and functioning. Inadequate but Stable in future prospects. Overall Conservation Status of Inadequate and Declining.</td></tr>
<tr><td rowspan="20">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>002171</td><td colspan="2">Bandon River</td></tr>
<tr><td>000623</td><td colspan="2">Ben Bulben, Gleniff and Glenade Complex</td></tr>
<tr><td>000020</td><td colspan="2">Black Head-Poulsallagh Complex</td></tr>
<tr><td>002170</td><td colspan="2">Blackwater River (Cork/Waterford)*</td></tr>
<tr><td>002047</td><td colspan="2">Cloghernagore Bog and Glenveagh National Park*</td></tr>
<tr><td>001952</td><td colspan="2">Comeragh Mountains</td></tr>
<tr><td>002034</td><td colspan="2">Connemara Bog Complex*</td></tr>
<tr><td>001926</td><td colspan="2">East Burren Complex</td></tr>
<tr><td>001879</td><td colspan="2">Glanmore Bog</td></tr>
<tr><td>000365</td><td colspan="2">Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment</td></tr>
<tr><td>000297</td><td colspan="2">Lough Corrib</td></tr>
<tr><td>002165</td><td colspan="2">Lower River Shannon*</td></tr>
<tr><td>002137</td><td colspan="2">Lower River Suir</td></tr>
<tr><td>000057</td><td colspan="2">Moyree River System</td></tr>
<tr><td>001932</td><td colspan="2">Mweelrea/Sheeffry/Erriff Complex</td></tr>
<tr><td>000534</td><td colspan="2">Owenduff/Nephin Complex</td></tr>
<tr><td>002162</td><td colspan="2">River Barrow and River Nore*</td></tr>
<tr><td>000781</td><td colspan="2">Slaney River Valley*</td></tr>
<tr><td>000636</td><td colspan="2">Templehouse and Cloonacleigha Loughs</td></tr>
<tr><td>000108</td><td colspan="2">The Gearagh</td></tr>
<tr><td>001898</td><td colspan="2">Unshin River</td></tr>
<tr><td>Pressures & threats from aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a direct pressure or threat to floating river vegetation</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">Abstraction and discharge to rivers from freshwater finfish and recirculation facilities</td></tr>
<tr><td>Potential significant effects from aquaculture</td><td colspan="3">Reduction in water flow from abstraction. Pollution, nutrient loading and hydrographic modifications arising from discharges.</td></tr>
</table>

Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Individual site assessment required. Discharge and abstraction arrangements with local authorities will specify limit and conditions. Once adhered to impacts should be minimised.

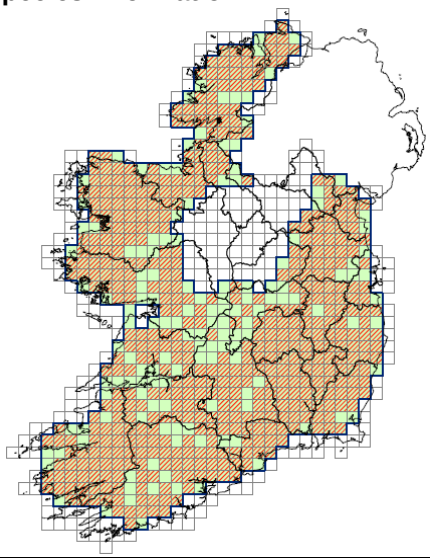
3.9.19 RIVERS WITH MUDDY BANKS

Habitat Name (code)	**Rivers with muddy banks with *Chenopodion rubri p.p.* and *Bidention p.p.* vegetation (3270)**	
Habitat Information 	Primarily found in riverine turloughs where flood water recedes relatively late and in areas prone to summer flooding. Dynamic habitat found on damp mineral soils (alluvial muds) with short lived, small, fast growing species because it is exposed for too short a time for perennial species to colonise.	
Conservation status and trend in Ireland	Overall status Favourable, no trend status available.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	000252	Coole-Garryland Complex
Pressures & threats from aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to Muddy banks	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Abstraction and discharge to rivers from freshwater finfish and recirculation facilities	
Potential significant effects from aquaculture	Abstraction and discharge impacts on the emergence regime which effects the exposure period of the muddy banks	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Individual site level assessment required. Discharge and abstraction arrangements with local authorities will specify limit and conditions. Once adhered to impacts should be minimised.	

3.9.20 SUBMERGED OR PARTLY SUBMERGED SEA CAVES

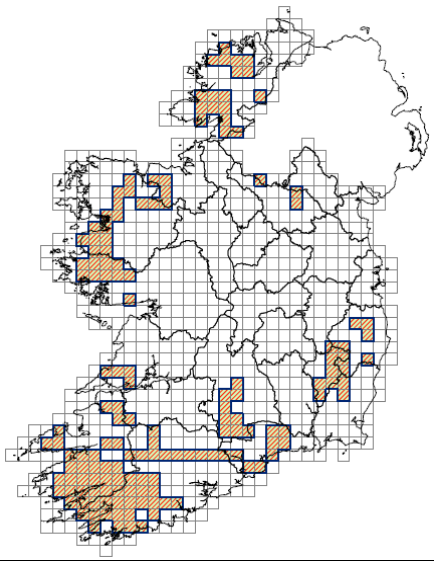
<table>
<tr><th>Habitat Name (code)</th><th colspan="3">Submerged or partly submerged sea caves (8330)</th></tr>
<tr><td>Habitat Information
  </td><td colspan="3">Sea caves vary from small to large caverns 50 -100m in width. Usually occur on cliff faces. Sandstone / limestone geology is associated with approximately 85% of sea caves. Outer margins likely to be similar to exposed intertidal and sub tidal reef communities but where scour is intense the cave may have very limited fauna.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Favourable across range, areas, structure & function and future prospects. Overall Conservations Status therefore Favourable.</td></tr>
<tr><td rowspan="10">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>000020</td><td colspan="2">Black Head-Poulsallagh Complex</td></tr>
<tr><td>002172</td><td colspan="2">Blasket Islands</td></tr>
<tr><td>000472</td><td colspan="2">Broadhaven Bay*</td></tr>
<tr><td>000213</td><td colspan="2">Inishmore Island*</td></tr>
<tr><td>002158</td><td colspan="2">Kenmare River*</td></tr>
<tr><td>002264</td><td colspan="2">Kilkee Reefs</td></tr>
<tr><td>000097</td><td colspan="2">Lough Hyne Nature Reserve and Environs</td></tr>
<tr><td>000101</td><td colspan="2">Roaringwater Bay and Islands*</td></tr>
<tr><td>000707</td><td colspan="2">Saltee Islands</td></tr>
<tr><td>000191</td><td colspan="2">St. John's Point</td></tr>
<tr><td>Pressures & threats from aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a direct pressure or threat to sea caves</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">Physical presence of marine aquaculture facilities adjacent or near to sea caves.</td></tr>
<tr><td>Potential significant effects from aquaculture</td><td colspan="3">Aquaculture blocking access.</td></tr>
<tr><td>Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts</td><td colspan="3">Site level assessment as appropriate.</td></tr>
</table>

3.9.21 ATLANTIC SALMON

<table>
<tr><th>Species Name (code)</th><th colspan="2">Atlantic Salmon (freshwater)</th><th>Salmo salar (1106)</th></tr>
<tr><td>Species Information
  </td><td colspan="3">The Atlantic Salmon is an anadramous species indigenous to the North Atlantic. Salmon used rivers to reproduce and as a nursery area during their juvenile phase. The Irish Population general comprises fish that spend two winters in freshwater before going to sea during spring as smolts. They spend one to three winters at sea before returning to their natal rivers during summer as grilse. They reproduce at this stage by depositing eggs in redds excavated from river gravel and the cycle begins once more. While the recent stabilisation of salmon numbers spawning in Ireland along with the increasing number of salmon rivers meeting their conservation limits is good, there are concerns about the low rate of marine survival and ongoing threats to the quality of freshwater habitats</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Range and habitat are Favourable. Population is Stable but Inadequate leading to an overall Conservation Status of Inadequate with a Stable future trend.</td></tr>
<tr><td rowspan="28">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>002170</td><td colspan="2">Blackwater River (Cork/Waterford)*</td></tr>
<tr><td>002173</td><td colspan="2">Blackwater River (Kerry)</td></tr>
<tr><td>000343</td><td colspan="2">Castlemaine Harbour*</td></tr>
<tr><td>002047</td><td colspan="2">Cloghernagore Bog and Glenveagh National Park*</td></tr>
<tr><td>002034</td><td colspan="2">Connemara Bog Complex*</td></tr>
<tr><td>000500</td><td colspan="2">Glenamoy Bog Complex*</td></tr>
<tr><td>000365</td><td colspan="2">Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment</td></tr>
<tr><td>002176</td><td colspan="2">Leannan River*</td></tr>
<tr><td>000297</td><td colspan="2">Lough Corrib</td></tr>
<tr><td>000163</td><td colspan="2">Lough Eske and Ardnamona Wood*</td></tr>
<tr><td>001976</td><td colspan="2">Lough Gill</td></tr>
<tr><td>000428</td><td colspan="2">Lough Melvin</td></tr>
<tr><td>002165</td><td colspan="2">Lower River Shannon*</td></tr>
<tr><td>002137</td><td colspan="2">Lower River Suir</td></tr>
<tr><td>002008</td><td colspan="2">Maumturk Mountains</td></tr>
<tr><td>001932</td><td colspan="2">Mweelrea/Sheeffry/Erriff Complex</td></tr>
<tr><td>002144</td><td colspan="2">Newport River</td></tr>
<tr><td>000534</td><td colspan="2">Owenduff/Nephin Complex</td></tr>
<tr><td>002162</td><td colspan="2">River Barrow and River Nore*</td></tr>
<tr><td>002299</td><td colspan="2">River Boyne and River Blackwater</td></tr>
<tr><td>002301</td><td colspan="2">River Finn*</td></tr>
<tr><td>002298</td><td colspan="2">River Moy</td></tr>
<tr><td>000781</td><td colspan="2">Slaney River Valley*</td></tr>
<tr><td>002031</td><td colspan="2">The Twelve Bens/Garraun Complex*</td></tr>
<tr><td>001898</td><td colspan="2">Unshin River</td></tr>
<tr><td>000197</td><td colspan="2">West of Ardara/Maas Road*</td></tr>
<tr><td>Pressures & threats related to aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>intensive fish farming, intensification</td><td colspan="2">M</td><td>M</td></tr>
</table>

Potential interactions with aquaculture (by species and culture method)	Interactions with marine and freshwater finfish culture - salmon and trout.
Potential significant effects from aquaculture activities	Sedimentation changes; biogeochemical changes; chemical inputs; infrastructure impacts incl. physical disturbance; noise & visual disturbance; predator control; interbreeding risks; pathogen risks.
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	All marine finfish aquaculture applications require an EIA and screening for AA. Site selection should be carried out on the basis of proximity to areas protected for Atlantic Salmon taking into consideration already established migration routes. Controls, mitigation & management as outlined in Section 3.6 & 3.7.

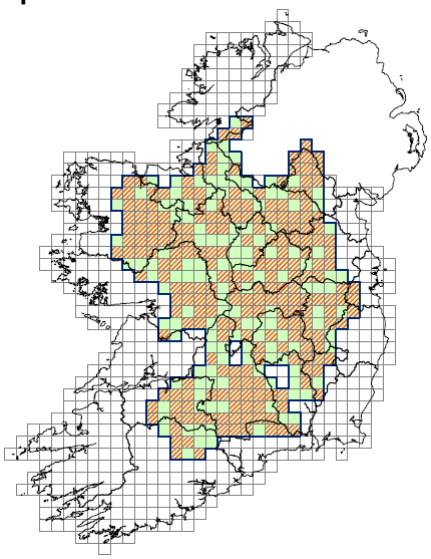
3.9.22 FRESHWATER PEARL MUSSEL

Species Name (code)	**Freshwater Pearl Mussel**	***Margaritifera margaritifera* (1029)**
Species Information 	A large bivalve found in oligotrophic soft to neutral waters of rivers and occasionally lakes. Notable biology and ecology. Grows to very large sizes and can survive in natural conditions up to 100 years. Produces glochidial larvae that use a salmonid host (salmon, seatrout and brown trout). Considered critically endangered in Ireland and across Europe. Reproduction is limited by poor water quality related to eutrophication and sedimentation.	
Conservation status and trend in Ireland	Range is Favourable. Population and habitat are Bad and Declining. Future prospects are Bad but Improving. Overall Conservation Status is Bad and Declining.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	002171	Bandon River
	002170	Blackwater River (Cork/Waterford)*
	002173	Blackwater River (Kerry)
	002047	Cloghernagore Bog and Glenveagh National Park*
	000140	Fawnboy Bog/Lough Nacung
	001879	Glanmore Bog
	000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment
	002176	Leannan River*
	000297	Lough Corrib
	000163	Lough Eske and Ardnamona Wood*
	002165	Lower River Shannon*
	002137	Lower River Suir
	000375	Mount Brandon

	001932	Mweelrea/Sheeffry/Erriff Complex
	002144	Newport River
	002162	River Barrow and River Nore*
	000781	Slaney River Valley*
	002031	The Twelve Bens/Garraun Complex*
	000197	West of Ardara/Maas Road*

Pressures & threats related to aquaculture	Main pressures	Main threats
Aquaculture not identified as a pressure or threat to freshwater Pearl Mussel	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Freshwater aquaculture installations discharging to rivers and lakes.	
Potential significant effects from aquaculture activities	Discharges from fish farms which may have an impact on water quality. This is unlikely if the farm operates within the conditions set by its effluent discharge consent licence.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Knowledge of the presence of Freshwater Pearl Mussels and careful management of discharges in accordance with the requirement of effluent discharge consent permit.	

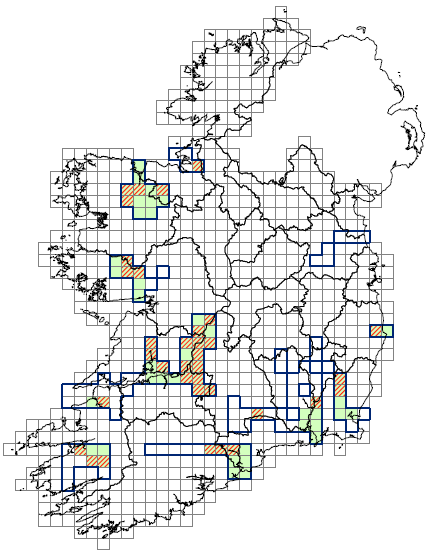
3.9.23 WHITE-CLAWED CRAYFISH

Species Name (code)	**White-Clawed Crayfish**	***Austropotamobius pallipes* (1092)**
Species Information 	Largest non-marine invertebrate found in Ireland. Grows to approx. 11cm long and lives for up to 10 years. Introduced in the 17th century and highly vulnerable to fungal disease from other species of crayfish. Generally associated with moderate to good water quality. Susceptible to some pesticides and organic compounds	
Conservation status and trend in Ireland	Favourable in range population and habitat. Future prospects are Inadequate but Stable. Overall Conservation Status is Unfavourable - Inadequate but Stable.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	002170	Blackwater River (Cork/Waterford)*
	001656	Bricklieve Mountains & Keishcorran
	001919	Glenade Lough
	001786	Kilroosky Lough Cluster
	002120	Lough Bane and Lough Glass

	000297	Lough Corrib
	001976	Lough Gill
	000633	Lough Hoe Bog
	002121	Lough Lene
	002135	Lough Nageage
	000688	Lough Owel
	002137	Lower River Suir
	002162	River Barrow and River Nore*
	002298	River Moy
	001810	White Lough, Ben Loughs and Lough Doo

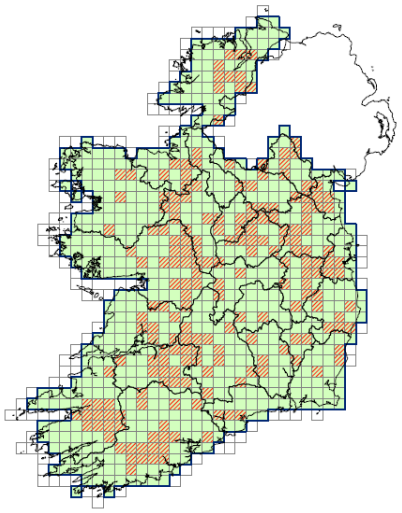
Pressures & threats related to aquaculture	Main pressures	Main threats
Aquaculture not identified as a pressure or threat to freshwater Pearl Mussel	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Freshwater aquaculture installations discharging to rivers and lakes.	
Potential significant effects from aquaculture activities	Discharges from fish farms which may have an impact on water quality. This is unlikely if the farm operates within the conditions set by its effluent discharge consent licence.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Knowledge of the presence of White-clawed Crayfish and careful management of discharges in accordance with the requirement of effluent discharge consent permit.	

3.9.24 SEA LAMPREY

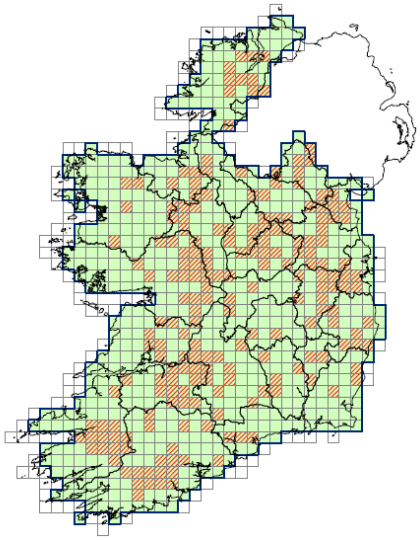
Species Name (code)	**Sea Lamprey**	***Petromyzon marinus* (1095)**
Species Information 	Sea Lamprey contain both freshwater and marine phases. Adults live in the sea as external parasites on host fish. They migrate into freshwater in spring ascending rivers to spawn. Adult males excavate redds in gravel of fast flowing rivers and release a pheromone which attracts females. Reproduction is external and takes place in June and July. Young lamprey hatch within days and either swim or are washed downstream where it burrows in fine sediments and remains for a number of years. Upon maturation the young adults migrate to estuaries and open sea in late autumn and winter. Barriers to upstream movement have a major negative impact on the good conservation status.	
Conservation status and trend in Ireland	Range and population and future prospects Bad but Stable. Habitat Favourable. Overall Conservation Status is Bad.	

<table>
<tr><td rowspan="11">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>002170</td><td colspan="2">Blackwater River (Cork/Waterford)*</td></tr>
<tr><td>000343</td><td colspan="2">Castlemaine Harbour*</td></tr>
<tr><td>000627</td><td colspan="2">Cummeen Strand/Drumcliff Bay (Sligo Bay)</td></tr>
<tr><td>000458</td><td colspan="2">Killala Bay/Moy Estuary</td></tr>
<tr><td>000365</td><td colspan="2">Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment</td></tr>
<tr><td>000297</td><td colspan="2">Lough Corrib</td></tr>
<tr><td>001976</td><td colspan="2">Lough Gill</td></tr>
<tr><td>002165</td><td colspan="2">Lower River Shannon*</td></tr>
<tr><td>002137</td><td colspan="2">Lower River Suir</td></tr>
<tr><td>002162</td><td colspan="2">River Barrow and River Nore*</td></tr>
<tr><td>002298</td><td colspan="2">River Moy</td></tr>
<tr><td>000781</td><td colspan="2">Slaney River Valley*</td></tr>
<tr><td>Pressures & threats related to aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a pressure or threat to Sea Lamprey</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">All types of marine and freshwater aquaculture.</td></tr>
<tr><td>Potential significant effects from aquaculture activities</td><td colspan="3">Changes in sedimentation of rivers associated with discharges from freshwater fish farms located on rivers which could bring about changes to the location of suitable habitat for reproduction and burrowing. Also, biogeochemical changes; chemical inputs.</td></tr>
<tr><td>Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts</td><td colspan="3">Compliance with the requirements of the discharge consent licence will mitigate this risk.</td></tr>
</table>

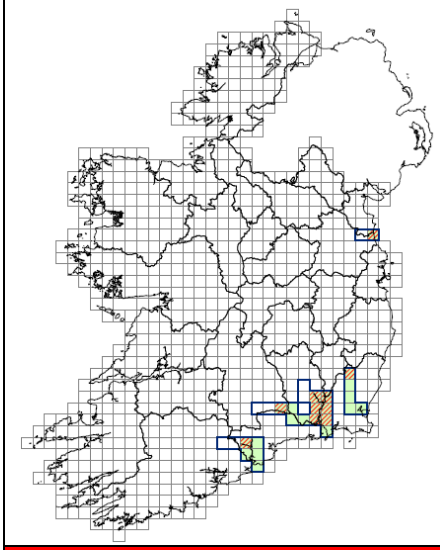
3.9.25 BROOK LAMPREY

<table>
<tr><th>Species Name (code)</th><th colspan="2">Brook Lamprey</th><th>*Lampetra planeri* (1096)</th></tr>
<tr><td>Species Information
  </td><td colspan="3">This is the smallest of the three lamprey species. It does not migrate nor is it parasitic. It spawns in spring in fine gravel and once hatched the young migrate to fine sediments in which they burrow and filter feed for a number of years. Adults die post spawning. They can be impacted negatively by sedimentary changes to their habitat, and both diffuse and point source pollution. Indistinguishable from River Lamprey at larval stage.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Range, population, habitat and future prospects are all Favourable meaning the overall Conservation Status is also Favourable.</td></tr>
<tr><td rowspan="10">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>002171</td><td colspan="2">Bandon River</td></tr>
<tr><td>000365</td><td colspan="2">Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment</td></tr>
<tr><td>000297</td><td colspan="2">Lough Corrib</td></tr>
<tr><td>001976</td><td colspan="2">Lough Gill</td></tr>
<tr><td>002165</td><td colspan="2">Lower River Shannon*</td></tr>
<tr><td>002137</td><td colspan="2">Lower River Suir</td></tr>
<tr><td>002162</td><td colspan="2">River Barrow and River Nore*</td></tr>
<tr><td>002298</td><td colspan="2">River Moy</td></tr>
<tr><td>000781</td><td colspan="2">Slaney River Valley*</td></tr>
<tr><td>002170</td><td colspan="2">Blackwater River (Cork/Waterford)*</td></tr>
<tr><td>Pressures & threats related to aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a pressure or threat to Brook Lamprey</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">Freshwater aquaculture discharging to rivers hosting the species.</td></tr>
<tr><td>Potential significant effects from aquaculture activities</td><td colspan="3">Changes in sedimentation and chemical inputs associated with, and biogeochemical changes brought about by discharges from freshwater fish farms located on rivers could have an impact. Where a farm operates within the limits of its effluent discharge consent licence this should not be an issue.</td></tr>
<tr><td>Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts</td><td colspan="3">Compliance with the requirements of the farm's effluent discharge consent licence will mitigate this risk.</td></tr>
</table>

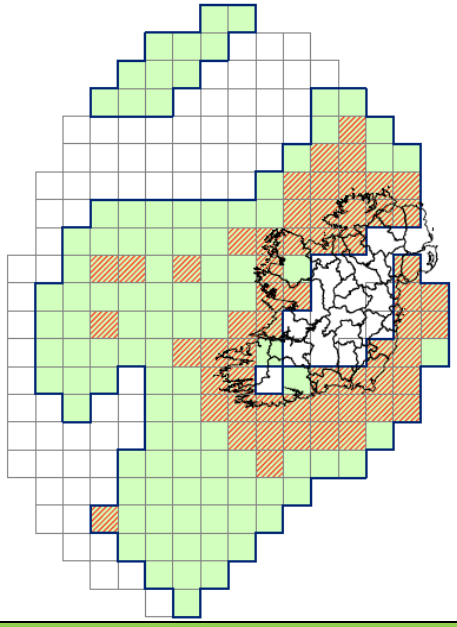
3.9.26 RIVER LAMPREY

<table>
<tr><th>Species Name (code)</th><th colspan="2">River Lamprey</th><th>*Lampetra fluviatilis* (1099)</th></tr>
<tr><td>Species Information
  </td><td colspan="3">Spawns in spring in fine gravel and once hatched the young migrate to fine sediments in which they burrow and filter feed for a number of years. Adults die post spawning. They can be impacted negatively by sedimentary changes to their habitat, and both diffuse and point source pollution. Indistinguishable from Brook Lamprey and larval stage.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Range, population, habitat and future prospects are all Favourable meaning the overall Conservation Status is also Favourable.</td></tr>
<tr><td>SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td colspan="3"><table>
<tr><td>000343</td><td>Castlemaine Harbour*</td></tr>
<tr><td>000627</td><td>Cummeen Strand/Drumcliff Bay (Sligo Bay)</td></tr>
<tr><td>000365</td><td>Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment</td></tr>
<tr><td>001976</td><td>Lough Gill</td></tr>
<tr><td>002165</td><td>Lower River Shannon*</td></tr>
<tr><td>002137</td><td>Lower River Suir</td></tr>
<tr><td>002162</td><td>River Barrow and River Nore*</td></tr>
<tr><td>002299</td><td>River Boyne and River Blackwater</td></tr>
<tr><td>000781</td><td>Slaney River Valley*</td></tr>
<tr><td>002170</td><td>Blackwater River (Cork/Waterford)*</td></tr>
</table></td></tr>
<tr><td>Pressures & threats related to aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a direct pressure or threat to River Lamprey</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">Freshwater aquaculture discharging to rivers hosting the species.</td></tr>
<tr><td>Potential significant effects from aquaculture activities</td><td colspan="3">Changes in sedimentation and chemical inputs associated with, and biogeochemical changes brought about by discharges from freshwater fish farms located on rivers could have an impact. Where a farm operates within the limits of its effluent discharge consent licence this should not be an issue.</td></tr>
<tr><td>Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts</td><td colspan="3">Compliance with the requirements of the farm's effluent discharge consent licence will mitigate this risk.</td></tr>
</table>

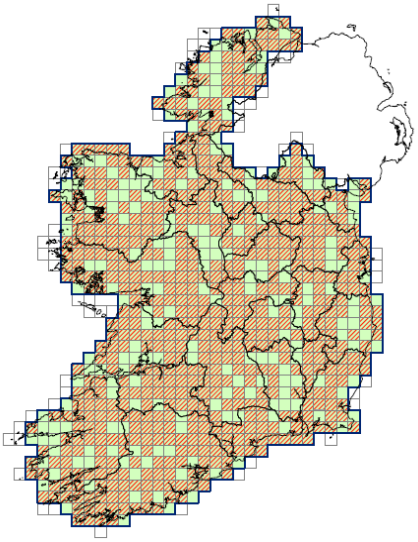
3.9.27 TWAITE SHAD

<table>
<tr><th>Species Name (code)</th><th colspan="2">Twaite Shad</th><th>*Alosa fallax* (1103)</th></tr>
<tr><td>Species Information
  </td><td colspan="3">A member of the herring family which, as adults, lives in the lower reaches of estuaries or at sea. Travel to the upper tidal reaches of rivers to spawn before descending back into the estuaries. Eggs are externally fertilised and float or sit on the channel bed until hatching in June and July. Can live in estuarine waters for two full years before going to sea. Naturally shoal and can be caught in fishing gear where they are normally considered by-catch. Found in East and South East only.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Range is Bad but Improving. Population, habitat and future prospects are Inadequate but Stable giving an overall assessment of Bad but Stable.</td></tr>
<tr><td rowspan="5">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>000365</td><td colspan="2">Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment</td></tr>
<tr><td>002137</td><td colspan="2">Lower River Suir</td></tr>
<tr><td>002162</td><td colspan="2">River Barrow and River Nore*</td></tr>
<tr><td>000781</td><td colspan="2">Slaney River Valley*</td></tr>
<tr><td>002170</td><td colspan="2">Blackwater River (Cork/Waterford)*</td></tr>
<tr><td>Pressures & threats related to aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a pressure or threat to Twaite Shad</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">All types of marine aquaculture.</td></tr>
<tr><td>Potential significant effects from aquaculture activities</td><td colspan="3">Sedimentation changes; biogeochemical changes, chemical inputs; noise & visual disturbance; predator control measures; pathogens.</td></tr>
<tr><td>Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts</td><td colspan="3">Controls, mitigation & management as outlined in Section 3.6 & 3.7.</td></tr>
</table>

3.9.28 HARBOUR PORPOISE

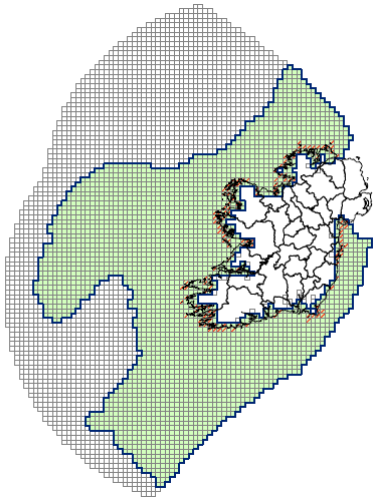
<table>
<tr><th>Species Name (code)</th><th>Harbour Porpoise</th><th>Phocoena phocoena (1351) (also Annex IV)</th></tr>
<tr><td>Species Information
  </td><td colspan="2">The smallest cetacean species in Irish waters. Only inhabits the northern hemisphere and is predominantly found in cold temperate the sub-polar waters. Classified as a species of least conservation concern due to its widespread occurrence and overall abundance estimates meaning it is well above thresholds for threatened category.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="2">Range, population, habitat and future prospects are Favourable giving an overall Conservation Status of Favourable. Most frequently recorded cetacean species around the Irish coast.</td></tr>
<tr><td rowspan="3">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>002172</td><td>Blasket Islands</td></tr>
<tr><td>000101</td><td>Roaringwater Bay and Islands*</td></tr>
<tr><td>003000</td><td>Rockabill to Dalkey Island</td></tr>
<tr><td>Pressures & threats related to Aquaculture</td><td colspan="2">Main pressures | Main threats</td></tr>
<tr><td>Aquaculture not identified as a direct pressure or threat to Harbour Porpoise</td><td colspan="2">No pressure | No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="2">All marine aquaculture.</td></tr>
<tr><td>Potential significant effects from aquaculture activities</td><td colspan="2">Chemical inputs, noise & visual disturbance; predator control measures.</td></tr>
<tr><td>Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts</td><td colspan="2">Allowable non-lethal predator control measures to be stated as a licence condition.</td></tr>
</table>

3.9.29 OTTER

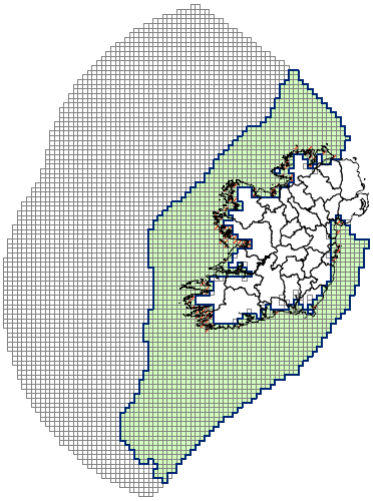
Species Name (code)	Otter	*Lutra lutra* (1355) (also Annex IV)
Species Information 	A large carnivore with a long slim body, short legs, tapered tail and webbed feet. Otters have two basic requirements: aquatic prey and safe refuges where they can rest. They are territorial animals and can be found along rivers lakes and the coast with plenty of nearby cover. Coastal otters also require a source of freshwater within their territory. They are opportunistic predators and feed on fish, molluscs, bird and even small mammals. Main threats to otters in Ireland are habitat destruction, pollution and accidental death e.g. fishing gear. The European populations have suffered large declines but the Irish population has remained strong.	
Conservation status and trend in Ireland	Range, population, habitat and future prospects are Favourable giving an overall Conservation Status of Favourable.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	000623	Ben Bulben, Gleniff and Glenade Complex
	002170	Blackwater River (Cork/Waterford) *
	002173	Blackwater River (Kerry)
	000343	Castlemaine Harbour*
	001482	Clew Bay Complex*
	002047	Cloghernagore Bog and Glenveagh National Park*
	002034	Connemara Bog Complex*
	000032	Dromore Woods and Loughs
	001926	East Burren Complex
	000268	Galway Bay Complex*
	000090	Glengarriff Harbour and Woodland*
	001141	Gweedore Bay and Islands*
	002158	Kenmare River*
	002111	Kilkieran Bay and Islands*
	000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment
	002176	Leannan River*
	001774	Lough Carra/Mask Complex
	000297	Lough Corrib
	001976	Lough Gill
	000428	Lough Melvin
	000007	Lough Oughter and Associated Loughs
	000440	Lough Ree
	002287	Lough Swilly*
	002165	Lower River Shannon*
	002137	Lower River Suir
	000057	Moyree River System
	000470	Mullet/Blacksod Bay Complex
	002159	Mulroy Bay*
	001932	Mweelrea/Sheeffry/Erriff Complex
	002012	North Inishowen Coast*
	000534	Owenduff/Nephin Complex
	002162	River Barrow and River Nore*

	002299	River Boyne and River Blackwater
	002301	River Finn*
	002298	River Moy
	000216	River Shannon Callows
	000101	Roaringwater Bay and Islands*
	000781	Slaney River Valley*
	000190	Slieve Tooey/Tormore Island/Loughros Beg Bay*
	000108	The Gearagh
	002031	The Twelve Bens/Garraun Complex*
	002070	Tralee Bay and Magharees Peninsula, West to Cloghane
	001898	Unshin River
	000197	West of Ardara/Maas Road*
	002122	Wicklow Mountains
Pressures & threats related to aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to Otters	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	All types of freshwater and marine aquaculture.	
Potential significant effects from aquaculture activities	Sedimentation changes; chemical inputs; infrastructure impacts incl. physical disturbance; noise and visual disturbance; predator control measures.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Awareness of local populations of otters. Non-lethal predator deterrents as a condition of licence.	

3.9.30 GREY SEAL

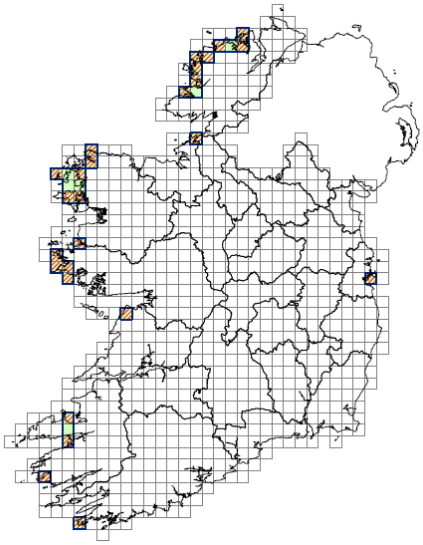
<table>
<tr><th>Species Name (code)</th><th colspan="2">Grey Seal</th><th>*Halichoerus grypus* (1364)</th></tr>
<tr><td>Species Information
  </td><td colspan="3">The larger of the two species of seal which inhabit and breed in Irish waters. Grey seals only inhabit the northern hemisphere and are predominantly found in cold temperate and sub polar waters occurring in estuarine, coastal and offshore marine areas and occasionally travelling upstream in rivers. Grey seas also inhabit established terrestrial colonies known as haul out sites. Here individual seals breed, moult, rest and engage in social activity. Use of the sites follows an annual cycle and in Ireland there is a tendency for them to be located in more remote locations. The Grey Seal is classified as a species of least conservation concern due to overall abundance estimated for the north atlantic and evidence of increasing populations.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Range, Population, Habitat and Future Prospects are favourable giving an overall conservation status of Favourable. Most frequently recorded cetacean species around the Irish coast.</td></tr>
<tr><td rowspan="10">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>002172</td><td colspan="2">Blasket Islands</td></tr>
<tr><td>000495</td><td colspan="2">Duvillaun Islands</td></tr>
<tr><td>000147</td><td colspan="2">Horn Head and Rinclevan</td></tr>
<tr><td>000278</td><td colspan="2">Inishbofin and Inishshark</td></tr>
<tr><td>000507</td><td colspan="2">Inishkea Islands</td></tr>
<tr><td>000204</td><td colspan="2">Lambay Island</td></tr>
<tr><td>000101</td><td colspan="2">Roaringwater Bay and Islands*</td></tr>
<tr><td>000707</td><td colspan="2">Saltee Islands</td></tr>
<tr><td>000190</td><td colspan="2">Slieve Tooey/Tormore Island/Loughros Beg Bay*</td></tr>
<tr><td>000328</td><td colspan="2">Slyne Head Islands*</td></tr>
<tr><td>Pressures & threats related to aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a direct pressure or threat to Grey Seals</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">Given its range in coastal areas grey seals can occur near and on any marine aquaculture site.</td></tr>
<tr><td>Potential significant effects from aquaculture activities</td><td colspan="3">Noise and visual disturbance particularly at haul out sites; predator control measures; catching in aquaculture structures; chemical inputs. Displacement from haul out sites. Entanglement in cage nets and other equipment</td></tr>
<tr><td>Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts</td><td colspan="3">Local knowledge of haul out sites in proximity to aquaculture site to be consulted to assist with site selection. Specification of use of non-lethal predator deterrents as a condition of licence. Clever cage design to minimise ability to interact and get caught in structures.</td></tr>
</table>

3.9.31 COMMON / HARBOUR SEAL

<table>
<tr><th>Species Name (code)</th><th colspan="2">Common / Harbour Seal</th><th>*Phoca vitulina* (1365)</th></tr>
<tr><td>Species Information
  </td><td colspan="3">The smaller of the two species of seal found in Irish waters. It prefers enclosed sheltered coastal bays and estuaries and can also travel further upstream within river systems. Also occupies terrestrial haul out sites for breeding, moulting, resting and engaging in social activities according to an annual cycle. One of the most widespread pinneped species in the northern hemisphere from sub-tropical to northern polar regions with stable or increasing overall numbers. However, some declines have been recorded in Europe. Pressures where they do occur appear to be low and of localised importance e.g. disturbance due to proximity of haul outs to other coastal activities.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Range, Population, Habitat and Future Prospects are favourable giving an overall conservation status of Favourable. Most frequently recorded cetacean species around the Irish coast.</td></tr>
<tr><td rowspan="13">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>000019</td><td colspan="2">Ballysadare Bay</td></tr>
<tr><td>001482</td><td colspan="2">Clew Bay Complex*</td></tr>
<tr><td>000627</td><td colspan="2">Cummeen Strand/Drumcliff Bay (Sligo Bay)</td></tr>
<tr><td>000133</td><td colspan="2">Donegal Bay (Murvagh)*</td></tr>
<tr><td>000268</td><td colspan="2">Galway Bay Complex*</td></tr>
<tr><td>000090</td><td colspan="2">Glengarriff Harbour and Woodland*</td></tr>
<tr><td>002158</td><td colspan="2">Kenmare River*</td></tr>
<tr><td>002111</td><td colspan="2">Kilkieran Bay and Islands*</td></tr>
<tr><td>000458</td><td colspan="2">Killala Bay/Moy Estuary</td></tr>
<tr><td>000204</td><td colspan="2">Lambay Island</td></tr>
<tr><td>002283</td><td colspan="2">Rutland Island and Sound*</td></tr>
<tr><td>000781</td><td colspan="2">Slaney River Valley*</td></tr>
<tr><td>000197</td><td colspan="2">West of Ardara/Maas Road*</td></tr>
<tr><td>Pressures & threats related to aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Marine & freshwater aquaculture</td><td colspan="2">L</td><td>L</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">All types of marine aquaculture. Intertidal aquaculture sites located on established or potential haul out sites. Seals swimming and hunting in the vicinity of marine cage sites. Provision of additional haul out (resting) sites on floats and other structures.</td></tr>
<tr><td>Potential significant effects from aquaculture activities</td><td colspan="3">Noise and visual disturbance particularly at haul out sites; predator control measures; catching in aquaculture structures; chemical inputs. Displacement from haul out sites. Entanglement in cage nets and other equipment</td></tr>
</table>

Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Careful site selection and equipment design and maintenance. Net pens kept taut eliminate risks of entanglement.

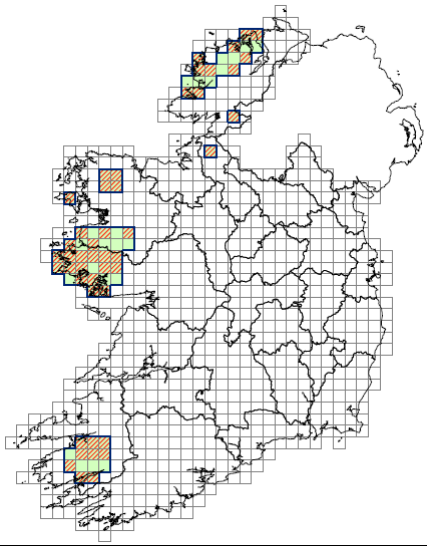
3.9.32 PETALWORT

Species Name (code)	**Petalwort**	***Petalophyllum ralfsii* (1395)**
Species Information 	A small pale green liverwort found in sand dune habitats. There are 30 extant populations in Ireland predominantly on the west coast from Donegal to west Cork and one population on the east coast in Dublin.	
Conservation status and trend in Ireland	Range, Population, Habitat and Future Prospects are favourable giving an overall conservation status of Favourable.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	000335	Ballinskelligs Bay and Inny Estuary
	000020	Black Head-Poulsallagh Complex
	000625	Bunduff Lough and Machair/Trawalua/Mullaghmore
	000343	Castlemaine Harbour*
	001497	Doogort Machair/Lough Doo
	000500	Glenamoy Bog Complex*
	001141	Gweedore Bay and Islands*
	000147	Horn Head and Rinclevan
	000507	Inishkea Islands
	001513	Keel Machair/Menaun Cliffs
	000470	Mullet/Blacksod Bay Complex
	002129	Murvey Machair
	001932	Mweelrea/Sheeffry/Erriff Complex
	000206	North Dublin Bay
	001309	Omey Island Machair
	001190	Sheephaven*
	002074	Slyne Head Peninsula*
	002070	Tralee Bay and Magharees Peninsula, West to Cloghane

	000194	Tranarossan and Melmore Lough
	000197	West of Ardara/Maas Road*

Pressures & threats related to aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to Petalwort	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Spatial overlap with service facilities for and access routes to intertidal culture sites.	
Potential significant effects from aquaculture activities	Infrastructure impact incl. physical disturbance. Removal of vegetation through erosion and compaction of sediments by tractor traffic. Destruction through service facility construction.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic.	

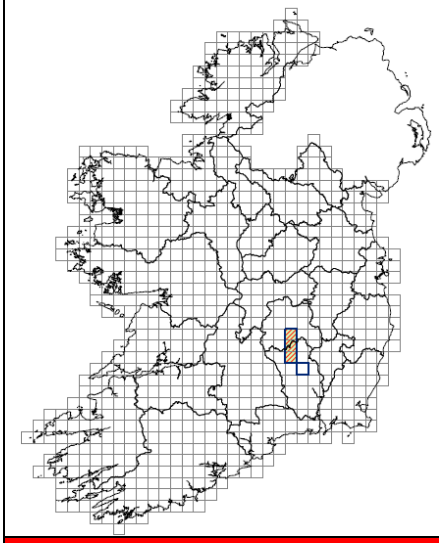
3.9.33 SLENDER NAIAD

Species Name (code)	**Slender Naiad**	**Najas flexilis (1833) (also Annex IV)**
Species Information 	A small annual water plant that grows permanently submerged in the lower euphotic depths of clear water lowland lakes.	
Conservation status and trend in Ireland	Favourable in range. Inadequate but stable population, habitat and future prospects giving an overall conservation status of inadequate but stable.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	001975	Ballyhoorisky Point to Fanad Head*
	002118	Barnahallia Lough
	001342	Cloonee and Inchiquin Loughs, Uragh Wood
	002034	Connemara Bog Complex*
	001251	Cregduff Lough
	001919	Glenade Lough
	001141	Gweedore Bay and Islands*
	000147	Horn Head and Rinclevan
	002111	Kilkieran Bay and Islands*

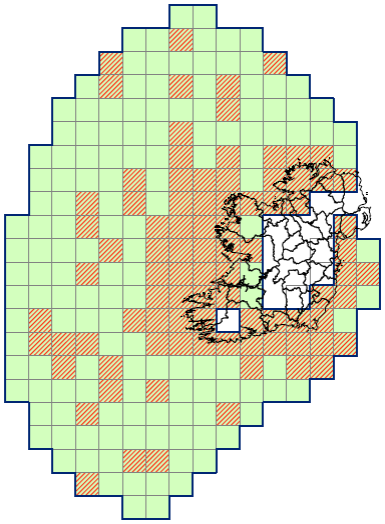
	000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment
	001151	Kindrum Lough
	002176	Leannan River*
	000297	Lough Corrib
	002177	Lough Dahybaun
	002119	Lough Nageeron
	000164	Lough Nagreany Dunes
	002008	Maumturk Mountains
	001932	Mweelrea/Sheeffry/Erriff Complex
	001311	Rusheenduff Lough
	000185	Sessiagh Lough
	002074	Slyne Head Peninsula*
	002031	The Twelve Bens/Garraun Complex*
	002130	Tully Lough
	000197	West of Ardara/Maas Road*

Pressures & threats related to aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to Slender Naiad	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Only potential spatial link is with freshwater finfish culture in lakes.	
Potential significant effects from aquaculture activities	Discharges from fish farms which may have an impact on water quality. This is unlikely if the farm operates within the conditions set by its effluent discharge consent licence.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Knowledge of the presence of Slender Najad and careful management of discharges in accordance with the requirement of effluent discharge consent permit.	

3.9.34 IRISH /NORE FRESHWATER PEARL MUSSEL

Species Name (code)	**Irish / Nore Freshwater Pearl Mussel**	***Margaritifera durrovensis* (1990)**
Species Information 	Known only from the lime rich waters of the River Nore in contrast to *Margaritifera margaritifera* which lives in acid waters.	
Conservation status and trend in Ireland	Bad but stable range and habitat. Bad and declining population and future prospects giving an overall Conservation Status of Bad.	
SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)	002162	River Barrow and River Nore*
Pressures & threats related to aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to Nore Freshwater Pearl Mussel	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Freshwater aquaculture installations discharging to rivers and lakes.	
Potential significant effects from aquaculture activities	Discharges from fish farms which may have an impact on water quality. This is unlikely if the farm operates within the conditions set by its effluent discharge consent licence.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Knowledge of the presence of Nore Freshwater Pearl Mussels and careful management of discharges in accordance with the requirement of effluent discharge consent permit.	

3.9.35 BOTTLENOSE DOLPHIN

<table>
<tr><th>Species Name (code)</th><th colspan="2">Bottlenose Dolphin</th><th>Tursiops truncatus (1349) (Annex IV)</th></tr>
<tr><td>Species Information
  </td><td colspan="3">One of the most frequently recorded and familiar cetacean species occurring in Irish waters. Found throughout the world's tropical and temperate waters, it is classified as a species of least concern and occurs in numbers well above the threatened threshold.</td></tr>
<tr><td>Conservation status and trend in Ireland</td><td colspan="3">Range, population, habitat and future prospects are favourable giving an overall conservation status of Favourable.</td></tr>
<tr><td rowspan="2">SACs where it is a feature (NPWS Site Code, Name, *SAC contains existing aquaculture)</td><td>002165</td><td colspan="2">Lower River Shannon*</td></tr>
<tr><td>002998</td><td colspan="2">West Connaught Coast</td></tr>
<tr><td>Pressures & threats related to aquaculture</td><td colspan="2">Main pressures</td><td>Main threats</td></tr>
<tr><td>Aquaculture not identified as a direct pressure or threat to common Bottlenose Dolphin</td><td colspan="2">No pressure</td><td>No threat</td></tr>
<tr><td>Potential interactions with aquaculture (by species and culture method)</td><td colspan="3">All marine aquaculture</td></tr>
<tr><td>Potential significant effects from aquaculture activities</td><td colspan="3">Chemical inputs, noise & visual disturbance; predator control measures.</td></tr>
<tr><td>Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts</td><td colspan="3">Allowable non-lethal predator control measures to be stated as a licence condition.</td></tr>
</table>

3.10 IMPACT PREDICTIONS AND MITIGATION MEASURES - BIRDS

All bird species screened for further assessment are subject to a strategic level assessment. The following section of the NIS provides a table for groups of Bird Species Screened IN during the stage 1 assessment.

Bird Group	Count of Species
Auks	3
Crakes & rails	2
Crows	1
Divers	2
Grebes	2
Gulls	5
Kingfishers & allies	1
Seabirds	7
Terns	5
Waders	15
Water birds	1
Wildfowl	20
Raptors & falcons	3
Total	**67**

Background information and details of the current conservation status for the assessed bird species have been collected from three primary sources:

- BirdWatch Ireland (2011): *Action Plans for Dune and Machair Birds/ Lake, Fen and Turlough Birds/ Lowland Farmland Birds/ Marine and Seacliff Birds/ Raised Bog Birds/ Shore and Lagoon Birds/ Riparian Birds/ Woodland and Scrub Birds/ Upland Birds/ Urban and Suburban Birds.*
- Colhoun, K. & Cummins, S. (2013): *Birds of Conservation Concern in Ireland 2014-2019.*
- BirdLife International (2004): *Birds in Europe: population estimates, trends and conservation status.*

Potential impacts are identified by reference to Figures 3.5a and 3.5b. Potential pressures/threats are identified through the relevant species fact sheets from BirdLife International (2014/2015) IUCN Red List for birds as well as via the completed bay scale Appropriate Assessments carried out by the Marine Institute (www.agriculture.gov.ie). Potential interactions are based on Huntington et al. (2006). While useful for a strategic level assessment, it must be acknowledged that actual impacts are dependent on the scale of the operation and the nature of the receiving environment. The assessments included are a generic indicator and do not replace the need for site level assessment where the proposed activities are examined in the context of the conservation objectives of the specific site where the activities are to take place. This information has been tabulated in the format illustrated by the master table in Figure 3.10 below.

Bird group		
Species		
Pressures & threats related to aquaculture	Main pressures H – High importance M – Medium importance L – Low importance	Main threats: H – High importance M – Medium importance L – Low importance
Potential interactions with aquaculture (by species and culture method)	Identify aquaculture species and culture methods likely to interact with the bird group.	
Potential pressures from aquaculture activities	Using Aquaculture and Pressures Tables (3.5a & 3.5b) in NIS report: Sedimentation changes; biogeochemical changes; chemical inputs; infrastructures impacts incl. physical disturbance; noise& visual disturbance; predator control; interbreeding risks; pathogen risks; alien species risks	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts		

Fig. 3.10: Master table birds assessment

Conservation priority according to Colhoun & Cummins 2013:

Species	red-listed in Ireland: highest conservation priority
Species	amber-listed in Ireland: lesser conservation priority
Species	green-listed in Ireland: least conservation priority

As this assessment addresses interactions between aquaculture and those bird species that are listed as a Feature of Interest in designated SPAs, a second table has been included that lists each species in their respective group and identifies the relevant designated site where aquaculture activities take place. Out of 188 SPAs in Ireland, only 34 host aquaculture activities.

The following table provides information on these 34 SPAs that host aquaculture activities and the various bird species that are listed as Features of Interest.

A full table for all bird species and all SPAs where each species is listed as a Feature of Interest can be found in Annex 6.4.

Detailed species information including conservation status and trend can be found in Annex 6.6.

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*	Total number of sites/species
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076	
Arctic Tern											x								x	x									x	x						5
Barnacle Goose																		x	x										x			x		x		5
Bar-tailed Godwit		x	x	x		x		x	x					x	x	x					x		x			x				x				x	14
Bewick's Swan																																			x	1
Black-headed Gull		x							x						x		x				x				x	x				x				x	9
Black-tailed Godwit		x		x					x						x	x										x									x	7
Chough					x													x				x					x					x		x		6
Common Gull		x							x						x		x				x					x								x		7
Common Scoter						x		x					x		x																x					5
Common Tern									x										x		x					x					x					5
Coot																										x									x	2
Cormorant								x	x									x			x					x					x		x		x	8
Corncrake																																		x		1
Curlew		x		x					x						x	x					x		x			x									x	11
Dunlin		x	x	x		x			x			x			x	x					x		x			x					x				x	14
Eider																																				0
Fulmar					x													x				x											x			4
Gadwall																																				0
Gannet																																				0
Golden Plover		x		x					x			x			x	x					x		x			x									x	10
Goldeneye																									x										x	2

Great Crested Grebe								x						x	x								x										x	5
Great Northern Diver					x							x								x														3
Greenland White-fronted goose																	x							x						x			x	4
Greenshank							x																	x	x									3
Grey Heron								x												x				x									x	4
Grey Plover	x	x	x					x						x	x								x			x				x	x			x	11
Greylag Goose														x											x										2
Guillemot																	x		x				x												3
Hen Harrier																												x						x	2
Herring Gull														x										x								x	x		4
Kingfisher																																			0
Kittiwake																	x		x		x											x			4
Knot			x											x	x									x	x				x					x	7
Lapwing	x		x					x						x	x					x					x									x	8
Leach's Petrel																																			0
Lesser Black-backed Gull	x							x		x													x											x	5
Light-bellied Brent Goose		x	x		x	x	x		x			x		x	x					x					x				x		x			x	14
Little Grebe								x																											x	2
Little Tern																		x	x									x						x	4
Mallard							x							x										x										x	4
Manx Shearwater										x																									1
Merlin											x																x								2
Oystercatcher			x				x	x	x					x	x									x					x					x	9
Peregrine											x						x				x					x						x			5
Pintail			x					x						x											x									x	5
Pochard																																			0
Puffin																																			0
Purple Sandpiper																																			0
Razorbill																	x															x			2
Red-breasted Merganser					x			x						x	x					x				x										x	7
Redshank	x	x	x				x	x	x					x	x					x		x		x	x				x					x	14
Red-throated Diver							x					x																		x					3
Ringed Plover	x				x		x							x						x		x			x				x					8
Roseate Tern																														x					1
Sanderling	x				x		x					x	x									x							x	x				x	9

Sandwich Tern					x										x				x				x				x							5
Scaup							x																x	x								x	4
Shag																x														x	x		3
Shelduck			x					x						x	x								x	x								x	7
Shoveler								x											x				x	x									4
Storm Petrel										x																							1
Teal	x							x						x					x				x	x								x	7
Tufted Duck																																	0
Turnstone	x						x								x				x														9
Whooper Swan																							x	x								x	3
Wigeon							x	x											x				x	x								x	6

Total number of species/site	15	5	13	2	9	1	15	23	3	4	5	4	2	21	15	3	10	4	3	20	5	9	2	24	21	2	2	4	13	6	3	5	6	32

Fig. 3.10a: Bird species that are Features of Interest and SPAs hosting aquaculture activities

3.10.1 AUKS

Bird group	Auks (3 species)	
	Uria aalge	Guillemot
	Fratercula arctica	Puffin
	Alca torda	Razorbill
Pressures & threats related to aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat.	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Potential spatial overlap with marine finfish farms, on-shore activities close to breeding/nesting areas.	
Potential significant effects from aquaculture	Sedimentation, biogeochemical changes, chemical inputs, noise and visual disturbance, predator control measures, entanglement in cage nets.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Careful site selection and equipment design and maintenance. Net pens kept taut to eliminate risks of entanglement. Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Guillemot																	X		X			X												
Puffin																																		
Razorbill																	X															X		

3.10.2 CRAKES AND RAILS

Bird group	**Crakes and rails**	
	Fulica atra	Coot
	Crex crex	Corncrake
Pressures & threats related to aquaculture (by species and culture method)	Main pressures	Main threats
Fishing and harvesting of aquatic resources	-	L *(Fulica atra)*
Potential interactions with aquaculture (by species and culture method)	Coot: Spatial overlap with freshwater aquaculture, farm infrastructure and on-shore activities. (As the corncrake is more terrestrial these potential interactions are only relevant to the coot.)	
Potential significant effects from aquaculture	Coot: Sedimentation, biogeochemical changes, chemical inputs, infrastructure impact, disturbance, predator control. (As the corncrake is more terrestrial these potential significant effects are only relevant to the coot.)	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Deryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Sieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Coot																									X										X
Corncrake																																	X		

3.10.3 CROWS

Bird group	Crows	
	Pyrrhocorax pyrrhocorax	Red-beaked Chough
Pressures & threats related to aquaculture (by species and culture method)	Main Pressures	Main Threats
Aquaculture not identified as direct threat or pressure to crows.	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	All types of freshwater and marine aquaculture.	
Potential significant effects from aquaculture	Noise and visual disturbance, predator control.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Chough					X													X				X					X					X		X	

3.10.4 DIVERS

Bird group	Divers	
	Gavia immer	Great Northern Diver
	Gavia stellata	Red-throated Diver
Pressures & threats related to aquaculture	Main pressures	Main threats
Aquaculture not identified as direct threat or pressure to divers.	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Freshwater lake aquaculture, intertidal shellfish culture, fishing and harvesting of aquatic resources, on-shore activities.	
Potential significant effects from aquaculture	Sedimentation, biogeochemical changes, chemical inputs, infrastructure impact, noise and visual disturbance although the impact is usually short-lived as husbandry activities tend to be short-term. Chemical use also has the potential to impact on diver health.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Careful site selection. Single access routes should be employed and shared by operators to minimise disturbance from vehicular traffic. Strict noise minimisation when working in the intertidal or in on-shore facilities. Non-lethal predator control measures to be stated as a licence condition. Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Great Northern Diver						X							X								X														
Red-throated Diver								X					X																		X				

3.10.5 GREBES

Bird group	Grebes	
	Podiceps cristatus	Great Crested Grebe
	Tachybaptus ruficollis	Little Grebe
Pressures & threats related to Aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct threat to grebes.	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Freshwater lake aquaculture, bottom shellfish culture, fishing and harvesting of aquatic resources, on-shore activities. Intertidal shellfish culture may have a neutral to positive effect though this would be site specific.	
Potential significant effects from aquaculture	Sedimentation, biogeochemical changes, chemical inputs, infrastructure impact, noise and visual disturbance although the impact is usually short-lived as husbandry activities tend to be short-term. Chemical use also has the potential to impact on grebe health.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Careful site selection. Strict noise minimisation when working in the intertidal or in on-shore facilities. Non-lethal predator control measures to be stated as a licence condition. Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Great Crested Grebe									X						X	X									X										X
Little Grebe									X																										X

3.10.6 GULLS

Bird group	Gulls	
	Chroicocephalus ridibundus	Black-headed Gull
	Larus canus	Common Gull
	Larus argentatus	Herring Gull
	Rissa tridactyla	Kittiwake
	Larus fuscus	Lesser Black-backed Gull
Pressures & threats related to aquaculture (by species and culture method)	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to gulls.	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	All types of freshwater and marine aquaculture.	
Potential significant effects from aquaculture	Chemical inputs, noise and visual disturbance, predator control measures.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Black-headed Gull		X							X						X		X				X				X	X				X					X
Common Gull		X							X						X		X				X				X									X	
Herring Gull															X									X									X	X	
Kittiwake																		X		X		X											X		
Lesser Black-backed Gull		X							X		X									X				X											X

3.10.7 KINGFISHERS

Bird group	**Kingfishers**	
	Alcedo atthis	Kingfisher
Pressures & threats related to aquaculture (by species and culture method)	Main pressures	Main threats
Aquaculture not identified as direct threat or pressure to kingfishers.	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Freshwater aquaculture.	
Potential significant effects from aquaculture	Noise and visual disturbance.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Kingfisher																																			

3.10.8 RAPTORS AND FALCONS

Bird group	Raptors and falcons	
	Falco peregrinus	Peregrine
	Falco columbarius	Merlin
	Circus cyaneus	Hen Harrier
Pressures & threats related to Aquaculture	Main pressures	Main threats
Aquaculture not identified as a direct pressure or threat to raptors and falcons.	No pressure	No threat
Potential interactions with aquaculture (by species and culture method)	Spatial overlap with freshwater aquaculture and intertidal shellfish farming.	
Potential significant effects from aquaculture	Chemical inputs, noise and visual disturbance, predator control.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Peregrine												X						X				X					X						X		
Merlin												X																X							
Hen Harrier																												X						X

3.10.9 SEABIRDS

Bird group	**Sea birds**	
	Phalacrocorax carbo	Cormorant
	Fulmarus glacialis	Fulmar
	Morus bassanus	Gannet
	Oceanodroma leucorhoa	Leach's Petrel
	Puffinus puffinus	Manx Shearwater
	Phalacrocorax aristotelis	Shag
	Hydrobates pelagicus	Storm Petrel
Pressures & threats related to aquaculture	Main pressures	Main threats
Marine aquaculture	L	L
Potential interactions with aquaculture (by species and culture method)	Freshwater and marine finfish farming. Bottom shellfish culture.	
Potential significant effects from aquaculture	Sedimentation, biogeochemical changes, chemical inputs, infrastructure impact, noise and visual disturbance, predator control.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Non-lethal predator control measures to be stated as a licence condition. Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Cormorant								X	X									X			X					X					X		X		X
Fulmar					X													X				X											X		
Gannet																																			
Leach's Petrel																																			
Manx Shearwater											X																								
Shag																		X															X	X	
Storm Petrel											X																								

3.10.10 TERNS

Bird group	Terns	
	Sterna paradisaea	Arctic Tern
	Sterna hirundo	Common Tern
	Sterna albifrons	Little Tern
	Sterna dougallii	Roseate Tern
	Sterna sandvicensis	Sandwich Tern
Pressures & threats related to aquaculture	Main pressures	Main threats
Bottom mussel culture	-	L
Potential interactions with aquaculture (by species and culture method)	Marine finfish farming, bottom shellfish culture, and on-shore infrastructure.	
Potential significant effects from aquaculture	Biogeochemical changes, chemical inputs, infrastructure impact, noise and visual disturbance, predator control.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Careful site selection for on-shore facilities and access routes to avoid breeding areas. Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Arctic Tern											X								X	X									X	X					
Common Tern									X										X		X				X					X					
Little Tern																			X	X									X						X
Roseate Tern																														X					
Sandwich Tern						X											X				X				X				X						

3.10.11 WADERS

Bird group	Waders	
	Limosa lapponica	Bar-tailed Godwit
	Limosa limosa	Black-tailed Godwit
	Numenius arquata	Curlew
	Calidris alpina	Dunlin
	Pluvialis apricaria	Golden Plover
	Tringa nebularia	Greenshank
	Pluvialis squatarola	Grey Plover
	Calidris canutus	Knot
	Vanellus vanellus	Lapwing
	Haematopus ostralegus	Oystercatcher
	Tringa totanus	Redshank
	Charadrius hiaticula	Ringed Plover
	Arenaria interpres	Turnstone
	Calidris alba	Sanderling
	Calidris maritima	Purple Sandpiper
Pressures & threats related to aquaculture	Main pressures	Main threats
Intertidal shellfish culture	H	H
Bottom shellfish culture	-	L
Freshwater pond culture	-	L
Fishing and harvesting of aquatic resources	L	M
Access routes	L	M
On-shore facilities	L	M
Potential interactions with aquaculture (by species and culture method)	Spatial overlap with intertidal and subtidal shellfish aquaculture.	
Potential significant effects from aquaculture	Noise and visual disturbance of feeding areas although the impact is usually short-lived as husbandry activities tend to be short-term. Displacement from feeding areas due to intertidal structures, sedimentation changes, on-shore infrastructure impacts. Some waders show a neutral to positive response to intertidal shellfish culture.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Careful site selection. Single access routes should be employed and shared by operators to minimise disturbance from vehicular traffic. Strict noise minimisation when working in the intertidal or in on-shore facilities. Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Bar-tailed Godwit		x	x	x		x		x	x					x	x	x					x		x			x				x					x
Black-tailed Godwit		x		x					x						x	x										x									x
Curlew		x		x		x			x						x	x					x		x		x	x									x
Dunlin		x	x	x		x			x			x			x	x					x		x		x	x				x					x
Golden Plover		x		x					x			x			x	x					x		x			x									x
Greenshank								x																	x	x									
Grey Plover		x	x	x					x						x	x							x			x				x	x				x
Knot				x											x	x									x	x				x					x
Lapwing		x		x					x						x	x					x					x									x
Oystercatcher				x				x	x	x					x	x									x					x					x
Redshank		x	x	x				x	x	x					x	x					x		x		x	x				x					x
Ringed Plover		x				x		x							x						x		x			x				x					
Turnstone		x						x								x					x														
Sanderling		x				x		x					x	x									x							x	x				x
Purple Sandpiper																																			

3.10.12 WATER BIRDS

Bird group	**Water birds**	
	Ardea cinerea	Grey Heron
Pressures & threats related to Aquaculture	Main pressures	Main threats
Freshwater aquaculture	-	M
Intertidal shellfish farming	-	L
Suspended shellfish aquaculture	-	L
Fishing and harvesting of aquatic resources	-	L
Potential interactions with aquaculture (by species and culture method)	Freshwater finfish aquaculture.	
Potential significant effects from aquaculture	Sedimentation, biogeochemical changes, chemical inputs, infrastructure impact, noise and visual disturbance, predator control.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Non-lethal predator control measures to be stated as a licence condition. Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	**SPA SITENAME**	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Grey Heron									X												X				X										X

3.10.13 WILDFOWL

Bird group	Wildfowl	
	Branta leucopsis	Barnacle Goose
	Cygnus columbianus bewickii	Bewick's Swan
	Somateria mollissima	Eider
	Anas strepera	Gadwall
	Bucephala clangula	Goldeneye
	Anser albifrons	Greenland White-fronted goose
	Anser anser	Greylag Goose
	Branta bernicla hrota	Light-bellied Brent Goose
	Anas acuta	Pintail
	Aythya ferina	Pochard
	Aythya marila	Scaup
	Tadorna tadorna	Shelduck
	Anas clypeata	Shoveler
	Anas crecca	Teal
	Aythya fuligula	Tufted Duck
	Cygnus cygnus	Whooper Swan
	Anas penelope	Wigeon
	Anas platyrhynchos	Mallard
	Mergus serrator	Red-breasted Merganser
	Melanitta nigra	Common Scoter
Pressures & threats related to aquaculture	Main pressures	Main threats
Intertidal shellfish culture	L	L
Suspended culture	L	L
Bottom mussel culture	L	L
Fishing and harvesting of aquatic resources.	L	L
Potential interactions with aquaculture (by species and culture method)	Intertidal shellfish culture, suspended culture.	
Potential significant effects from aquaculture	Sedimentation, biogeochemical changes, chemical inputs, infrastructure impact, predator control, noise and visual disturbance although the impact is usually short-lived as husbandry activities tend to be short-term. Chemical use also has the potential to impact on wildfowl health. Some wildfowl show a neutral to positive response to bottom and longline mussel culture as well as intertidal oyster cultivation.	
Considerations for site selection, licence application and Appropriate Assessment including mitigation / management measures to minimise potential impacts	Careful site selection. Single access routes should be employed and shared by operators to minimise disturbance from vehicular traffic. Strict noise minimisation when working in the intertidal or in on-shore facilities. Non-lethal predator control measures to be stated as a licence condition. Controls, mitigation & management as outlined in Section 3.6 & 3.7.	

BIRD SPECIES	SPA SITENAME	Ballymacoda Bay*	Ballysadare Bay*	Bannow Bay*	Beara Peninsula*	Blacksod Bay / Broadhaven*	Carlingford Lough (cross border)*	Castlemaine Harbour*	Cork Harbour*	Cummeen Strand*	Deenish Island & Scariff Island*	Derryveagh and Glendowan Mountains*	Donegal Bay*	Drumcliff Bay*	Dundalk Bay*	Dungarvan Harbour*	Greers Isle*	Horn Head to Fanad Head*	Illancrone & Inishkeeragh*	Inishmore*	Inner Galway Bay*	Iveragh Peninsula*	Killala Bay/Moy Estuary*	Lough Derg (Donegal)*	Lough Swilly*	River Shannon & River Fergus Estuaries*	Sheep's Head to Toe Head*	Slieve Aughty Mountains*	Slyne Head to Ardmore Point Islands	South Dublin Bay & River Tolka Estuary*	The Raven*	Trawbreaga Bay*	West Donegal Coast*	West Donegal Islands SPA*	Wexford Harbour & Slobs*
	Code	004023	004129	004033	004155	004037	004078	004029	004030	004035	004175	004039	004151	004013	004026	004032	004082	004194	004132	004152	004031	004154	004036	004057	004075	004077	004156	004168	004159	004024	004019	004034	004150	004230	004076
Barnacle Goose																		x	x										x			x		x	
Bewick's Swan																																		x
Eider																																		
Gadwall																																		
Goldeneye																								x										x
Greenland White-fronted goose																		x						x						x				x
Greylag Goose															x									x										
Light-bellied Brent Goose		x	x		x	x	x		x			x		x	x					x					x				x		x			x
Pintail			x					x						x											x									x
Pochard																																		
Scaup							x																	x	x									x
Shelduck			x					x						x	x									x	x									x
Shoveler								x												x				x	x									
Teal	x							x						x						x				x	x									x
Tufted Duck																																		
Whooper Swan																								x	x									x
Wigeon								x	x											x				x	x									x
Mallard								x						x										x										x
Red-breasted Merganser					x				x					x	x					x				x										x
Common Scoter					x			x					x		x															x				

3.11 KEY MITIGATION MEASURES

The key mitigation measures following from the identification of interactions between aquaculture activities and Natura 2000 habitats and species as well as protected bird species as identified above include:

Habitats:

- Controls, mitigation & management as outlined in Section 3.6 & 3.7.
- Site selection in consultation with conservation objectives *(existing part of licence application process).*
- Project level EIA and screening for AA *(existing part of licence application process).*
- Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic *(existing licence condition)*.

Species:

- Controls, mitigation & management as outlined in Section 3.6 & 3.7.
- Project level EIA and screening for AA *(existing part of licence application process).*
- Site selection taking into account location of protected species *(existing part of licence application process).*
- Compliance with effluent discharge consent licence *(existing licence condition)*.
- Single access routes should be employed and where applicable be shared by operators to minimise the impacts of vehicular traffic *(existing licence condition)*.
- Equipment design and maintenance *(existing licence condition)*.
- Allowable non-lethal predator control measures to be stated as a licence condition. Currently, dolphin, porpoise, seal and whale species are protected wild animals under the Fifth Schedule of the Wildlife Act 1979 as amended. Therefore, the use of non-lethal predator control requires a specific consent from the Minister of Arts Heritage and the Gaeltacht before deployment. An assessment of the potential impacts of these controls on protected species arising from salmon farming is required during the determination of such a consent request.

Birds:

- Controls, mitigation & management as outlined in Section 3.6 & 3.7.
- Project level EIA and screening for AA *(existing part of licence application process).*
- Site selection taking into account location of protected species incl. nesting, roosting, and feeding sites *(existing part of licence application process).*
- Careful site selection for on-shore facilities and access routes to avoid breeding areas *(existing part of licence application process).*
- Equipment design and maintenance (net pens kept taut to eliminate risks of entanglement) *(existing licence condition)*.
- Single access routes should be employed and shared by operators to minimise disturbance from vehicular traffic *(existing licence condition)*.
- Strict noise minimisation when working in the intertidal or in on-shore facilities.
- Non-lethal predator control measures to be stated as a licence condition. The use of non-lethal predator control requires a specific consent from the Minister of Arts Heritage and the Gaeltacht.

As can be seen from the summary above, the majority of mitigation and management measures are already covered either by the current licensing process or by existing licence terms and conditions thus minimising any potential impacts on Natura 2000 areas. In line with this the increase in production under the proposed 'Build capacity and scale in the industry' policy action of the draft NSPA in compliance with the conservation objectives is achievable if existing controls and proposed new measures contained in the policy actions of the draft plan are correctly implemented.

3.12 KEY MANAGEMENT MEASURES INTRODUCED BY THE DRAFT NSPA

The aspect *Aquaculture Licensing* of the draft NSPA recommends a full review of the legislative base for aquaculture licensing and includes measures for a continuing compliant and evidence based licensing system, a balanced and improved efficiency of administration and a transparent licensing system on a strategic level. In support of this, a review of the current licensing system as outlined in Section 3.6 needs to be carried out to improve the existing controls and make the system more streamlined and transparent, in particular through the development of a data management and information system with online tracking functionality and spatial mapping of aquaculture sites as well as exclusion areas, which will benefit applicants, administrators and the wider stakeholders.

Contained within the aspect *Ensuring Sustainability*, guidance derived from the principles recommended by the Marine Institute will focus on responsible, sustainable and inclusive development of the aquaculture industry taking into account not only the latest national and international scientific research, but also seeking public and local knowledge inputs. These guidelines also emphasise the importance of further implementation of and adherence to Codes of Best Practice and independent certification schemes (e.g. ECOPACT, Origin Green and other organic/environmental/quality schemes as mentioned in Chapter 3.8), whilst the draft NSPA makes additional mention of a specific industry Code of Practice for Invasive Alien Species and pledges further support for organic certification of aquaculture production under *Aiming for Growth* and *Ensuring Sustainability*. In addition, the draft NSPA proposes the establishment of a business, planning and environmental advisory services scheme to improve performance and competitiveness and to reduce the environmental impact of operations referring specifically to environmental impact assessments thus creating a tailor made approach for the Irish aquaculture industry to increase in capacity and scale whilst minimising, avoiding or possibly even positively impacting on the environment.

In line with Council Directive 2014/89 EU Establishing a Framework for Maritime Planning, which was adopted by the European Parliament and the Council legislation in July 2014 to create a common framework for maritime spatial planning in Europe, DAFM and its agencies will participate in Marine Spatial Planning initiatives at the appropriate levels of governance and facilitate industry engagement as a key stakeholder during the implementation of the draft NSPA. The National Integrated Marine Plan for Ireland, which includes spatial planning is in the early stages of development and will be a key tool to guide future aquaculture development together with all other coastal and marine developments and demands. This will ensure further protection of the environment through early identification of impact and opportunities for multiple use of space, increase coordination between administrators, reduce conflicts between sectors and create synergies between different activities.

Further policy actions proposed under the draft NSPA that will contribute to and enhance the harmonisation of sustainable coastal resource use include the conducting of a study regarding the contributions of aquaculture to rural communities as well as the identification of marine tourism opportunities from aquaculture. As an additional layer of integration it is also proposed that data collected as part of aquaculture monitoring is consistent with and informs MSFD monitoring thus creating an inclusive and rounded approach to marine monitoring in Ireland.

In addition, proposed measures under the aspect *Knowledge, Innovation & Technology* and *Ensuring Sustainability*, including the support scheme for best husbandry and disease management practice, the development of an industry Code of Practice for Invasive Alien Species as well as the continuation of the Invasive Species Ireland project will all contribute to the safeguarding of animal health and welfare and protection against invasive alien species contributing to maintaining of, or improving Good Environmental Status of Ireland's freshwater and marine environment. This approach will be further supported through the development of opportunities and constraints mapping for aquaculture identifying specific areas suitable for specific aquaculture activities while at the same time recognising areas with constraints to specific aquaculture activities.

Through continued financial support of the aquaculture sector, fostering knowledge, innovation and technology transfer and enhancing the skills base as detailed under the draft NSPA aspect *Knowledge, Innovation & Technology*, DAFM and its agencies are able to ensure that the development of the aquaculture industry continues to employ latest technologies and best practice across all sectors thus making certain that the Irish aquaculture industry remains a leader in economic, social and environmentally sustainable production and minimising the effects of aquaculture operations on the environment.

Finally, all existing operations as well as all new applicants will continue to receive assistance from BIM and MI with site selection for their proposed activity to ensure minimum disturbance and interaction with Natura 2000 features.

3.13 ADDITIONAL SPECIES UNDER ARTICLE 12 ANNEX IV

Using the same approach as the AA in Section 3.9, a full assessment of Annex IV species was carried out and is included in the Environmental Report of the Strategic Environmental Assessment of the draft NSPA. Five species were identified that may be affected by measures included in the draft NSPA. These include Slender Najad *(Najas flexilis),* Otter *(Lutra lutra),* Bottlenose Dolphin *(Tursiops truncatus)*, Harbour Porpoise *(Phocoena phocoena)* and Natterjack Toad *(Bufo calamita).*

The only potential interactions between aquaculture or aquaculture related activities and species protected under the Habitats Directive are related to

- Deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;
- Deterioration or destruction of breeding sites or resting places.

These potentially affect only the five above named species. Both aspects are addressed during the licensing process in any application specific AA or EIA. Thus, any potential significant impacts can be avoided through careful site considerations and mitigation measures before the application is granted. Therefore, neither an Annex IV (European Protected Species) Impact Assessment nor a derogation under the Habitats Directive is required for the draft NSPA.

By continuing to make full use of the existing controls and management options and taking into account the introduction of positive changes through the draft NSPA the draft plan will have no significant effects on Annex IV species. Therefore, neither an Annex IV Species (European Protected Species) Impact Assessment nor a derogation under the Habitats Directive is required for the draft NSPA.

4.0 CONCLUSION OF ASSESSMENT PROCESS

The majority of the measures included in the draft NSPA will contribute positively to the management of those Natura 2000 sites that host aquaculture activities. Measures proposed on a strategic level relating to the simplification of administrative procedures are key to streamlining the current application process, making it more transparent as well as ensuring the economic, social and environmental sustainability of the aquaculture sector through continuing application of the existing controls and management options.

Of particular significance is the application of the guiding principles as recommended by the Marine Institute. Engaging in responsible planning within the wider marine spatial planning framework will tie in fully with the National Integrated Marine Plan. This will encourage cooperation and communication on a strategic level as well as strengthening a strategic approach on a local level when considering applications for aquaculture activities in Natura 2000 areas. Emphasising ecosystem protection and a science-based approach will help the industry as well as the regulatory authority in ensuring that a healthy marine environment will be maintained.

Continued financial support of the industry to encourage improvements in technology will ensure the aquaculture sector's continuous minimisation of environmental interactions supported on a local level

through best practice regarding animal health and welfare and continued uptake of organic, environmental of quality certification schemes.

The only potential negative effects of measures included in the draft NSPA relate to the increase in capacity and scale in particular the expected 25% growth related to new licences as these would cover new areas potentially within designated Natura 2000 sites, however these potential impacts are fully mitigated and controlled through the measures detailed in Section 3.6 and 3.7. As explored earlier, the overall coverage of aquaculture licensed area in comparison to overall designated Natura 2000 area is close to 1%. On a national scale there is sufficient capacity to accommodate a 25% growth increase in compliance with the conservation objectives related to new licences as it would mean only small extra coverage even if all new licence applications were related to Natura 2000 areas. This scenario is unlikely and a percentage of new licences will be situated outside Natura 2000 areas and their influence zone. Any potential effects relating to new licences and siting of these areas is expected to be minimised through existing controls and management measures as well through the positive effects of the other measures contained in the draft NSPA, especially in relation to the administrative procedures and the guidance provided by the six principles as recommended by the Marine Institute.

In conclusion, this assessment under Article 6 (3) of the Habitats Directive clearly shows that the draft NSPA does not propose any objectives that will cause significant impact on Natura 2000 sites and their qualifying features, nor does it compromise the conservation objectives of Natura 2000 sites in Ireland. The evaluation of the identified potential impacts and any residual risk based on the mitigation in place shows that the proposed measures under the draft NSPA act as mitigation for any potential effects on Natura 2000 areas in addition to the existing control and management measures as discussed in Section 3.6 and 3.7.

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6.0 APPENDICES

6.1 SACS IN IRELAND AND HABITATS FOR WHICH THEY HAVE BEEN DESIGNATED.

P – Priority Habitat. Green – Screened OUT. Blue – Screened IN. It is clear to see that where an SAC hosts a single habitat type that has been screened IN, that SAC has also been screened IN.

SITECODE	SITENAME	Hab Code	P	Habitat
IE0002268	Achill Head	1160		Large shallow inlets and bays
IE0002268	Achill Head	1140		Mudflats and sandflats not covered by seawater at low tide
IE0002268	Achill Head	1170		Reefs
IE0000332	Akeragh, Banna and Barrow Harbour	1210		Annual vegetation of drift lines
IE0000332	Akeragh, Banna and Barrow Harbour	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000332	Akeragh, Banna and Barrow Harbour	2110		Embryonic shifting dunes
IE0000332	Akeragh, Banna and Barrow Harbour	4030		European dry heaths
IE0000332	Akeragh, Banna and Barrow Harbour	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000332	Akeragh, Banna and Barrow Harbour	2190		Humid dune slacks
IE0000332	Akeragh, Banna and Barrow Harbour	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000332	Akeragh, Banna and Barrow Harbour	1310		Salicornia and other annuals colonizing mud and sand
IE0000332	Akeragh, Banna and Barrow Harbour	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000566	All Saints Bog and Esker	7110	*	Active raised bogs
IE0000566	All Saints Bog and Esker	91D0	*	Bog woodland
IE0000566	All Saints Bog and Esker	7120		Degraded raised bogs still capable of natural regeneration
IE0000566	All Saints Bog and Esker	7150		Depressions on peat substrates of the Rhynchosporion
IE0000566	All Saints Bog and Esker	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0002125	Anglesey Road	6230	*	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
IE0001626	Annaghmore Lough (Roscommon)	7230		Alkaline fens
IE0000111	Aran Island (Donegal) Cliffs	4060		Alpine and Boreal heaths
IE0000111	Aran Island (Donegal) Cliffs	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0000111	Aran Island (Donegal) Cliffs	4030		European dry heaths
IE0000111	Aran Island (Donegal) Cliffs	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0000111	Aran Island (Donegal) Cliffs	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002341	Ardagullion Bog	7110	*	Active raised bogs
IE0002341	Ardagullion Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002341	Ardagullion Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0002356	Ardgraigue Bog	7110	*	Active raised bogs
IE0002356	Ardgraigue Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002356	Ardgraigue Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000461	Ardkill Turlough	3180	*	Turloughs

IE0002123	Ardmore Head	4030		European dry heaths
IE0002123	Ardmore Head	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002244	Ardrahan Grassland	4060		Alpine and Boreal heaths
IE0002244	Ardrahan Grassland	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0002244	Ardrahan Grassland	8240	*	Limestone pavements
IE0001403	Arroo Mountain	7130	*	Blanket bog (*active only)
IE0001403	Arroo Mountain	8120		Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)
IE0001403	Arroo Mountain	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0001403	Arroo Mountain	4010		Northern Atlantic wet heaths with Erica tetralix
IE0001403	Arroo Mountain	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0002279	Askeaton Fen Complex	7230		Alkaline fens
IE0002279	Askeaton Fen Complex	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0001228	Aughrusbeg Machair and Lake	4010		Northern Atlantic wet heaths with Erica tetralix
IE0001228	Aughrusbeg Machair and Lake	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000199	Baldoyle Bay	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000199	Baldoyle Bay	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000199	Baldoyle Bay	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000199	Baldoyle Bay	1310		Salicornia and other annuals colonizing mud and sand
IE0000463	Balla Turlough	3180	*	Turloughs
IE0002295	Ballinduff Turlough	3180	*	Turloughs
IE0000335	Ballinskelligs Bay and Inny Estuary	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000335	Ballinskelligs Bay and Inny Estuary	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000115	Ballintra	4030		European dry heaths
IE0000115	Ballintra	8240	*	Limestone pavements
IE0000588	Ballinturly Turlough	3180	*	Turloughs
IE0000014	Ballyallia Lake	3150		Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation
IE0000116	Ballyarr Wood	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000016	Ballycullinan Lake	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0000641	Ballyduff/Clonfinane Bog	7110	*	Active raised bogs
IE0000641	Ballyduff/Clonfinane Bog	91D0	*	Bog woodland
IE0000641	Ballyduff/Clonfinane Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000641	Ballyduff/Clonfinane Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0001975	Ballyhoorisky Point to Fanad Head	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0001975	Ballyhoorisky Point to Fanad Head	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0001975	Ballyhoorisky Point to Fanad Head	1220		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0001975	Ballyhoorisky Point to Fanad Head	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002036	Ballyhoura Mountains	7130	*	Blanket bog (*active only)
IE0002036	Ballyhoura Mountains	4030		European dry heaths
IE0002036	Ballyhoura Mountains	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000077	Ballymacoda (Clonpriest and Pillmore)	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000077	Ballymacoda (Clonpriest and Pillmore)	1130		Estuaries
IE0000077	Ballymacoda (Clonpriest and Pillmore)	1140		Mudflats and sandflats not covered by seawater at low tide

IE0000077	Ballymacoda (Clonpriest and Pillmore)	1310		Salicornia and other annuals colonizing mud and sand
IE0000474	Ballymaglancy Cave, Cong	8310		Caves not open to the public
IE0000713	Ballyman Glen	7230		Alkaline fens
IE0000713	Ballyman Glen	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0002313	Ballymore Fen	7140		Transition mires and quaking bogs
IE0000391	Ballynafagh Bog	7110	*	Active raised bogs
IE0000391	Ballynafagh Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000391	Ballynafagh Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0001387	Ballynafagh Lake	7230		Alkaline fens
IE0002339	Ballynamona Bog and Corkip Lough	7110	*	Active raised bogs
IE0002339	Ballynamona Bog and Corkip Lough	91D0	*	Bog woodland
IE0002339	Ballynamona Bog and Corkip Lough	7120		Degraded raised bogs still capable of natural regeneration
IE0002339	Ballynamona Bog and Corkip Lough	7150		Depressions on peat substrates of the Rhynchosporion
IE0002339	Ballynamona Bog and Corkip Lough	3180	*	Turloughs
IE0001090	Ballyness Bay	2110		Embryonic shifting dunes
IE0001090	Ballyness Bay	1130		Estuaries
IE0001090	Ballyness Bay	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001090	Ballyness Bay	2190		Humid dune slacks
IE0001090	Ballyness Bay	1140		Mudflats and sandflats not covered by seawater at low tide
IE0001090	Ballyness Bay	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000019	Ballyogan Lough	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0002256	Ballyprior Grassland	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000622	Ballysadare Bay	2110		Embryonic shifting dunes
IE0000622	Ballysadare Bay	1130		Estuaries
IE0000622	Ballysadare Bay	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000622	Ballysadare Bay	2190		Humid dune slacks
IE0000622	Ballysadare Bay	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000622	Ballysadare Bay	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0002112	Ballyseedy Wood	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0000994	Ballyteige (Clare)	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0000696	Ballyteige Burrow	1210		Annual vegetation of drift lines
IE0000696	Ballyteige Burrow	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0000696	Ballyteige Burrow	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000696	Ballyteige Burrow	1150	*	Coastal lagoons
IE0000696	Ballyteige Burrow	2110		Embryonic shifting dunes
IE0000696	Ballyteige Burrow	1130		Estuaries
IE0000696	Ballyteige Burrow	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000696	Ballyteige Burrow	1420		Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)
IE0000696	Ballyteige Burrow	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000696	Ballyteige Burrow	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000696	Ballyteige Burrow	1220		Perennial vegetation of stony banks
IE0000696	Ballyteige Burrow	1310		Salicornia and other annuals colonizing mud and sand

IE0000696	Ballyteige Burrow	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000696	Ballyteige Burrow	1320		Spartina swards (Spartinion maritimae)
IE0000996	Ballyvaughan Turlough	3180	*	Turloughs
IE0002171	Bandon River	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0002171	Bandon River	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0000697	Bannow Bay	1210		Annual vegetation of drift lines
IE0000697	Bannow Bay	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000697	Bannow Bay	2110		Embryonic shifting dunes
IE0000697	Bannow Bay	1130		Estuaries
IE0000697	Bannow Bay	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000697	Bannow Bay	1420		Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)
IE0000697	Bannow Bay	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000697	Bannow Bay	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000697	Bannow Bay	1220		Perennial vegetation of stony banks
IE0000697	Bannow Bay	1310		Salicornia and other annuals colonizing mud and sand
IE0000697	Bannow Bay	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001040	Barley Cove to Ballyrisode Point	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0001040	Barley Cove to Ballyrisode Point	4030		European dry heaths
IE0001040	Barley Cove to Ballyrisode Point	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001040	Barley Cove to Ballyrisode Point	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0001040	Barley Cove to Ballyrisode Point	1140		Mudflats and sandflats not covered by seawater at low tide
IE0001040	Barley Cove to Ballyrisode Point	1220		Perennial vegetation of stony banks
IE0001040	Barley Cove to Ballyrisode Point	1310		Salicornia and other annuals colonizing mud and sand
IE0001040	Barley Cove to Ballyrisode Point	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0002118	Barnahallia Lough	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000432	Barrigone	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000432	Barrigone	8240	*	Limestone pavements
IE0000432	Barrigone	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000231	Barroughter Bog	7110	*	Active raised bogs
IE0000231	Barroughter Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000231	Barroughter Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0002327	Belgica Mound Province	1170		Reefs
IE0001922	Bellacorick Bog Complex	7230		Alkaline fens
IE0001922	Bellacorick Bog Complex	7130	*	Blanket bog (*active only)
IE0001922	Bellacorick Bog Complex	7150		Depressions on peat substrates of the Rhynchosporion
IE0001922	Bellacorick Bog Complex	3160		Natural dystrophic lakes and ponds
IE0001922	Bellacorick Bog Complex	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002005	Bellacragher Saltmarsh	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002005	Bellacragher Saltmarsh	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000592	Bellanagare Bog	7110	*	Active raised bogs
IE0000592	Bellanagare Bog	7120		Degraded raised bogs still capable of natural regeneration

IE0000592	Bellanagare Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000623	Ben Bulben, Gleniff and Glenade Complex	4060		Alpine and Boreal heaths
IE0000623	Ben Bulben, Gleniff and Glenade Complex	8120		Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)
IE0000623	Ben Bulben, Gleniff and Glenade Complex	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0000623	Ben Bulben, Gleniff and Glenade Complex	4030		European dry heaths
IE0000623	Ben Bulben, Gleniff and Glenade Complex	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000623	Ben Bulben, Gleniff and Glenade Complex	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000623	Ben Bulben, Gleniff and Glenade Complex	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0000020	Black Head-Poulsallagh Complex	4060		Alpine and Boreal heaths
IE0000020	Black Head-Poulsallagh Complex	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000020	Black Head-Poulsallagh Complex	8240	*	Limestone pavements
IE0000020	Black Head-Poulsallagh Complex	6510		Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
IE0000020	Black Head-Poulsallagh Complex	1220		Perennial vegetation of stony banks
IE0000020	Black Head-Poulsallagh Complex	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000020	Black Head-Poulsallagh Complex	1170		Reefs
IE0000020	Black Head-Poulsallagh Complex	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000020	Black Head-Poulsallagh Complex	8330		Submerged or partly submerged sea caves
IE0000020	Black Head-Poulsallagh Complex	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0000770	Blackstairs Mountains	4030		European dry heaths
IE0000770	Blackstairs Mountains	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002170	Blackwater River (Cork/Waterford)	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0002170	Blackwater River (Cork/Waterford)	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002170	Blackwater River (Cork/Waterford)	1130		Estuaries
IE0002170	Blackwater River (Cork/Waterford)	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0002170	Blackwater River (Cork/Waterford)	1140		Mudflats and sandflats not covered by seawater at low tide
IE0002170	Blackwater River (Cork/Waterford)	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002170	Blackwater River (Cork/Waterford)	1220		Perennial vegetation of stony banks
IE0002170	Blackwater River (Cork/Waterford)	1310		Salicornia and other annuals colonizing mud and sand
IE0002170	Blackwater River (Cork/Waterford)	91J0	*	Taxus baccata woods of the British Isles
IE0002170	Blackwater River (Cork/Waterford)	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0002173	Blackwater River (Kerry)	4030		European dry heaths
IE0002172	Blasket Islands	4030		European dry heaths
IE0002172	Blasket Islands	1170		Reefs
IE0002172	Blasket Islands	8330		Submerged or partly submerged sea caves
IE0002172	Blasket Islands	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002032	Boleybrack Mountain	7130	*	Blanket bog (*active only)
IE0002032	Boleybrack Mountain	4030		European dry heaths
IE0002032	Boleybrack Mountain	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)

IE0002032	Boleybrack Mountain	3160		Natural dystrophic lakes and ponds
IE0002032	Boleybrack Mountain	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002124	Bolingbrook Hill	4030		European dry heaths
IE0002124	Bolingbrook Hill	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002124	Bolingbrook Hill	6230	*	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
IE0001957	Boyne Coast and Estuary	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0001957	Boyne Coast and Estuary	2110		Embryonic shifting dunes
IE0001957	Boyne Coast and Estuary	1130		Estuaries
IE0001957	Boyne Coast and Estuary	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001957	Boyne Coast and Estuary	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0001957	Boyne Coast and Estuary	1140		Mudflats and sandflats not covered by seawater at low tide
IE0001957	Boyne Coast and Estuary	1310		Salicornia and other annuals colonizing mud and sand
IE0001957	Boyne Coast and Estuary	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000471	Brackloon Woods	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000714	Bray Head	4030		European dry heaths
IE0000714	Bray Head	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0001656	Bricklieve Mountains & Keishcorran	8120		Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)
IE0001656	Bricklieve Mountains & Keishcorran	6510		Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
IE0001656	Bricklieve Mountains & Keishcorran	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0001656	Bricklieve Mountains & Keishcorran	3180	*	Turloughs
IE0000472	Broadhaven Bay	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000472	Broadhaven Bay	1160		Large shallow inlets and bays
IE0000472	Broadhaven Bay	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000472	Broadhaven Bay	1170		Reefs
IE0000472	Broadhaven Bay	8330		Submerged or partly submerged sea caves
IE0002346	Brown Bog	7110	*	Active raised bogs
IE0002346	Brown Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002346	Brown Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000729	Buckroney-Brittas Dunes and Fen	7230		Alkaline fens
IE0000729	Buckroney-Brittas Dunes and Fen	1210		Annual vegetation of drift lines
IE0000729	Buckroney-Brittas Dunes and Fen	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0000729	Buckroney-Brittas Dunes and Fen	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0000729	Buckroney-Brittas Dunes and Fen	2110		Embryonic shifting dunes
IE0000729	Buckroney-Brittas Dunes and Fen	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000729	Buckroney-Brittas Dunes and Fen	2190		Humid dune slacks
IE0000729	Buckroney-Brittas Dunes and Fen	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000729	Buckroney-Brittas Dunes and Fen	1220		Perennial vegetation of stony banks
IE0000729	Buckroney-Brittas Dunes and Fen	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmore	7230		Alkaline fens
IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmor	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)

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IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmore	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmore	1160		Large shallow inlets and bays
IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmore	21A0	*	Machairs (* in Ireland)
IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmore	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmore	1170		Reefs
IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmore	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmore	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000093	Caha Mountains	4060		Alpine and Boreal heaths
IE0000093	Caha Mountains	7130	*	Blanket bog (*active only)
IE0000093	Caha Mountains	3160		Natural dystrophic lakes and ponds
IE0000093	Caha Mountains	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000093	Caha Mountains	3130		Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
IE0000093	Caha Mountains	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0000238	Caherglassaun Turlough	3180	*	Turloughs
IE0002294	Cahermore Turlough	3180	*	Turloughs
IE0000700	Cahore Polders and Dunes	1210		Annual vegetation of drift lines
IE0000700	Cahore Polders and Dunes	2110		Embryonic shifting dunes
IE0000700	Cahore Polders and Dunes	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000700	Cahore Polders and Dunes	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000595	Callow Bog	7110	*	Active raised bogs
IE0000595	Callow Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000595	Callow Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0002347	Camderry Bog	7110	*	Active raised bogs
IE0002347	Camderry Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002347	Camderry Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000453	Carlingford Mountain	4060		Alpine and Boreal heaths
IE0000453	Carlingford Mountain	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0000453	Carlingford Mountain	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0000453	Carlingford Mountain	8110		Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)
IE0002306	Carlingford Shore	1210		Annual vegetation of drift lines
IE0002306	Carlingford Shore	1220		Perennial vegetation of stony banks
IE0002336	Carn Park Bog	7110	*	Active raised bogs
IE0002336	Carn Park Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002269	Carnsore Point	1140		Mudflats and sandflats not covered by seawater at low tide
IE0002269	Carnsore Point	1170		Reefs
IE0000716	Carriggower Bog	7140		Transition mires and quaking bogs
IE0002293	Carrowbaun, Newhall and Ballylee Turloughs	3180	*	Turloughs
IE0000597	Carrowbehy/Caher Bog	7110	*	Active raised bogs

IE0000597	Carrowbehy/Caher Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000597	Carrowbehy/Caher Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000475	Carrowkeel Turlough	3180	*	Turloughs
IE0002250	Carrowmore Dunes	2110		Embryonic shifting dunes
IE0002250	Carrowmore Dunes	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0002250	Carrowmore Dunes	1170		Reefs
IE0002250	Carrowmore Dunes	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000476	Carrowmore Lake Complex	7130	*	Blanket bog (*active only)
IE0000476	Carrowmore Lake Complex	7150		Depressions on peat substrates of the Rhynchosporion
IE0001021	Carrowmore Point to Spanish Point and Islands	1150	*	Coastal lagoons
IE0001021	Carrowmore Point to Spanish Point and Islands	1220		Perennial vegetation of stony banks
IE0001021	Carrowmore Point to Spanish Point and Islands	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0001021	Carrowmore Point to Spanish Point and Islands	1170		Reefs
IE0001242	Carrownagappul Bog	7110	*	Active raised bogs
IE0001242	Carrownagappul Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0001242	Carrownagappul Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000343	Castlemaine Harbour	91e0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0000343	Castlemaine Harbour	1210		Annual vegetation of drift lines
IE0000343	Castlemaine Harbour	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000343	Castlemaine Harbour	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0000343	Castlemaine Harbour	2110		Embryonic shifting dunes
IE0000343	Castlemaine Harbour	1130		Estuaries
IE0000343	Castlemaine Harbour	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000343	Castlemaine Harbour	2190		Humid dune slacks
IE0000343	Castlemaine Harbour	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000343	Castlemaine Harbour	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000343	Castlemaine Harbour	1220		Perennial vegetation of stony banks
IE0000343	Castlemaine Harbour	1310		Salicornia and other annuals colonizing mud and sand
IE0000343	Castlemaine Harbour	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001625	Castlesampson Esker	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0001625	Castlesampson Esker	3180	*	Turloughs
IE0000242	Castletaylor Complex	4060		Alpine and Boreal heaths
IE0000242	Castletaylor Complex	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000242	Castletaylor Complex	8240	*	Limestone pavements
IE0000242	Castletaylor Complex	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000242	Castletaylor Complex	3180	*	Turloughs
IE0000571	Charleville Wood	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000572	Clara Bog	7110	*	Active raised bogs
IE0000572	Clara Bog	91D0	*	Bog woodland
IE0000572	Clara Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000572	Clara Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000572	Clara Bog	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)

IE0000930	Clare Glen	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002243	Clare Island Cliffs	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0002243	Clare Island Cliffs	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0002243	Clare Island Cliffs	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0001043	Cleanderry Wood	91a0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001482	Clew Bay Complex	1210		Annual vegetation of drift lines
IE0001482	Clew Bay Complex	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0001482	Clew Bay Complex	1150	*	Coastal lagoons
IE0001482	Clew Bay Complex	2110		Embryonic shifting dunes
IE0001482	Clew Bay Complex	1160		Large shallow inlets and bays
IE0001482	Clew Bay Complex	1140		Mudflats and sandflats not covered by seawater at low tide
IE0001482	Clew Bay Complex	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001482	Clew Bay Complex	1220		Perennial vegetation of stony banks
IE0001482	Clew Bay Complex	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001459	Clogher Head	4030		European dry heaths
IE0001459	Clogher Head	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002047	Cloghernagore Bog and Glenveagh National Park	4060		Alpine and Boreal heaths
IE0002047	Cloghernagore Bog and Glenveagh National Park	7130	*	Blanket bog (*active only)
IE0002047	Cloghernagore Bog and Glenveagh National Park	7150		Depressions on peat substrates of the Rhynchosporion
IE0002047	Cloghernagore Bog and Glenveagh National Park	4030		European dry heaths
IE0002047	Cloghernagore Bog and Glenveagh National Park	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0002047	Cloghernagore Bog and Glenveagh National Park	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002047	Cloghernagore Bog and Glenveagh National Park	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002047	Cloghernagore Bog and Glenveagh National Park	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0002047	Cloghernagore Bog and Glenveagh National Park	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0000091	Clonakilty Bay	1210		Annual vegetation of drift lines
IE0000091	Clonakilty Bay	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0000091	Clonakilty Bay	2110		Embryonic shifting dunes
IE0000091	Clonakilty Bay	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000091	Clonakilty Bay	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000091	Clonakilty Bay	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000859	Clonaslee Eskers and Derry Bog	7230		Alkaline fens
IE0001899	Cloonakillina Lough	7140		Transition mires and quaking bogs
IE0000600	Cloonchambers Bog	7110	*	Active raised bogs
IE0000600	Cloonchambers Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000600	Cloonchambers Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0001342	Cloonee and Inchiquin Loughs, Uragh Wood	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001342	Cloonee and Inchiquin Loughs, Uragh Wood	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0002348	Clooneen Bog	91D0	*	Bog woodland
IE0002348	Clooneen Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002348	Clooneen Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000248	Cloonmoylan Bog	7110	*	Active raised bogs
IE0000248	Cloonmoylan Bog	91D0	*	Bog woodland

IE0000248	Cloonmoylan Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000248	Cloonmoylan Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000614	Cloonshanville Bog	7110	*	Active raised bogs
IE0000614	Cloonshanville Bog	91D0	*	Bog woodland
IE0000614	Cloonshanville Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000614	Cloonshanville Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000479	Cloughmoyne	8240	*	Limestone pavements
IE0000480	Clyard Kettle-holes	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0000480	Clyard Kettle-holes	3180	*	Turloughs
IE0001952	Comeragh Mountains	4060		Alpine and Boreal heaths
IE0001952	Comeragh Mountains	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0001952	Comeragh Mountains	4030		European dry heaths
IE0001952	Comeragh Mountains	4010		Northern Atlantic wet heaths with Erica tetralix
IE0001952	Comeragh Mountains	3130		Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
IE0001952	Comeragh Mountains	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0001952	Comeragh Mountains	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0002034	Connemara Bog Complex	7230		Alkaline fens
IE0002034	Connemara Bog Complex	7130	*	Blanket bog (*active only)
IE0002034	Connemara Bog Complex	1150	*	Coastal lagoons
IE0002034	Connemara Bog Complex	7150		Depressions on peat substrates of the Rhynchosporion
IE0002034	Connemara Bog Complex	4030		European dry heaths
IE0002034	Connemara Bog Complex	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0002034	Connemara Bog Complex	3160		Natural dystrophic lakes and ponds
IE0002034	Connemara Bog Complex	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002034	Connemara Bog Complex	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002034	Connemara Bog Complex	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0002034	Connemara Bog Complex	1170		Reefs
IE0002034	Connemara Bog Complex	7140		Transition mires and quaking bogs
IE0002034	Connemara Bog Complex	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0000218	Coolcam Turlough	3180	*	Turloughs
IE0000252	Coole-Garryland Complex	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000252	Coole-Garryland Complex	8240	*	Limestone pavements
IE0000252	Coole-Garryland Complex	3150		Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation
IE0000252	Coole-Garryland Complex	3270		Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation
IE0000252	Coole-Garryland Complex	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000252	Coole-Garryland Complex	3180	*	Turloughs
IE0002332	Coolrain Bog	7110	*	Active raised bogs
IE0002332	Coolrain Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002332	Coolrain Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0001107	Coolvoy Bog	7130	*	Blanket bog (*active only)
IE0002349	Corbo Bog	7110	*	Active raised bogs
IE0002349	Corbo Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002349	Corbo Bog	7150		Depressions on peat substrates of the Rhynchosporion

IE0002110	Corliskea/Trien/Cloonfelliv Bog	7110	*	Active raised bogs
IE0002110	Corliskea/Trien/Cloonfelliv Bog	91D0	*	Bog woodland
IE0002110	Corliskea/Trien/Cloonfelliv Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002110	Corliskea/Trien/Cloonfelliv Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000979	Corratirrim	8240	*	Limestone pavements
IE0000485	Corraun Plateau	4060		Alpine and Boreal heaths
IE0000485	Corraun Plateau	4030		European dry heaths
IE0000485	Corraun Plateau	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000485	Corraun Plateau	4010		Northern Atlantic wet heaths with Erica tetralix
IE0001230	Courtmacsherry Estuary	1210		Annual vegetation of drift lines
IE0001230	Courtmacsherry Estuary	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0001230	Courtmacsherry Estuary	2110		Embryonic shifting dunes
IE0001230	Courtmacsherry Estuary	1130		Estuaries
IE0001230	Courtmacsherry Estuary	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001230	Courtmacsherry Estuary	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0001230	Courtmacsherry Estuary	1140		Mudflats and sandflats not covered by seawater at low tide
IE0001230	Courtmacsherry Estuary	1220		Perennial vegetation of stony banks
IE0001230	Courtmacsherry Estuary	1310		Salicornia and other annuals colonizing mud and sand
IE0001230	Courtmacsherry Estuary	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001251	Cregduff Lough	7140		Transition mires and quaking bogs
IE0001955	Croaghaun/Slievemore	4060		Alpine and Boreal heaths
IE0000255	Croaghill Turlough	3180	*	Turloughs
IE0000129	Croaghonagh Bog	7130	*	Blanket bog (*active only)
IE0000484	Cross Lough (Killadoon)	1220		Perennial vegetation of stony banks
IE0002337	Crosswood Bog	7110	*	Active raised bogs
IE0002337	Crosswood Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000584	Cuilcagh - Anierin Uplands	7130	*	Blanket bog (*active only)
IE0000584	Cuilcagh - Anierin Uplands	4030		European dry heaths
IE0000584	Cuilcagh - Anierin Uplands	3160		Natural dystrophic lakes and ponds
IE0000584	Cuilcagh - Anierin Uplands	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000584	Cuilcagh - Anierin Uplands	3130		Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
IE0000584	Cuilcagh - Anierin Uplands	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0000584	Cuilcagh - Anierin Uplands	6230	*	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
IE0000831	Cullahill Mountain	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	2110		Embryonic shifting dunes
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	1130		Estuaries
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000174	Curraghchase Woods	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)

IE0000174	Curraghchase Woods	91J0	*	Taxus baccata woods of the British Isles
IE0002350	Curraghlehanagh Bog	7110	*	Active raised bogs
IE0002350	Curraghlehanagh Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002350	Curraghlehanagh Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000030	Danes Hole, Poulnalecka	8310		Caves not open to the public
IE0000030	Danes Hole, Poulnalecka	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000717	Deputy's Pass Nature Reserve	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000604	Derrinea Bog	7110	*	Active raised bogs
IE0000604	Derrinea Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000604	Derrinea Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0001873	Derryclogher (Knockboy) Bog	7130	*	Blanket bog (*active only)
IE0000261	Derrycrag Wood Nature Reserve	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001257	Dog's Bay	1210		Annual vegetation of drift lines
IE0001257	Dog's Bay	2110		Embryonic shifting dunes
IE0001257	Dog's Bay	4030		European dry heaths
IE0001257	Dog's Bay	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001257	Dog's Bay	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000133	Donegal Bay (Murvagh)	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000133	Donegal Bay (Murvagh)	2190		Humid dune slacks
IE0000133	Donegal Bay (Murvagh)	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000492	Doocastle Turlough	3180	*	Turloughs
IE0001497	Doogort Machair/Lough Doo	21a0	*	Machairs (* in Ireland)
IE0000032	Dromore Woods and Loughs	6430		Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
IE0000032	Dromore Woods and Loughs	8240	*	Limestone pavements
IE0000032	Dromore Woods and Loughs	3150		Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation
IE0002187	Drongawn Lough	1150	*	Coastal lagoons
IE0002338	Drumalough Bog	7110	*	Active raised bogs
IE0002338	Drumalough Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002338	Drumalough Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0002181	Drummin Wood	91a0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002280	Dunbeacon Shingle	1220		Perennial vegetation of stony banks
IE0000455	Dundalk Bay	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000455	Dundalk Bay	1130		Estuaries
IE0000455	Dundalk Bay	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000455	Dundalk Bay	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000455	Dundalk Bay	1220		Perennial vegetation of stony banks
IE0000455	Dundalk Bay	1310		Salicornia and other annuals colonizing mud and sand
IE0000495	Duvillaun Islands	1170		Reefs
IE0000495	Duvillaun Islands	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0000495	Duvillaun Islands	1364		Grey Seal
IE0002303	Dunmuckrum Turloughs	3180	*	Turloughs
IE0001125	Dunragh Loughs/Pettigo Plateau	7130	*	Blanket bog (*active only)
IE0001125	Dunragh Loughs/Pettigo Plateau	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000138	Durnesh Lough	1150	*	Coastal lagoons
IE0000138	Durnesh Lough	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils

				(Molinion caeruleae)
IE0001926	East Burren Complex	7230		Alkaline fens
IE0001926	East Burren Complex	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0001926	East Burren Complex	4060		Alpine and Boreal heaths
IE0001926	East Burren Complex	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0001926	East Burren Complex	8310		Caves not open to the public
IE0001926	East Burren Complex	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0001926	East Burren Complex	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0001926	East Burren Complex	8240	*	Limestone pavements
IE0001926	East Burren Complex	6510		Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
IE0001926	East Burren Complex	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0001926	East Burren Complex	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0001926	East Burren Complex	3180	*	Turloughs
IE0001926	East Burren Complex	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0001501	Erris Head	4060		Alpine and Boreal heaths
IE0001501	Erris Head	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0000607	Errit Lough	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0002189	Farranamanagh Lough	1150	*	Coastal lagoons
IE0002189	Farranamanagh Lough	1220		Perennial vegetation of stony banks
IE0000140	Fawnboy Bog/Lough Nacung	7130	*	Blanket bog (*active only)
IE0000140	Fawnboy Bog/Lough Nacung	7150		Depressions on peat substrates of the Rhynchosporion
IE0000140	Fawnboy Bog/Lough Nacung	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000575	Ferbane Bog	7110	*	Active raised bogs
IE0000575	Ferbane Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000575	Ferbane Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000576	Fin Lough (Offaly)	7230		Alkaline fens
IE0000497	Flughany Bog	7110	*	Active raised bogs
IE0000497	Flughany Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000497	Flughany Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000448	Fortwilliam Turlough	3180	*	Turloughs
IE0001637	Four Roads Turlough	3180	*	Turloughs
IE0001858	Galmoy Fen	7230		Alkaline fens
IE0000646	Galtee Mountains	4060		Alpine and Boreal heaths
IE0000646	Galtee Mountains	7130	*	Blanket bog (*active only)
IE0000646	Galtee Mountains	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0000646	Galtee Mountains	4030		European dry heaths
IE0000646	Galtee Mountains	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0000646	Galtee Mountains	6230	*	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
IE0000268	Galway Bay Complex	7230		Alkaline fens
IE0000268	Galway Bay Complex	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000268	Galway Bay Complex	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0000268	Galway Bay Complex	1150	*	Coastal lagoons

IE0000268	Galway Bay Complex	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000268	Galway Bay Complex	1160		Large shallow inlets and bays
IE0000268	Galway Bay Complex	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000268	Galway Bay Complex	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000268	Galway Bay Complex	1220		Perennial vegetation of stony banks
IE0000268	Galway Bay Complex	1170		Reefs
IE0000268	Galway Bay Complex	1310		Salicornia and other annuals colonizing mud and sand
IE0000268	Galway Bay Complex	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000268	Galway Bay Complex	3180	*	Turloughs
IE0000142	Gannivegil Bog	7130	*	Blanket bog (*active only)
IE0000142	Gannivegil Bog	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000142	Gannivegil Bog	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000679	Garriskil Bog	7110	*	Active raised bogs
IE0000679	Garriskil Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000679	Garriskil Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0001879	Glanmore Bog	7130	*	Blanket bog (*active only)
IE0001879	Glanmore Bog	4010		Northern Atlantic wet heaths with Erica tetralix
IE0001879	Glanmore Bog	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0001879	Glanmore Bog	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0001430	Glen Bog	91e0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0000719	Glen of the Downs	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001919	Glenade Lough	3150		Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation
IE0000500	Glenamoy Bog Complex	7130	*	Blanket bog (*active only)
IE0000500	Glenamoy Bog Complex	7150		Depressions on peat substrates of the Rhynchosporion
IE0000500	Glenamoy Bog Complex	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000500	Glenamoy Bog Complex	21A0	*	Machairs (* in Ireland)
IE0000500	Glenamoy Bog Complex	3160		Natural dystrophic lakes and ponds
IE0000500	Glenamoy Bog Complex	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000500	Glenamoy Bog Complex	7140		Transition mires and quaking bogs
IE0000500	Glenamoy Bog Complex	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0001209	Glenasmole Valley	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0001209	Glenasmole Valley	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0001209	Glenasmole Valley	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0001912	Glendree Bog	7130	*	Blanket bog (*active only)
IE0000090	Glengarriff Harbour and Woodland	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0000090	Glengarriff Harbour and Woodland	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002213	Glenloughaun Esker	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0001013	Glenomra Wood	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002180	Gortacarnaun Wood	91a0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001271	Gortnandarragh Limestone Pavement	8240	*	Limestone pavements
IE0000503	Greaghans Turlough	3180	*	Turloughs

IE0001058	Great Island Channel	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0001058	Great Island Channel	1140		Mudflats and sandflats not covered by seawater at low tide
IE0001141	Gweedore Bay and Islands	4060		Alpine and Boreal heaths
IE0001141	Gweedore Bay and Islands	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0001141	Gweedore Bay and Islands	1150	*	Coastal lagoons
IE0001141	Gweedore Bay and Islands	2140	*	Decalcified fixed dunes with Empetrum nigrum
IE0001141	Gweedore Bay and Islands	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0001141	Gweedore Bay and Islands	2110		Embryonic shifting dunes
IE0001141	Gweedore Bay and Islands	4030		European dry heaths
IE0001141	Gweedore Bay and Islands	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001141	Gweedore Bay and Islands	2190		Humid dune slacks
IE0001141	Gweedore Bay and Islands	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0001141	Gweedore Bay and Islands	21a0	*	Machairs (* in Ireland)
IE0001141	Gweedore Bay and Islands	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0001141	Gweedore Bay and Islands	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0001141	Gweedore Bay and Islands	1220		Perennial vegetation of stony banks
IE0001141	Gweedore Bay and Islands	1170		Reefs
IE0001141	Gweedore Bay and Islands	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000665	Helvick Head	4030		European dry heaths
IE0000665	Helvick Head	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0001757	Holdenstown Bog	7140		Transition mires and quaking bogs
IE0000764	Hook Head	1160		Large shallow inlets and bays
IE0000764	Hook Head	1170		Reefs
IE0000764	Hook Head	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0000147	Horn Head and Rinclevan	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0000147	Horn Head and Rinclevan	2110		Embryonic shifting dunes
IE0000147	Horn Head and Rinclevan	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000147	Horn Head and Rinclevan	2190		Humid dune slacks
IE0000147	Horn Head and Rinclevan	21a0	*	Machairs (* in Ireland)
IE0000147	Horn Head and Rinclevan	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0002328	Hovland Mound Province	1170		Reefs
IE0000202	Howth Head	4030		European dry heaths
IE0000202	Howth Head	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0000404	Hugginstown Fen	7230		Alkaline fens
IE0000036	Inagh River Estuary	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000036	Inagh River Estuary	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000036	Inagh River Estuary	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000036	Inagh River Estuary	1310		Salicornia and other annuals colonizing mud and sand
IE0000036	Inagh River Estuary	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000278	Inishbofin and Inishshark	1150	*	Coastal lagoons
IE0000278	Inishbofin and Inishshark	4030		European dry heaths
IE0000278	Inishbofin and Inishshark	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000278	Inishbofin and Inishshark	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0001275	Inisheer Island	1150	*	Coastal lagoons
IE0001275	Inisheer Island	4030		European dry heaths

IE0001275	Inisheer Island	8240	*	Limestone pavements
IE0001275	Inisheer Island	6510		Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
IE0001275	Inisheer Island	1170		Reefs
IE0001275	Inisheer Island	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000507	Inishkea Islands	21A0	*	Machairs (* in Ireland)
IE0000212	Inishmaan Island	2110		Embryonic shifting dunes
IE0000212	Inishmaan Island	4030		European dry heaths
IE0000212	Inishmaan Island	8240	*	Limestone pavements
IE0000212	Inishmaan Island	6510		Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
IE0000212	Inishmaan Island	21A0	*	Machairs (* in Ireland)
IE0000212	Inishmaan Island	1220		Perennial vegetation of stony banks
IE0000212	Inishmaan Island	1170		Reefs
IE0000212	Inishmaan Island	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000212	Inishmaan Island	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000212	Inishmaan Island	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0000213	Inishmore Island	4060		Alpine and Boreal heaths
IE0000213	Inishmore Island	1150	*	Coastal lagoons
IE0000213	Inishmore Island	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0000213	Inishmore Island	2110		Embryonic shifting dunes
IE0000213	Inishmore Island	4030		European dry heaths
IE0000213	Inishmore Island	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000213	Inishmore Island	2190		Humid dune slacks
IE0000213	Inishmore Island	8240	*	Limestone pavements
IE0000213	Inishmore Island	6510		Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
IE0000213	Inishmore Island	21a0	*	Machairs (* in Ireland)
IE0000213	Inishmore Island	1220		Perennial vegetation of stony banks
IE0000213	Inishmore Island	1170		Reefs
IE0000213	Inishmore Island	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000213	Inishmore Island	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000213	Inishmore Island	8330		Submerged or partly submerged sea caves
IE0000213	Inishmore Island	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0000154	Inishtrahull	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002193	Ireland's Eye	1220		Perennial vegetation of stony banks
IE0002193	Ireland's Eye	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002236	Island Fen	7230		Alkaline fens
IE0002236	Island Fen	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0001513	Keel Machair/Menaun Cliffs	4060		Alpine and Boreal heaths
IE0001513	Keel Machair/Menaun Cliffs	21a0	*	Machairs (* in Ireland)
IE0001513	Keel Machair/Menaun Cliffs	1220		Perennial vegetation of stony banks
IE0001197	Keeper Hill	7130	*	Blanket bog (*active only)
IE0001197	Keeper Hill	4010		Northern Atlantic wet heaths with Erica tetralix
IE0001197	Keeper Hill	6230	*	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental

				Europe)
IE0002158	Kenmare River	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002158	Kenmare River	6130		Calaminarian grasslands of the Violetalia calaminariae
IE0002158	Kenmare River	4030		European dry heaths
IE0002158	Kenmare River	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0002158	Kenmare River	1160		Large shallow inlets and bays
IE0002158	Kenmare River	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0002158	Kenmare River	1220		Perennial vegetation of stony banks
IE0002158	Kenmare River	1170		Reefs
IE0002158	Kenmare River	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0002158	Kenmare River	8330		Submerged or partly submerged sea caves
IE0002158	Kenmare River	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002263	Kerry Head Shoal	1170		Reefs
IE0000647	Kilcarren-Firville Bog	7110	*	Active raised bogs
IE0000647	Kilcarren-Firville Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000647	Kilcarren-Firville Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000934	Kilduff, Devilsbit Mountain	4030		European dry heaths
IE0000934	Kilduff, Devilsbit Mountain	6230	*	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
IE0000504	Kilglassan/Caheravoostia Turlough Complex	3180	*	Turloughs
IE0002264	Kilkee Reefs	1160		Large shallow inlets and bays
IE0002264	Kilkee Reefs	1170		Reefs
IE0002264	Kilkee Reefs	8330		Submerged or partly submerged sea caves
IE0001061	Kilkeran Lake and Castlefreke Dunes	1150	*	Coastal lagoons
IE0001061	Kilkeran Lake and Castlefreke Dunes	2110		Embryonic shifting dunes
IE0001061	Kilkeran Lake and Castlefreke Dunes	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001061	Kilkeran Lake and Castlefreke Dunes	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0002111	Kilkieran Bay and Islands	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002111	Kilkieran Bay and Islands	1150	*	Coastal lagoons
IE0002111	Kilkieran Bay and Islands	1160		Large shallow inlets and bays
IE0002111	Kilkieran Bay and Islands	6510		Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
IE0002111	Kilkieran Bay and Islands	21A0	*	Machairs (* in Ireland)
IE0002111	Kilkieran Bay and Islands	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0002111	Kilkieran Bay and Islands	1140		Mudflats and sandflats not covered by seawater at low tide
IE0002111	Kilkieran Bay and Islands	1170		Reefs
IE0000458	Killala Bay/Moy Estuary	1210		Annual vegetation of drift lines
IE0000458	Killala Bay/Moy Estuary	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000458	Killala Bay/Moy Estuary	2110		Embryonic shifting dunes
IE0000458	Killala Bay/Moy Estuary	1130		Estuaries
IE0000458	Killala Bay/Moy Estuary	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000458	Killala Bay/Moy Estuary	2190		Humid dune slacks
IE0000458	Killala Bay/Moy Estuary	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000458	Killala Bay/Moy Estuary	1310		Salicornia and other annuals colonizing mud and sand
IE0000458	Killala Bay/Moy Estuary	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)

IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	4060		Alpine and Boreal heaths
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	7130	*	Blanket bog (*active only)
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	6130		Calaminarian grasslands of the Violetalia calaminariae
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	7150		Depressions on peat substrates of the Rhynchosporion
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	4030		European dry heaths
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	3130		Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	91J0	*	Taxus baccata woods of the British Isles
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0002214	Killeglan Grassland	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000006	Killyconny Bog (Cloghbally)	7110	*	Active raised bogs
IE0000006	Killyconny Bog (Cloghbally)	7120		Degraded raised bogs still capable of natural regeneration
IE0001741	Kilmuckridge-Tinnaberna Sandhills	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001741	Kilmuckridge-Tinnaberna Sandhills	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001742	Kilpatrick Sandhills	1210		Annual vegetation of drift lines
IE0001742	Kilpatrick Sandhills	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0001742	Kilpatrick Sandhills	2110		Embryonic shifting dunes
IE0001742	Kilpatrick Sandhills	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001742	Kilpatrick Sandhills	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001786	Kilroosky Lough Cluster	7230		Alkaline fens
IE0001786	Kilroosky Lough Cluster	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0001786	Kilroosky Lough Cluster	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0000285	Kilsallagh Bog	7110	*	Active raised bogs
IE0000285	Kilsallagh Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000285	Kilsallagh Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000286	Kiltartan Cave (Coole)	8310		Caves not open to the public
IE0001285	Kiltiernan Turlough	3180	*	Turloughs

IE0001151	Kindrum Lough	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0002265	Kingstown Bay	1160		Large shallow inlets and bays
IE0002333	Knockacoller Bog	7110	*	Active raised bogs
IE0002333	Knockacoller Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002333	Knockacoller Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000725	Knocksink Wood	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0000725	Knocksink Wood	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000516	Lackan Saltmarsh and Kilcummin Head	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000516	Lackan Saltmarsh and Kilcummin Head	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000516	Lackan Saltmarsh and Kilcummin Head	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000516	Lackan Saltmarsh and Kilcummin Head	1310		Salicornia and other annuals colonizing mud and sand
IE0000516	Lackan Saltmarsh and Kilcummin Head	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000704	Lady's Island Lake	1150	*	Coastal lagoons
IE0000704	Lady's Island Lake	1220		Perennial vegetation of stony banks
IE0000704	Lady's Island Lake	1170		Reefs
IE0000204	Lambay Island	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002176	Leannan River	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000295	Levally Lough	3180	*	Turloughs
IE0000869	Lisbigney Bog	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0002147	Lisduff Fen	7230		Alkaline fens
IE0002147	Lisduff Fen	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000609	Lisduff Turlough	3180	*	Turloughs
IE0001683	Liskeenan Fen	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0000296	Lisnageeragh Bog and Ballinastack Turlough	7110	*	Active raised bogs
IE0000296	Lisnageeragh Bog and Ballinastack Turlough	7120		Degraded raised bogs still capable of natural regeneration
IE0000296	Lisnageeragh Bog and Ballinastack Turlough	7150		Depressions on peat substrates of the Rhynchosporion
IE0000296	Lisnageeragh Bog and Ballinastack Turlough	3180	*	Turloughs
IE0002161	Long Bank	1110		Sandbanks which are slightly covered by sea water all the time
IE0001673	Lough Arrow	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0002120	Lough Bane and Lough Glass	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0001529	Lough Cahasy, Lough Baun and Roonah Lough	1150	*	Coastal lagoons
IE0001529	Lough Cahasy, Lough Baun and Roonah Lough	1220		Perennial vegetation of stony banks
IE0001529	Lough Cahasy, Lough Baun and Roonah Lough	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001774	Lough Carra/Mask Complex	7230		Alkaline fens
IE0001774	Lough Carra/Mask Complex	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0001774	Lough Carra/Mask Complex	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0001774	Lough Carra/Mask Complex	4030		European dry heaths
IE0001774	Lough Carra/Mask Complex	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0001774	Lough Carra/Mask Complex	8240	*	Limestone pavements
IE0001774	Lough Carra/Mask Complex	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)

IE0001774	Lough Carra/Mask Complex	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000297	Lough Corrib	7110	*	Active raised bogs
IE0000297	Lough Corrib	7230		Alkaline fens
IE0000297	Lough Corrib	91D0	*	Bog woodland
IE0000297	Lough Corrib	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0000297	Lough Corrib	7120		Degraded raised bogs still capable of natural regeneration
IE0000297	Lough Corrib	7150		Depressions on peat substrates of the Rhynchosporion
IE0000297	Lough Corrib	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0000297	Lough Corrib	8240	*	Limestone pavements
IE0000297	Lough Corrib	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0000297	Lough Corrib	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000297	Lough Corrib	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000297	Lough Corrib	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000297	Lough Corrib	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000297	Lough Corrib	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0002117	Lough Coy	3180	*	Turloughs
IE0000610	Lough Croan Turlough	3180	*	Turloughs
IE0002241	Lough Derg, North-East Shore	7230		Alkaline fens
IE0002241	Lough Derg, North-East Shore	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0002241	Lough Derg, North-East Shore	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0002241	Lough Derg, North-East Shore	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0002241	Lough Derg, North-East Shore	8240	*	Limestone pavements
IE0002241	Lough Derg, North-East Shore	91J0	*	Taxus baccata woods of the British Isles
IE0000685	Lough Ennell	7230		Alkaline fens
IE0000163	Lough Eske and Ardnamona Wood	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000163	Lough Eske and Ardnamona Wood	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000163	Lough Eske and Ardnamona Wood	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000606	Lough Fingall Complex	4060		Alpine and Boreal heaths
IE0000606	Lough Fingall Complex	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0000606	Lough Fingall Complex	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000606	Lough Fingall Complex	8240	*	Limestone pavements
IE0000606	Lough Fingall Complex	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000606	Lough Fingall Complex	3180	*	Turloughs
IE0001818	Lough Forbes Complex	7110	*	Active raised bogs
IE0001818	Lough Forbes Complex	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0001818	Lough Forbes Complex	7120		Degraded raised bogs still capable of natural regeneration
IE0001818	Lough Forbes Complex	7150		Depressions on peat substrates of the Rhynchosporion
IE0001818	Lough Forbes Complex	3150		Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation
IE0000611	Lough Funshinagh	3180	*	Turloughs
IE0000522	Lough Gall Bog	7130	*	Blanket bog (*active only)

IE0000522	Lough Gall Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000051	Lough Gash Turlough	3180	*	Turloughs
IE0001976	Lough Gill	91e0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0001976	Lough Gill	3150		Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation
IE0001976	Lough Gill	91a0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002164	Lough Golagh and Breesy Hill	7130	*	Blanket bog (*active only)
IE0000633	Lough Hoe Bog	7130	*	Blanket bog (*active only)
IE0000633	Lough Hoe Bog	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000097	Lough Hyne Nature Reserve and Environs	1160		Large shallow inlets and bays
IE0000097	Lough Hyne Nature Reserve and Environs	1170		Reefs
IE0000097	Lough Hyne Nature Reserve and Environs	8330		Submerged or partly submerged sea caves
IE0002121	Lough Lene	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0000301	Lough Lurgeen Bog/Glenamaddy Turlough	7110	*	Active raised bogs
IE0000301	Lough Lurgeen Bog/Glenamaddy Turlough	7120		Degraded raised bogs still capable of natural regeneration
IE0000301	Lough Lurgeen Bog/Glenamaddy Turlough	7150		Depressions on peat substrates of the Rhynchosporion
IE0000301	Lough Lurgeen Bog/Glenamaddy Turlough	3180	*	Turloughs
IE0000428	Lough Melvin	3130		Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
IE0000634	Lough Nabrickkeagh Bog	7130	*	Blanket bog (*active only)
IE0002135	Lough Nageage	1092		Freshwater Crayfish
IE0002119	Lough Nageeron	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000164	Lough Nagreany Dunes	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0000164	Lough Nagreany Dunes	2140	*	Decalcified fixed dunes with Empetrum nigrum
IE0000164	Lough Nagreany Dunes	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0000164	Lough Nagreany Dunes	2110		Embryonic shifting dunes
IE0000164	Lough Nagreany Dunes	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000165	Lough Nillan Bog (Carrickatlieve)	7130	*	Blanket bog (*active only)
IE0000165	Lough Nillan Bog (Carrickatlieve)	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000007	Lough Oughter and Associated Loughs	91D0	*	Bog woodland
IE0000007	Lough Oughter and Associated Loughs	3150		Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation
IE0000688	Lough Owel	7230		Alkaline fens
IE0000688	Lough Owel	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0000688	Lough Owel	7140		Transition mires and quaking bogs
IE0000304	Lough Rea	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0000440	Lough Ree	7230		Alkaline fens
IE0000440	Lough Ree	91D0	*	Bog woodland
IE0000440	Lough Ree	7120		Degraded raised bogs still capable of natural regeneration
IE0000440	Lough Ree	8240	*	Limestone pavements
IE0000440	Lough Ree	3150		Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation
IE0000440	Lough Ree	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000440	Lough Ree	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)

IE0002287	Lough Swilly	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002287	Lough Swilly	1150	*	Coastal lagoons
IE0002287	Lough Swilly	1130		Estuaries
IE0002287	Lough Swilly	91a0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000370	Lough Yganavan and Lough Nambrackdarrig	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000370	Lough Yganavan and Lough Nambrackdarrig	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000308	Loughatorick South Bog	7130	*	Blanket bog (*active only)
IE0002165	Lower River Shannon	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0002165	Lower River Shannon	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002165	Lower River Shannon	1150	*	Coastal lagoons
IE0002165	Lower River Shannon	1130		Estuaries
IE0002165	Lower River Shannon	1160		Large shallow inlets and bays
IE0002165	Lower River Shannon	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0002165	Lower River Shannon	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0002165	Lower River Shannon	1140		Mudflats and sandflats not covered by seawater at low tide
IE0002165	Lower River Shannon	1220		Perennial vegetation of stony banks
IE0002165	Lower River Shannon	1170		Reefs
IE0002165	Lower River Shannon	1310		Salicornia and other annuals colonizing mud and sand
IE0002165	Lower River Shannon	1110		Sandbanks which are slightly covered by sea water all the time
IE0002165	Lower River Shannon	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002165	Lower River Shannon	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0002137	Lower River Suir	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0002137	Lower River Suir	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002137	Lower River Suir	6430		Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
IE0002137	Lower River Suir	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0002137	Lower River Suir	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002137	Lower River Suir	91J0	*	Taxus baccata woods of the British Isles
IE0002137	Lower River Suir	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0002261	Magharee Islands	1170		Reefs
IE0001766	Magherabeg Dunes	1210		Annual vegetation of drift lines
IE0001766	Magherabeg Dunes	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0001766	Magherabeg Dunes	2110		Embryonic shifting dunes
IE0001766	Magherabeg Dunes	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001766	Magherabeg Dunes	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0001766	Magherabeg Dunes	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000168	Magheradrumman Bog	7130	*	Blanket bog (*active only)
IE0000168	Magheradrumman Bog	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000205	Malahide Estuary	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000205	Malahide Estuary	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000205	Malahide Estuary	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000205	Malahide Estuary	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000205	Malahide Estuary	1310		Salicornia and other annuals colonizing mud and sand
IE0000205	Malahide Estuary	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000205	Malahide Estuary	1320		Spartina swards (Spartinion maritimae)

IE0001881	Maulagowna Bog	7130	*	Blanket bog (*active only)
IE0002008	Maumturk Mountains	4060		Alpine and Boreal heaths
IE0002008	Maumturk Mountains	7130	*	Blanket bog (*active only)
IE0002008	Maumturk Mountains	7150		Depressions on peat substrates of the Rhynchosporion
IE0002008	Maumturk Mountains	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002008	Maumturk Mountains	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0002008	Maumturk Mountains	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0001880	Meenaguse Scragh	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000172	Meenaguse/Ardbane Bog	7130	*	Blanket bog (*active only)
IE0000173	Meentygrannagh Bog	7230		Alkaline fens
IE0000173	Meentygrannagh Bog	7130	*	Blanket bog (*active only)
IE0000173	Meentygrannagh Bog	7140		Transition mires and quaking bogs
IE0002257	Moanour Mountain	6230	*	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
IE0002351	Moanveanlagh Bog	7110	*	Active raised bogs
IE0002351	Moanveanlagh Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002351	Moanveanlagh Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0001536	Mocorha Lough	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0000054	Moneen Mountain	4060		Alpine and Boreal heaths
IE0000054	Moneen Mountain	6130		Calaminarian grasslands of the Violetalia calaminariae
IE0000054	Moneen Mountain	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000054	Moneen Mountain	8240	*	Limestone pavements
IE0000054	Moneen Mountain	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000054	Moneen Mountain	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000054	Moneen Mountain	3180	*	Turloughs
IE0002340	Moneybeg and Clareisland Bogs	7110	*	Active raised bogs
IE0002340	Moneybeg and Clareisland Bogs	7120		Degraded raised bogs still capable of natural regeneration
IE0002340	Moneybeg and Clareisland Bogs	7150		Depressions on peat substrates of the Rhynchosporion
IE0000580	Mongan Bog	7110	*	Active raised bogs
IE0000580	Mongan Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000580	Mongan Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0002352	Monivea Bog	7110	*	Active raised bogs
IE0002352	Monivea Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002352	Monivea Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0002331	Mouds Bog	7110	*	Active raised bogs
IE0002331	Mouds Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002331	Mouds Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000375	Mount Brandon	4060		Alpine and Boreal heaths
IE0000375	Mount Brandon	7130	*	Blanket bog (*active only)
IE0000375	Mount Brandon	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0000375	Mount Brandon	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000375	Mount Brandon	3130		Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
IE0000375	Mount Brandon	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0000375	Mount Brandon	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts

IE0002342	Mount Hevey Bog	7110	*	Active raised bogs
IE0002342	Mount Hevey Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002342	Mount Hevey Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000581	Moyclare Bog	7110	*	Active raised bogs
IE0000581	Moyclare Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000581	Moyclare Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000057	Moyree River System	7230		Alkaline fens
IE0000057	Moyree River System	8310		Caves not open to the public
IE0000057	Moyree River System	8240	*	Limestone pavements
IE0000057	Moyree River System	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0001179	Muckish Mountain	4060		Alpine and Boreal heaths
IE0001179	Muckish Mountain	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0001371	Mucksna Wood	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001890	Mullaghanish Bog	7130	*	Blanket bog (*active only)
IE0000470	Mullet/Blacksod Bay Complex	7230		Alkaline fens
IE0000470	Mullet/Blacksod Bay Complex	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0000470	Mullet/Blacksod Bay Complex	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000470	Mullet/Blacksod Bay Complex	1160		Large shallow inlets and bays
IE0000470	Mullet/Blacksod Bay Complex	21a0	*	Machairs (* in Ireland)
IE0000470	Mullet/Blacksod Bay Complex	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000470	Mullet/Blacksod Bay Complex	3150		Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation
IE0000470	Mullet/Blacksod Bay Complex	1170		Reefs
IE0000470	Mullet/Blacksod Bay Complex	1310		Salicornia and other annuals colonizing mud and sand
IE0000470	Mullet/Blacksod Bay Complex	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000612	Mullygollan Turlough	3180	*	Turloughs
IE0002159	Mulroy Bay	1160		Large shallow inlets and bays
IE0002159	Mulroy Bay	1170		Reefs
IE0002129	Murvey Machair	21A0	*	Machairs (* in Ireland)
IE0001932	Mweelrea/Sheeffry/Erriff Complex	7230		Alkaline fens
IE0001932	Mweelrea/Sheeffry/Erriff Complex	4060		Alpine and Boreal heaths
IE0001932	Mweelrea/Sheeffry/Erriff Complex	1210		Annual vegetation of drift lines
IE0001932	Mweelrea/Sheeffry/Erriff Complex	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0001932	Mweelrea/Sheeffry/Erriff Complex	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0001932	Mweelrea/Sheeffry/Erriff Complex	7130	*	Blanket bog (*active only)
IE0001932	Mweelrea/Sheeffry/Erriff Complex	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0001932	Mweelrea/Sheeffry/Erriff Complex	1150	*	Coastal lagoons
IE0001932	Mweelrea/Sheeffry/Erriff Complex	7150		Depressions on peat substrates of the Rhynchosporion
IE0001932	Mweelrea/Sheeffry/Erriff Complex	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0001932	Mweelrea/Sheeffry/Erriff Complex	2110		Embryonic shifting dunes
IE0001932	Mweelrea/Sheeffry/Erriff Complex	4030		European dry heaths
IE0001932	Mweelrea/Sheeffry/Erriff Complex	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0001932	Mweelrea/Sheeffry/Erriff Complex	21a0	*	Machairs (* in Ireland)

IE0001932	Mweelrea/Sheeffry/Erriff Complex	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0001932	Mweelrea/Sheeffry/Erriff Complex	3160		Natural dystrophic lakes and ponds
IE0001932	Mweelrea/Sheeffry/Erriff Complex	4010		Northern Atlantic wet heaths with Erica tetralix
IE0001932	Mweelrea/Sheeffry/Erriff Complex	3130		Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
IE0001932	Mweelrea/Sheeffry/Erriff Complex	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0001932	Mweelrea/Sheeffry/Erriff Complex	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0001932	Mweelrea/Sheeffry/Erriff Complex	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001932	Mweelrea/Sheeffry/Erriff Complex	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0001932	Mweelrea/Sheeffry/Erriff Complex	7140		Transition mires and quaking bogs
IE0001932	Mweelrea/Sheeffry/Erriff Complex	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0002091	Newhall and Edenvale Complex	8310		Caves not open to the public
IE0002144	Newport River	1029		Margaritifera margaritifera
E0002144	Newport River	1109		Salmo salar
E0002144	Newport River	4010		Northern Atlantic wet heaths with Erica tetralix
E0002144	Newport River	7130		Blanket bog (active)*
IE0000668	Nier Valley Woodlands	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000206	North Dublin Bay	1210		Annual vegetation of drift lines
IE0000206	North Dublin Bay	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000206	North Dublin Bay	2110		Embryonic shifting dunes
IE0000206	North Dublin Bay	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000206	North Dublin Bay	2190		Humid dune slacks
IE0000206	North Dublin Bay	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000206	North Dublin Bay	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000206	North Dublin Bay	1310		Salicornia and other annuals colonizing mud and sand
IE0000206	North Dublin Bay	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0002012	North Inishowen Coast	4030		European dry heaths
IE0002012	North Inishowen Coast	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0002012	North Inishowen Coast	21A0	*	Machairs (* in Ireland)
IE0002012	North Inishowen Coast	1140		Mudflats and sandflats not covered by seawater at low tide
IE0002012	North Inishowen Coast	1220		Perennial vegetation of stony banks
IE0002012	North Inishowen Coast	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002330	North-West Porcupine Bank	1170		Reefs
IE0000532	Oldhead Wood	4030		European dry heaths
IE0000532	Oldhead Wood	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001309	Omey Island Machair	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0001309	Omey Island Machair	21a0	*	Machairs (* in Ireland)
IE0000534	Owenduff/Nephin Complex	4060		Alpine and Boreal heaths
IE0000534	Owenduff/Nephin Complex	7130	*	Blanket bog (*active only)
IE0000534	Owenduff/Nephin Complex	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000534	Owenduff/Nephin Complex	3160		Natural dystrophic lakes and ponds
IE0000534	Owenduff/Nephin Complex	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000534	Owenduff/Nephin Complex	3130		Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea

IE0000534	Owenduff/Nephin Complex	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000534	Owenduff/Nephin Complex	7140		Transition mires and quaking bogs
IE0000534	Owenduff/Nephin Complex	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0002006	Ox Mountains Bogs	7130	*	Blanket bog (*active only)
IE0002006	Ox Mountains Bogs	7150		Depressions on peat substrates of the Rhynchosporion
IE0002006	Ox Mountains Bogs	3160		Natural dystrophic lakes and ponds
IE0002006	Ox Mountains Bogs	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002006	Ox Mountains Bogs	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000318	Peterswell Turlough	3180	*	Turloughs
IE0001847	Philipston Marsh	7140		Transition mires and quaking bogs
IE0001776	Pilgrim's Road Esker	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0002126	Pollagoona Bog	7130	*	Blanket bog (*active only)
IE0000396	Pollardstown Fen	7230		Alkaline fens
IE0000396	Pollardstown Fen	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0000396	Pollardstown Fen	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000319	Pollnaknockaun Wood Nature Reserve	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000037	Pouladatig Cave	8310		Caves not open to the public
IE0000064	Poulnagordon Cave (Quin)	8310		Caves not open to the public
IE0000322	Rahasane Turlough	3180	*	Turloughs
IE0000582	Raheenmore Bog	7110	*	Active raised bogs
IE0000582	Raheenmore Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000582	Raheenmore Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000181	Rathlin O'Birne Island	1170		Reefs
IE0002316	Ratty River Cave	8310		Caves not open to the public
IE0000710	Raven Point Nature Reserve	1210		Annual vegetation of drift lines
IE0000710	Raven Point Nature Reserve	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000710	Raven Point Nature Reserve	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0000710	Raven Point Nature Reserve	2110		Embryonic shifting dunes
IE0000710	Raven Point Nature Reserve	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000710	Raven Point Nature Reserve	2190		Humid dune slacks
IE0000710	Raven Point Nature Reserve	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000710	Raven Point Nature Reserve	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000397	Red Bog, Kildare	7140		Transition mires and quaking bogs
IE0002353	Redwood Bog	7110	*	Active raised bogs
IE0002353	Redwood Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002353	Redwood Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0002281	Reen Point Shingle	1220		Perennial vegetation of stony banks
IE0000919	Ridge Road, SW of Rapemills	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0002162	River Barrow and River Nore	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0002162	River Barrow and River Nore	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002162	River Barrow and River Nore	1130		Estuaries
IE0002162	River Barrow and River Nore	4030		European dry heaths
IE0002162	River Barrow and River Nore	6430		Hydrophilous tall herb fringe communities of plains and of the

				montane to alpine levels
IE0002162	River Barrow and River Nore	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0002162	River Barrow and River Nore	1140		Mudflats and sandflats not covered by seawater at low tide
IE0002162	River Barrow and River Nore	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002162	River Barrow and River Nore	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0002162	River Barrow and River Nore	1310		Salicornia and other annuals colonizing mud and sand
IE0002162	River Barrow and River Nore	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0002299	River Boyne and River Blackwater	7230		Alkaline fens
IE0002299	River Boyne and River Blackwater	91e0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0002301	River Finn	7130	*	Blanket bog (*active only)
IE0002301	River Finn	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002301	River Finn	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0002301	River Finn	7140		Transition mires and quaking bogs
IE0002298	River Moy	7110	*	Active raised bogs
IE0002298	River Moy	7230		Alkaline fens
IE0002298	River Moy	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0002298	River Moy	7120		Degraded raised bogs still capable of natural regeneration
IE0002298	River Moy	7150		Depressions on peat substrates of the Rhynchosporion
IE0002298	River Moy	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000216	River Shannon Callows	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0000216	River Shannon Callows	8240	*	Limestone pavements
IE0000216	River Shannon Callows	6510		Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
IE0000216	River Shannon Callows	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0000101	Roaringwater Bay and Islands	4030		European dry heaths
IE0000101	Roaringwater Bay and Islands	1160		Large shallow inlets and bays
IE0000101	Roaringwater Bay and Islands	1170		Reefs
IE0000101	Roaringwater Bay and Islands	8330		Submerged or partly submerged sea caves
IE0000101	Roaringwater Bay and Islands	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0030000	Rockabill to Dalkey Island	1170		Reefs
IE0000208	Rogerstown Estuary	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000208	Rogerstown Estuary	1130		Estuaries
IE0000208	Rogerstown Estuary	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000208	Rogerstown Estuary	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000208	Rogerstown Estuary	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000208	Rogerstown Estuary	1310		Salicornia and other annuals colonizing mud and sand
IE0000208	Rogerstown Estuary	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000324	Rosroe Bog	7130	*	Blanket bog (*active only)
IE0000324	Rosroe Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0001312	Ross Lake and Woods	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0001313	Rosturra Wood	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001311	Rusheenduff Lough	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0002283	Rutland Island and Sound	1210		Annual vegetation of drift lines
IE0002283	Rutland Island and Sound	1150	*	Coastal lagoons

IE0002283	Rutland Island and Sound	2110		Embryonic shifting dunes
IE0002283	Rutland Island and Sound	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0002283	Rutland Island and Sound	2190		Humid dune slacks
IE0002283	Rutland Island and Sound	1160		Large shallow inlets and bays
IE0002283	Rutland Island and Sound	1170		Reefs
IE0002283	Rutland Island and Sound	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001398	Rye Water Valley/Carton	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000707	Saltee Islands	1160		Large shallow inlets and bays
IE0000707	Saltee Islands	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000707	Saltee Islands	1170		Reefs
IE0000707	Saltee Islands	8330		Submerged or partly submerged sea caves
IE0000707	Saltee Islands	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0000692	Scragh Bog	7230		Alkaline fens
IE0000692	Scragh Bog	7140		Transition mires and quaking bogs
IE0000708	Screen Hills	4030		European dry heaths
IE0000708	Screen Hills	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000185	Sessiagh Lough	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000326	Shankill West Bog	7110	*	Active raised bogs
IE0000326	Shankill West Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000326	Shankill West Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0000585	Sharavogue Bog	7110	*	Active raised bogs
IE0000585	Sharavogue Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000585	Sharavogue Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0001190	Sheephaven	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0001190	Sheephaven	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001190	Sheephaven	21a0	*	Machairs (* in Ireland)
IE0001190	Sheephaven	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0001190	Sheephaven	1140		Mudflats and sandflats not covered by seawater at low tide
IE0001190	Sheephaven	91a0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001190	Sheephaven	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000102	Sheep's Head	4030		European dry heaths
IE0000102	Sheep's Head	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000382	Sheheree (Ardagh) Bog	7110	*	Active raised bogs
IE0000382	Sheheree (Ardagh) Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0000525	Shrule Turlough	3180	*	Turloughs
IE0000939	Silvermine Mountains	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000939	Silvermine Mountains	6230	*	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
IE0002258	Silvermines Mountains West	4030		European dry heaths
IE0002258	Silvermines Mountains West	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000541	Skealoghan Turlough	3180	*	Turloughs
IE0000781	Slaney River Valley	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0000781	Slaney River Valley	1130		Estuaries
IE0000781	Slaney River Valley	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000781	Slaney River Valley	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles

IE0000781	Slaney River Valley	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0002312	Slieve Bernagh Bog	7130	*	Blanket bog (*active only)
IE0002312	Slieve Bernagh Bog	4030		European dry heaths
IE0002312	Slieve Bernagh Bog	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000412	Slieve Bloom Mountains	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0000412	Slieve Bloom Mountains	7130	*	Blanket bog (*active only)
IE0000412	Slieve Bloom Mountains	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000542	Slieve Fyagh Bog	7130	*	Blanket bog (*active only)
IE0000189	Slieve League	4060		Alpine and Boreal heaths
IE0000189	Slieve League	7130	*	Blanket bog (*active only)
IE0000189	Slieve League	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0000189	Slieve League	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000189	Slieve League	1170		Reefs
IE0000189	Slieve League	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0000189	Slieve League	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002185	Slieve Mish Mountains	4060		Alpine and Boreal heaths
IE0002185	Slieve Mish Mountains	4030		European dry heaths
IE0002185	Slieve Mish Mountains	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002185	Slieve Mish Mountains	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0000190	Slieve Tooey/Tormore Island/Loughros Beg Bay	4060		Alpine and Boreal heaths
IE0000190	Slieve Tooey/Tormore Island/Loughros Beg Bay	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0000190	Slieve Tooey/Tormore Island/Loughros Beg Bay	7130	*	Blanket bog (*active only)
IE0000190	Slieve Tooey/Tormore Island/Loughros Beg Bay	2140	*	Decalcified fixed dunes with Empetrum nigrum
IE0000190	Slieve Tooey/Tormore Island/Loughros Beg Bay	2110		Embryonic shifting dunes
IE0000190	Slieve Tooey/Tormore Island/Loughros Beg Bay	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000190	Slieve Tooey/Tormore Island/Loughros Beg Bay	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0000328	Slyne Head Islands	1170		Reefs
IE0002074	Slyne Head Peninsula	7230		Alkaline fens
IE0002074	Slyne Head Peninsula	1210		Annual vegetation of drift lines
IE0002074	Slyne Head Peninsula	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002074	Slyne Head Peninsula	1150	*	Coastal lagoons
IE0002074	Slyne Head Peninsula	2110		Embryonic shifting dunes
IE0002074	Slyne Head Peninsula	4030		European dry heaths
IE0002074	Slyne Head Peninsula	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0002074	Slyne Head Peninsula	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0002074	Slyne Head Peninsula	1160		Large shallow inlets and bays
IE0002074	Slyne Head Peninsula	6510		Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
IE0002074	Slyne Head Peninsula	21A0	*	Machairs (* in Ireland)
IE0002074	Slyne Head Peninsula	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0002074	Slyne Head Peninsula	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0002074	Slyne Head Peninsula	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0002074	Slyne Head Peninsula	1220		Perennial vegetation of stony banks
IE0002074	Slyne Head Peninsula	1170		Reefs

IE0002074	Slyne Head Peninsula	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0002074	Slyne Head Peninsula	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001913	Sonnagh Bog	7130	*	Blanket bog (*active only)
IE0000210	South Dublin Bay	1140		Mudflats and sandflats not covered by seawater at low tide
IE0002329	South-West Porcupine Bank	1170		Reefs
IE0000849	Spahill and Clomantagh Hill	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0001831	Split Hills and Long Hill Esker	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000106	St. Gobnet's Wood	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000191	St. John's Point	7230		Alkaline fens
IE0000191	St. John's Point	1160		Large shallow inlets and bays
IE0000191	St. John's Point	8240	*	Limestone pavements
IE0000191	St. John's Point	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0000191	St. John's Point	1170		Reefs
IE0000191	St. John's Point	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000191	St. John's Point	8330		Submerged or partly submerged sea caves
IE0001680	Streedagh Point Dunes	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0001680	Streedagh Point Dunes	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0001680	Streedagh Point Dunes	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0001680	Streedagh Point Dunes	1140		Mudflats and sandflats not covered by seawater at low tide
IE0001680	Streedagh Point Dunes	1220		Perennial vegetation of stony banks
IE0001680	Streedagh Point Dunes	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000709	Tacumshin Lake	1210		Annual vegetation of drift lines
IE0000709	Tacumshin Lake	1150	*	Coastal lagoons
IE0000709	Tacumshin Lake	2110		Embryonic shifting dunes
IE0000709	Tacumshin Lake	1220		Perennial vegetation of stony banks
IE0000709	Tacumshin Lake	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001992	Tamur Bog	7130	*	Blanket bog (*active only)
IE0001992	Tamur Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0001992	Tamur Bog	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000636	Templehouse and Cloonacleigha Loughs	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0000636	Templehouse and Cloonacleigha Loughs	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0001321	Termon Lough	3180	*	Turloughs
IE0001195	Termon Strand	1150	*	Coastal lagoons
IE0000108	The Gearagh	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0000108	The Gearagh	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0000108	The Gearagh	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0000925	The Long Derries, Edenderry	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000407	The Loughans	3180	*	Turloughs
IE0002249	The Murrough Wetlands	7230		Alkaline fens
IE0002249	The Murrough Wetlands	1210		Annual vegetation of drift lines

IE0002249	The Murrough Wetlands	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002249	The Murrough Wetlands	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0002249	The Murrough Wetlands	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0002249	The Murrough Wetlands	1220		Perennial vegetation of stony banks
IE0002031	The Twelve Bens/Garraun Complex	4060		Alpine and Boreal heaths
IE0002031	The Twelve Bens/Garraun Complex	7130	*	Blanket bog (*active only)
IE0002031	The Twelve Bens/Garraun Complex	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0002031	The Twelve Bens/Garraun Complex	7150		Depressions on peat substrates of the Rhynchosporion
IE0002031	The Twelve Bens/Garraun Complex	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002031	The Twelve Bens/Garraun Complex	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0002031	The Twelve Bens/Garraun Complex	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0002031	The Twelve Bens/Garraun Complex	8110		Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)
IE0002252	Thomastown Quarry	7220	*	Petrifying springs with tufa formation (Cratoneurion)
IE0000109	Three Castle Head to Mizen Head	4030		European dry heaths
IE0000109	Three Castle Head to Mizen Head	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0000439	Tory Hill	7230		Alkaline fens
IE0000439	Tory Hill	7210	*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae
IE0000439	Tory Hill	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0002259	Tory Island Coast	1150	*	Coastal lagoons
IE0002259	Tory Island Coast	1220		Perennial vegetation of stony banks
IE0002259	Tory Island Coast	1170		Reefs
IE0002259	Tory Island Coast	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1210		Annual vegetation of drift lines
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1150	*	Coastal lagoons
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1130		Estuaries
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	2190		Humid dune slacks
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1160		Large shallow inlets and bays
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1140		Mudflats and sandflats not covered by seawater at low tide
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1220		Perennial vegetation of stony banks
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1170		Reefs
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1310		Salicornia and other annuals colonizing mud and sand
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)

IE0000671	Tramore Dunes and Backstrand	1210		Annual vegetation of drift lines
IE0000671	Tramore Dunes and Backstrand	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000671	Tramore Dunes and Backstrand	2110		Embryonic shifting dunes
IE0000671	Tramore Dunes and Backstrand	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000671	Tramore Dunes and Backstrand	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000671	Tramore Dunes and Backstrand	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000671	Tramore Dunes and Backstrand	1220		Perennial vegetation of stony banks
IE0000671	Tramore Dunes and Backstrand	1310		Salicornia and other annuals colonizing mud and sand
IE0000671	Tramore Dunes and Backstrand	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000194	Tranarossan and Melmore Lough	4060		Alpine and Boreal heaths
IE0000194	Tranarossan and Melmore Lough	1210		Annual vegetation of drift lines
IE0000194	Tranarossan and Melmore Lough	2140	*	Decalcified fixed dunes with Empetrum nigrum
IE0000194	Tranarossan and Melmore Lough	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0000194	Tranarossan and Melmore Lough	2110		Embryonic shifting dunes
IE0000194	Tranarossan and Melmore Lough	4030		European dry heaths
IE0000194	Tranarossan and Melmore Lough	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000194	Tranarossan and Melmore Lough	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0000194	Tranarossan and Melmore Lough	21a0	*	Machairs (* in Ireland)
IE0000194	Tranarossan and Melmore Lough	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000194	Tranarossan and Melmore Lough	1220		Perennial vegetation of stony banks
IE0000194	Tranarossan and Melmore Lough	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0000194	Tranarossan and Melmore Lough	1230		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0002354	Tullaghanrock Bog	7110	*	Active raised bogs
IE0002354	Tullaghanrock Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002354	Tullaghanrock Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0002343	Tullaher Lough and Bog	7110	*	Active raised bogs
IE0002343	Tullaher Lough and Bog	7120		Degraded raised bogs still capable of natural regeneration
IE0002343	Tullaher Lough and Bog	7150		Depressions on peat substrates of the Rhynchosporion
IE0002343	Tullaher Lough and Bog	7140		Transition mires and quaking bogs
IE0002130	Tully Lough	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000330	Tully Mountain	4060		Alpine and Boreal heaths
IE0000330	Tully Mountain	4030		European dry heaths
IE0000637	Turloughmore (Sligo)	3180	*	Turloughs
IE0000638	Union Wood	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0001898	Unshin River	91E0	*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
IE0001898	Unshin River	3260		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
IE0001571	Urlaur Lakes	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0000733	Vale of Clara (Rathdrum Wood)	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002262	Valencia Harbour/Portmagee Channel	1160		Large shallow inlets and bays

IE0002262	Valencia Harbour/Portmagee Channel	1140		Mudflats and sandflats not covered by seawater at low tide
IE0002262	Valencia Harbour/Portmagee Channel	1170		Reefs
IE0000197	West of Ardara/Maas Road	7230		Alkaline fens
IE0000197	West of Ardara/Maas Road	4060		Alpine and Boreal heaths
IE0000197	West of Ardara/Maas Road	2150	*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
IE0000197	West of Ardara/Maas Road	1330		Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
IE0000197	West of Ardara/Maas Road	7130	*	Blanket bog (*active only)
IE0000197	West of Ardara/Maas Road	2140	*	Decalcified fixed dunes with Empetrum nigrum
IE0000197	West of Ardara/Maas Road	7150		Depressions on peat substrates of the Rhynchosporion
IE0000197	West of Ardara/Maas Road	2170		Dunes with Salix repens ssp.argentea (Salix arenariae)
IE0000197	West of Ardara/Maas Road	1130		Estuaries
IE0000197	West of Ardara/Maas Road	4030		European dry heaths
IE0000197	West of Ardara/Maas Road	2130	*	Fixed coastal dunes with herbaceous vegetation (grey dunes)
IE0000197	West of Ardara/Maas Road	2190		Humid dune slacks
IE0000197	West of Ardara/Maas Road	5130		Juniperus communis formations on heaths or calcareous grasslands
IE0000197	West of Ardara/Maas Road	1160		Large shallow inlets and bays
IE0000197	West of Ardara/Maas Road	6510		Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
IE0000197	West of Ardara/Maas Road	21A0	*	Machairs (* in Ireland)
IE0000197	West of Ardara/Maas Road	1410		Mediterranean salt meadows (Juncetalia maritimi)
IE0000197	West of Ardara/Maas Road	6410		Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)
IE0000197	West of Ardara/Maas Road	1140		Mudflats and sandflats not covered by seawater at low tide
IE0000197	West of Ardara/Maas Road	4010		Northern Atlantic wet heaths with Erica tetralix
IE0000197	West of Ardara/Maas Road	3110		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
IE0000197	West of Ardara/Maas Road	6210	*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
IE0000197	West of Ardara/Maas Road	2120		Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
IE0001810	White Lough, Ben Loughs and Lough Doo	3140		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0002122	Wicklow Mountains	4060		Alpine and Boreal heaths
IE0002122	Wicklow Mountains	7130	*	Blanket bog (*active only)
IE0002122	Wicklow Mountains	8210		Calcareous rocky slopes with chasmophytic vegetation
IE0002122	Wicklow Mountains	4030		European dry heaths
IE0002122	Wicklow Mountains	3160		Natural dystrophic lakes and ponds
IE0002122	Wicklow Mountains	4010		Northern Atlantic wet heaths with Erica tetralix
IE0002122	Wicklow Mountains	91A0		Old sessile oak woods with Ilex and Blechnum in British Isles
IE0002122	Wicklow Mountains	3130		Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
IE0002122	Wicklow Mountains	8220		Siliceous rocky slopes with chasmophytic vegetation
IE0002122	Wicklow Mountains	8110		Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)
IE0002122	Wicklow Mountains	6230	*	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
IE0002274	Wicklow Reef	1170		Reefs
IE0002296	Williamstown Turloughs	3180	*	Turloughs

6.2 SACS IN IRELAND AND SPECIES FOR WHICH THEY HAVE BEEN DESIGNATED

Black – Screened OUT. Blue – Screened IN. It is clear to see that where an SAC hosts a single habitat type that has been screened IN, that SAC has also been screened IN.

SITECODE	SITENAME	SPEC NUM	SPECIES NAME
IE0001626	Annaghmore Lough (Roscommon)	1013	*Vertigo geyeri*
IE0002081	Ballinafad	1303	*Rhinolophus hipposideros*
IE0000335	Ballinskelligs Bay and Inny Estuary	1395	*Petalophyllum ralfsii*
IE0002246	Ballycullinan, Old Domestic Building	1303	*Rhinolophus hipposideros*
IE0001975	Ballyhoorisky Point to Fanad Head	1833	*Najas flexilis*
IE0001975	Ballyhoorisky Point to Fanad Head	1014	*Vertigo angustior*
IE0000474	Ballymaglancy Cave, Cong	1303	*Rhinolophus hipposideros*
IE0001387	Ballynafagh Lake	1065	*Euphydryas aurinia*
IE0001387	Ballynafagh Lake	1016	*Vertigo moulinsiana*
IE0001090	Ballyness Bay	1013	*Vertigo geyeri*
IE0000622	Ballysadare Bay	1365	*Phoca vitulina*
IE0000622	Ballysadare Bay	1014	*Vertigo angustior*
IE0002171	Bandon River	1096	*Lampetra planeri*
IE0002171	Bandon River	1029	*Margaritifera margaritifera*
IE0002118	Barnahallia Lough	1833	*Najas flexilis*
IE0000432	Barrigone	1065	*Euphydryas aurinia*
IE0001922	Bellacorick Bog Complex	1528	*Saxifraga hirculus*
IE0001922	Bellacorick Bog Complex	1013	*Vertigo geyeri*
IE0000466	Bellacorick Iron Flush	1528	*Saxifraga hirculus*
IE0000592	Bellanagare Bog	1065	*Euphydryas aurinia*
IE0000623	Ben Bulben, Gleniff and Glenade Complex	1355	*Lutra lutra*
IE0000623	Ben Bulben, Gleniff and Glenade Complex	1013	*Vertigo geyeri*
IE0000020	Black Head-Poulsallagh Complex	1395	*Petalophyllum ralfsii*
IE0002170	Blackwater River (Cork/Waterford)	1103	*Alosa fallax*
IE0002170	Blackwater River (Cork/Waterford)	1092	*Austropotamobius pallipes*
IE0002170	Blackwater River (Cork/Waterford)	1099	*Lampetra fluviatilis*
IE0002170	Blackwater River (Cork/Waterford)	1096	*Lampetra planeri*
IE0002170	Blackwater River (Cork/Waterford)	1029	*Margaritifera margaritifera*
IE0002170	Blackwater River (Cork/Waterford)	1095	*Petromyzon marinus*
IE0002170	Blackwater River (Cork/Waterford)	1106	*Salmo salar*
IE0002170	Blackwater River (Cork/Waterford)	1421	*Trichomanes speciosum*
IE0002170	Blackwater River (Cork/Waterford)	1355	*Lutra lutra*
IE0002173	Blackwater River (Kerry)	1024	*Geomalacus maculosus*
IE0002173	Blackwater River (Kerry)	1355	*Lutra lutra*
IE0002173	Blackwater River (Kerry)	1029	*Margaritifera margaritifera*
IE0002173	Blackwater River (Kerry)	1303	*Rhinolophus hipposideros*
IE0002173	Blackwater River (Kerry)	1106	*Salmo salar*
IE0002172	Blasket Islands	1364	*Halichoerus grypus*

IE0002172	Blasket Islands	1351	*Phocoena phocoena*
IE0001656	Bricklieve Mountains & Keishcorran	1092	*Austropotamobius pallipes*
IE0001656	Bricklieve Mountains & Keishcorran	1065	*Euphydryas aurinia*
IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmore	1395	*Petalophyllum ralfsii*
IE0000093	Caha Mountains	1024	*Geomalacus maculosus*
IE0000093	Caha Mountains	1421	*Trichomanes speciosum*
IE0000238	Caherglassaun Turlough	1303	*Rhinolophus hipposideros*
IE0000595	Callow Bog	1065	*Euphydryas aurinia*
IE0002037	Carrigeenamronety Hill	1421	*Trichomanes speciosum*
IE0000597	Carrowbehy/Caher Bog	1065	*Euphydryas aurinia*
IE0002250	Carrowmore Dunes	1014	*Vertigo angustior*
IE0000476	Carrowmore Lake Complex	1393	*Drepanocladus vernicosus*
IE0000476	Carrowmore Lake Complex	1528	*Saxifraga hirculus*
IE0000343	Castlemaine Harbour	1099	*Lampetra fluviatilis*
IE0000343	Castlemaine Harbour	1355	*Lutra lutra*
IE0000343	Castlemaine Harbour	1395	*Petalophyllum ralfsii*
IE0000343	Castlemaine Harbour	1095	*Petromyzon marinus*
IE0000343	Castlemaine Harbour	1106	*Salmo salar*
IE0001547	Castletownshend	1421	*Trichomanes speciosum*
IE0000571	Charleville Wood	1016	*Vertigo moulinsiana*
IE0000572	Clara Bog	1065	*Euphydryas aurinia*
IE0000930	Clare Glen	1421	*Trichomanes speciosum*
IE0001043	Cleanderry Wood	1421	*Trichomanes speciosum*
IE0001482	Clew Bay Complex	1355	*Lutra lutra*
IE0001482	Clew Bay Complex	1365	*Phoca vitulina*
IE0001482	Clew Bay Complex	1013	*Vertigo geyeri*
IE0002047	Cloghernagore Bog and Glenveagh National Park	1355	*Lutra lutra*
IE0002047	Cloghernagore Bog and Glenveagh National Park	1029	*Margaritifera margaritifera*
IE0002047	Cloghernagore Bog and Glenveagh National Park	1106	*Salmo salar*
IE0002047	Cloghernagore Bog and Glenveagh National Park	1421	*Trichomanes speciosum*
IE0000859	Clonaslee Eskers and Derry Bog	1013	*Vertigo geyeri*
IE0000600	Cloonchambers Bog	1065	*Euphydryas aurinia*
IE0001342	Cloonee and Inchiquin Loughs, Uragh Wood	1024	*Geomalacus maculosus*
IE0001342	Cloonee and Inchiquin Loughs, Uragh Wood	1833	*Najas flexilis*
IE0001342	Cloonee and Inchiquin Loughs, Uragh Wood	1303	*Rhinolophus hipposideros*
IE0001342	Cloonee and Inchiquin Loughs, Uragh Wood	1421	*Trichomanes speciosum*
IE0001952	Comeragh Mountains	1393	*Drepanocladus vernicosus*
IE0002034	Connemara Bog Complex	1065	*Euphydryas aurinia*
IE0002034	Connemara Bog Complex	1355	*Lutra lutra*
IE0002034	Connemara Bog Complex	1833	*Najas flexilis*
IE0002034	Connemara Bog Complex	1106	*Salmo salar*
IE0001251	Cregduff Lough	1833	*Najas flexilis*

IE0002317	Cregg House Stables, Crusheen	1303	*Rhinolophus hipposideros*
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	1099	*Lampetra fluviatilis*
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	1095	*Petromyzon marinus*
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	1365	*Phoca vitulina*
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	1014	*Vertigo angustior*
IE0000174	Curraghchase Woods	1303	*Rhinolophus hipposideros*
IE0000030	Danes Hole, Poulnalecka	1303	*Rhinolophus hipposideros*
IE0000133	Donegal Bay (Murvagh)	1365	*Phoca vitulina*
IE0001497	Doogort Machair/Lough Doo	1395	*Petalophyllum ralfsii*
IE0000032	Dromore Woods and Loughs	1355	*Lutra lutra*
IE0000032	Dromore Woods and Loughs	1303	*Rhinolophus hipposideros*
IE0000495	Duvillaun Islands	1364	*Halichoerus grypus*
IE0001926	East Burren Complex	1065	*Euphydryas aurinia*
IE0001926	East Burren Complex	1355	*Lutra lutra*
IE0001926	East Burren Complex	1303	*Rhinolophus hipposideros*
IE0000140	Fawnboy Bog/Lough Nacung	1029	*Margaritifera margaritifera*
IE0000576	Fin Lough (Offaly)	1013	*Vertigo geyeri*
IE0000268	Galway Bay Complex	1355	*Lutra lutra*
IE0000268	Galway Bay Complex	1365	*Phoca vitulina*
IE0002315	Glanlough Woods	1303	*Rhinolophus hipposideros*
IE0001879	Glanmore Bog	1029	*Margaritifera margaritifera*
IE0001879	Glanmore Bog	1421	*Trichomanes speciosum*
IE0001919	Glenade Lough	1092	*Austropotamobius pallipes*
IE0001919	Glenade Lough	1833	*Najas flexilis*
IE0000500	Glenamoy Bog Complex	1393	*Drepanocladus vernicosus*
IE0000500	Glenamoy Bog Complex	1395	*Petalophyllum ralfsii*
IE0000500	Glenamoy Bog Complex	1106	*Salmo salar*
IE0000500	Glenamoy Bog Complex	1528	*Saxifraga hirculus*
IE0002324	Glendine Wood	1421	*Trichomanes speciosum*
IE0000090	Glengarriff Harbour and Woodland	1024	*Geomalacus maculosus*
IE0000090	Glengarriff Harbour and Woodland	1355	*Lutra lutra*
IE0000090	Glengarriff Harbour and Woodland	1365	*Phoca vitulina*
IE0000090	Glengarriff Harbour and Woodland	1303	*Rhinolophus hipposideros*
IE0001432	Glenstal Wood	1421	*Trichomanes speciosum*
IE0001141	Gweedore Bay and Islands	1355	*Lutra lutra*
IE0001141	Gweedore Bay and Islands	1833	*Najas flexilis*
IE0001141	Gweedore Bay and Islands	1395	*Petalophyllum ralfsii*
IE0000147	Horn Head and Rinclevan	1364	*Halichoerus grypus*
IE0000147	Horn Head and Rinclevan	1833	*Najas flexilis*
IE0000147	Horn Head and Rinclevan	1395	*Petalophyllum ralfsii*
IE0000147	Horn Head and Rinclevan	1013	*Vertigo geyeri*
IE0000278	Inishbofin and Inishshark	1364	*Halichoerus grypus*

IE0000507	Inishkea Islands	1364	*Halichoerus grypus*
IE0000507	Inishkea Islands	1395	*Petalophyllum ralfsii*
IE0000213	Inishmore Island	1014	*Vertigo angustior*
IE0001513	Keel Machair/Menaun Cliffs	1395	*Petalophyllum ralfsii*
IE0002158	Kenmare River	1355	*Lutra lutra*
IE0002158	Kenmare River	1365	*Phoca vitulina*
IE0002158	Kenmare River	1303	*Rhinolophus hipposideros*
IE0002158	Kenmare River	1014	*Vertigo angustior*
IE0002320	Kildun Souterrain	1303	*Rhinolophus hipposideros*
IE0000364	Kilgarvan Ice House	1303	*Rhinolophus hipposideros*
IE0002111	Kilkieran Bay and Islands	1355	*Lutra lutra*
IE0002111	Kilkieran Bay and Islands	1833	*Najas flexilis*
IE0002111	Kilkieran Bay and Islands	1365	*Phoca vitulina*
IE0002319	Kilkishen House	1303	*Rhinolophus hipposideros*
E0000458	Killala Bay/Moy Estuary	1095	*Petromyzon marinus*
IE0000458	Killala Bay/Moy Estuary	1365	*Phoca vitulina*
IE0000458	Killala Bay/Moy Estuary	1014	*Vertigo angustior*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1103	*Alosa fallax*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1065	*Euphydryas aurinia*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1024	*Geomalacus maculosus*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1099	*Lampetra fluviatilis*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1096	*Lampetra planeri*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1355	*Lutra lutra*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1029	*Margaritifera margaritifera*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1833	*Najas flexilis*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1095	*Petromyzon marinus*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1303	*Rhinolophus hipposideros*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1106	*Salmo salar*
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	1421	*Trichomanes speciosum*
IE0001786	Kilroosky Lough Cluster	1092	*Austropotamobius pallipes*
IE0000286	Kiltartan Cave (Coole)	1303	*Rhinolophus hipposideros*
IE0001151	Kindrum Lough	1833	*Najas flexilis*
IE0001669	Knockalongy and Knockachree Cliffs	1421	*Trichomanes speciosum*
IE0002318	Knockanira House	1303	*Rhinolophus hipposideros*
IE0000204	Lambay Island	1364	*Halichoerus grypus*
IE0000204	Lambay Island	1365	*Phoca vitulina*
IE0002176	Leannan River	1355	*Lutra lutra*
IE0002176	Leannan River	1029	*Margaritifera margaritifera*
IE0002176	Leannan River	1833	*Najas flexilis*
IE0002176	Leannan River	1106	*Salmo salar*
IE0000869	Lisbigney Bog	1016	*Vertigo moulinsiana*

IE0002147	Lisduff Fen	1013	*Vertigo geyeri*
IE0002120	Lough Bane and Lough Glass	1092	*Austropotamobius pallipes*
IE0001774	Lough Carra/Mask Complex	1393	*Drepanocladus vernicosus*
IE0001774	Lough Carra/Mask Complex	1355	*Lutra lutra*
IE0001774	Lough Carra/Mask Complex	1303	*Rhinolophus hipposideros*
IE0000297	Lough Corrib	1092	*Austropotamobius pallipes*
IE0000297	Lough Corrib	1393	*Drepanocladus vernicosus*
IE0000297	Lough Corrib	1355	*Lutra lutra*
IE0000297	Lough Corrib	1029	*Margaritifera margaritifera*
IE0000297	Lough Corrib	1833	*Najas flexilis*
IE0000297	Lough Corrib	1095	*Petromyzon marinus*
IE0000297	Lough Corrib	1303	*Rhinolophus hipposideros*
IE0000297	Lough Corrib	1106	*Salmo salar*
IE0000297	Lough Corrib	1096	*Lampetra planeri*
IE0000299	Lough Cutra	1303	*Rhinolophus hipposideros*
IE0002177	Lough Dahybaun	1833	*Najas flexilis*
IE0000163	Lough Eske and Ardnamona Wood	1029	*Margaritifera margaritifera*
IE0000163	Lough Eske and Ardnamona Wood	1106	*Salmo salar*
IE0000163	Lough Eske and Ardnamona Wood	1421	*Trichomanes speciosum*
IE0000606	Lough Fingall Complex	1303	*Rhinolophus hipposideros*
IE0001976	Lough Gill	1092	*Austropotamobius pallipes*
IE0001976	Lough Gill	1099	*Lampetra fluviatilis*
IE0001976	Lough Gill	1096	*Lampetra planeri*
IE0001976	Lough Gill	1355	*Lutra lutra*
IE0001976	Lough Gill	1095	*Petromyzon marinus*
IE0001976	Lough Gill	1106	*Salmo salar*
IE0000633	Lough Hoe Bog	1092	*Austropotamobius pallipes*
IE0000633	Lough Hoe Bog	1013	*Vertigo geyeri*
IE0002121	Lough Lene	1092	*Austropotamobius pallipes*
IE0000428	Lough Melvin	1355	*Lutra lutra*
IE0000428	Lough Melvin	1106	*Salmo salar*
IE0002135	Lough Nageage	1092	*Austropotamobius pallipes*
IE0002119	Lough Nageeron	1833	*Najas flexilis*
IE0000164	Lough Nagreany Dunes	1833	*Najas flexilis*
IE0000007	Lough Oughter and Associated Loughs	1355	*Lutra lutra*
IE0000688	Lough Owel	1092	*Austropotamobius pallipes*
IE0000440	Lough Ree	1355	*Lutra lutra*
IE0002287	Lough Swilly	1355	*Lutra lutra*
IE0000370	Lough Yganavan and Lough Nambrackdarrig	1024	*Geomalacus maculosus*
IE0002165	Lower River Shannon	1099	*Lampetra fluviatilis*
IE0002165	Lower River Shannon	1096	*Lampetra planeri*
IE0002165	Lower River Shannon	1355	*Lutra lutra*

IE0002165	Lower River Shannon	1029	*Margaritifera margaritifera*
IE0002165	Lower River Shannon	1095	*Petromyzon marinus*
IE0002165	Lower River Shannon	1106	*Salmo salar*
IE0002165	Lower River Shannon	1349	*Tursiops truncatus*
IE0002137	Lower River Suir	1103	*Alosa fallax*
IE0002137	Lower River Suir	1092	*Austropotamobius pallipes*
IE0002137	Lower River Suir	1099	*Lampetra fluviatilis*
IE0002137	Lower River Suir	1096	*Lampetra planeri*
IE0002137	Lower River Suir	1355	*Lutra lutra*
IE0002137	Lower River Suir	1029	*Margaritifera margaritifera*
IE0002137	Lower River Suir	1095	*Petromyzon marinus*
IE0002137	Lower River Suir	1106	*Salmo salar*
IE0002008	Maumturk Mountains	1833	*Najas flexilis*
IE0002008	Maumturk Mountains	1106	*Salmo salar*
IE0000173	Meentygrannagh Bog	1393	*Drepanocladus vernicosus*
IE0000054	Moneen Mountain	1065	*Euphydryas aurinia*
IE0000054	Moneen Mountain	1303	*Rhinolophus hipposideros*
IE0000527	Moore Hall (Lough Carra)	1303	*Rhinolophus hipposideros*
IE0000375	Mount Brandon	1029	*Margaritifera margaritifera*
IE0000375	Mount Brandon	1421	*Trichomanes speciosum*
IE0002141	Mountmellick	1016	*Vertigo moulinsiana*
IE0000057	Moyree River System	1355	*Lutra lutra*
IE0000057	Moyree River System	1303	*Rhinolophus hipposideros*
IE0000470	Mullet/Blacksod Bay Complex	1355	*Lutra lutra*
IE0000470	Mullet/Blacksod Bay Complex	1395	*Petalophyllum ralfsii*
IE0002159	Mulroy Bay	1355	*Lutra lutra*
IE0002129	Murvey Machair	1395	*Petalophyllum ralfsii*
IE0001932	Mweelrea/Sheeffry/Erriff Complex	1355	*Lutra lutra*
IE0001932	Mweelrea/Sheeffry/Erriff Complex	1029	*Margaritifera margaritifera*
IE0001932	Mweelrea/Sheeffry/Erriff Complex	1833	*Najas flexilis*
IE0001932	Mweelrea/Sheeffry/Erriff Complex	1395	*Petalophyllum ralfsii*
IE0001932	Mweelrea/Sheeffry/Erriff Complex	1106	*Salmo salar*
IE0001932	Mweelrea/Sheeffry/Erriff Complex	1014	*Vertigo angustior*
IE0001932	Mweelrea/Sheeffry/Erriff Complex	1013	*Vertigo geyeri*
IE0001070	Myross Wood	1421	*Trichomanes speciosum*
IE0002157	Newgrove House	1303	*Rhinolophus hipposideros*
IE0002091	Newhall and Edenvale Complex	1303	*Rhinolophus hipposideros*
IE0002144	Newport River	1029	*Margaritifera margaritifera*
IE0002144	Newport River	1106	*Salmo salar*
IE0000206	North Dublin Bay	1395	*Petalophyllum ralfsii*
IE0002012	North Inishowen Coast	1355	*Lutra lutra*
IE0002012	North Inishowen Coast	1014	*Vertigo angustior*
IE0002010	Old Domestic Building (Keevagh)	1303	*Rhinolophus*

			hipposideros
IE0002098	Old Domestic Building, Askive Wood	1303	*Rhinolophus hipposideros*
IE0002041	Old Domestic Building, Curraglass Wood	1303	*Rhinolophus hipposideros*
IE0000353	Old Domestic Building, Dromore Wood	1303	*Rhinolophus hipposideros*
IE0002314	Old Domestic Buildings, Rylane	1303	*Rhinolophus hipposideros*
IE0002245	Old Farm Buildings, Ballymacrogan	1303	*Rhinolophus hipposideros*
IE0001309	Omey Island Machair	1395	*Petalophyllum ralfsii*
IE0000534	Owenduff/Nephin Complex	1393	*Drepanocladus vernicosus*
IE0000534	Owenduff/Nephin Complex	1355	*Lutra lutra*
IE0000534	Owenduff/Nephin Complex	1106	*Salmo salar*
IE0000534	Owenduff/Nephin Complex	1528	*Saxifraga hirculus*
IE0002006	Ox Mountains Bogs	1013	*Vertigo geyeri*
IE0000396	Pollardstown Fen	1014	*Vertigo angustior*
IE0000396	Pollardstown Fen	1013	*Vertigo geyeri*
IE0000396	Pollardstown Fen	1016	*Vertigo moulinsiana*
IE0000037	Pouladatig Cave	1303	*Rhinolophus hipposideros*
IE0000064	Poulnagordon Cave (Quin)	1303	*Rhinolophus hipposideros*
IE0002316	Ratty River Cave	1303	*Rhinolophus hipposideros*
IE0002162	River Barrow and River Nore	1103	*Alosa fallax*
IE0002162	River Barrow and River Nore	1092	*Austropotamobius pallipes*
IE0002162	River Barrow and River Nore	1099	*Lampetra fluviatilis*
IE0002162	River Barrow and River Nore	1096	*Lampetra planeri*
IE0002162	River Barrow and River Nore	1355	*Lutra lutra*
IE0002162	River Barrow and River Nore	1990	*Margaritifera durrovensis*
IE0002162	River Barrow and River Nore	1029	*Margaritifera margaritifera*
IE0002162	River Barrow and River Nore	1095	*Petromyzon marinus*
IE0002162	River Barrow and River Nore	1106	*Salmo salar*
IE0002162	River Barrow and River Nore	1421	*Trichomanes speciosum*
IE0002162	River Barrow and River Nore	1016	*Vertigo moulinsiana*
IE0002299	River Boyne and River Blackwater	1099	*Lampetra fluviatilis*
IE0002299	River Boyne and River Blackwater	1355	*Lutra lutra*
IE0002299	River Boyne and River Blackwater	1106	*Salmo salar*
IE0002301	River Finn	1355	*Lutra lutra*
IE0002301	River Finn	1106	*Salmo salar*
IE0002298	River Moy	1092	*Austropotamobius pallipes*
IE0002298	River Moy	1096	*Lampetra planeri*
IE0002298	River Moy	1355	*Lutra lutra*
IE0002298	River Moy	1095	*Petromyzon marinus*
IE0002298	River Moy	1106	*Salmo salar*
IE0000216	River Shannon Callows	1355	*Lutra lutra*
IE0000101	Roaringwater Bay and Islands	1364	*Halichoerus grypus*
IE0000101	Roaringwater Bay and Islands	1355	*Lutra lutra*
IE0000101	Roaringwater Bay and Islands	1351	*Phocoena phocoena*

IE003000	Rockabill to Dalkey Island	1351	*Phocoena Phocoena*
IE0001312	Ross Lake and Woods	1303	*Rhinolophus hipposideros*
IE0001311	Rusheenduff Lough	1833	*Najas flexilis*
IE0002283	Rutland Island and Sound	1365	*Phoca vitulina*
IE0001398	Rye Water Valley/Carton	1014	*Vertigo angustior*
IE0001398	Rye Water Valley/Carton	1016	*Vertigo moulinsiana*
IE0000707	Saltee Islands	1364	*Halichoerus grypus*
IE0000692	Scragh Bog	1393	*Drepanocladus vernicosus*
IE0000692	Scragh Bog	1065	*Euphydryas aurinia*
IE0000185	Sessiagh Lough	1833	*Najas flexilis*
IE0001190	Sheephaven	1395	*Petalophyllum ralfsii*
IE0000102	Sheep's Head	1024	*Geomalacus maculosus*
IE0000781	Slaney River Valley	1103	*Alosa fallax*
IE0000781	Slaney River Valley	1099	*Lampetra fluviatilis*
IE0000781	Slaney River Valley	1096	*Lampetra planeri*
IE0000781	Slaney River Valley	1355	*Lutra lutra*
IE0000781	Slaney River Valley	1029	*Margaritifera margaritifera*
IE0000781	Slaney River Valley	1095	*Petromyzon marinus*
IE0000781	Slaney River Valley	1365	*Phoca vitulina*
IE0000781	Slaney River Valley	1106	*Salmo salar*
IE0002185	Slieve Mish Mountains	1421	*Trichomanes speciosum*
IE0000190	Slieve Tooey/Tormore Island/Loughros Beg Bay	1364	*Halichoerus grypus*
IE0000190	Slieve Tooey/Tormore Island/Loughros Beg Bay	1355	*Lutra lutra*
IE0000190	Slieve Tooey/Tormore Island/Loughros Beg Bay	1014	*Vertigo angustior*
IE0000328	Slyne Head Islands	1364	*Halichoerus grypus*
IE0002074	Slyne Head Peninsula	1833	*Najas flexilis*
IE0002074	Slyne Head Peninsula	1395	*Petalophyllum ralfsii*
IE0001680	Streedagh Point Dunes	1014	*Vertigo angustior*
IE0000108	The Gearagh	1355	*Lutra lutra*
IE0002031	The Twelve Bens/Garraun Complex	1355	*Lutra lutra*
IE0002031	The Twelve Bens/Garraun Complex	1029	*Margaritifera margaritifera*
IE0002031	The Twelve Bens/Garraun Complex	1833	*Najas flexilis*
IE0002031	The Twelve Bens/Garraun Complex	1106	*Salmo salar*
IE0002247	Toonagh Estate	1303	*Rhinolophus hipposideros*
IE0002179	Towerhill House	1303	*Rhinolophus hipposideros*
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1355	*Lutra lutra*
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane	1395	*Petalophyllum ralfsii*
IE0000194	Tranarossan and Melmore Lough	1395	*Petalophyllum ralfsii*
IE0002130	Tully Lough	1833	*Najas flexilis*
IE0001898	Unshin River	1355	*Lutra lutra*
IE0001898	Unshin River	1106	*Salmo salar*
IE002998	West Connaught Coast	1349	*Tursiops truncatus*
IE0000197	West of Ardara/Maas Road	1065	*Euphydryas aurinia*
IE0000197	West of Ardara/Maas Road	1355	*Lutra lutra*

IE0000197	West of Ardara/Maas Road	1029	*Margaritifera margaritifera*
IE0000197	West of Ardara/Maas Road	1833	*Najas flexilis*
IE0000197	West of Ardara/Maas Road	1395	*Petalophyllum ralfsii*
IE0000197	West of Ardara/Maas Road	1365	*Phoca vitulina*
IE0000197	West of Ardara/Maas Road	1106	*Salmo salar*
IE0000197	West of Ardara/Maas Road	1013	*Vertigo geyeri*
IE0001810	White Lough, Ben Loughs and Lough Doo	1092	*Austropotamobius pallipes*
IE0002122	Wicklow Mountains	1355	*Lutra lutra*

6.3 ALL SACS IN IRELAND SCREENED IN

CODE	SITENAME SCREENED IN BY HABITAT & SPECIES
IE0002268	Achill Head
IE0000332	Akeragh, Banna and Barrow Harbour
IE0001228	Aughrusbeg Machair and Lake
IE0000199	Baldoyle Bay
IE0000335	Ballinskelligs Bay and Inny Estuary
IE0000014	Ballyallia Lake
IE0001975*	Ballyhoorisky Point to Fanad Head*
IE0000077*	Ballymacoda (Clonpriest and Pillmore)*
IE0001090*	Ballyness Bay*
IE0000622	Ballysadare Bay
IE0002112	Ballyseedy Wood
IE0000696	Ballyteige Burrow
IE0002171	Bandon River
IE0000697	Bannow Bay
IE0001040*	Barley Cove to Ballyrisode Point*
IE0002118	Barnahallia Lough
IE0002327	Belgica Mound Province
IE0002005	Bellacragher Saltmarsh
IE0000623	Ben Bulben, Gleniff and Glenade Complex
IE0000020	Black Head-Poulsallagh Complex
IE0002170*	Blackwater River (Cork/Waterford)*
IE0002173	Blackwater River (Kerry)
IE0002172	Blasket Islands
IE0001957	Boyne Coast and Estuary
IE0001656	Bricklieve Mountains & Keishcorran
IE0000472*	Broadhaven Bay*
IE0000729	Buckroney-Brittas Dunes and Fen
IE0000625	Bunduff Lough and Machair/Trawalua/Mullaghmore
IE0000700	Cahore Polders and Dunes
IE0002306*	Carlingford Shore*
IE0002269	Carnsore Point
IE0002250	Carrowmore Dunes
IE0001021	Carrowmore Point to Spanish Point and Islands
IE0000343*	Castlemaine Harbour*
IE0001482*	Clew Bay Complex*
IE0002047*	Cloghernagore Bog and Glenveagh National Park*
IE0000091	Clonakilty Bay
IE0001342	Cloonee and Inchiquin Loughs, Uragh Wood
IE0001952	Comeragh Mountains
IE0002034*	Connemara Bog Complex*
IE0000252	Coole-Garryland Complex
IE0001230	Courtmacsherry Estuary
IE0001251	Cregduff Lough
IE0000484	Cross Lough (Killadoon)
IE0000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)
IE0000174	Curraghchase Woods
IE0001257	Dog's Bay
IE0000133*	Donegal Bay (Murvagh)*
IE0001497	Doogort Machair/Lough Doo
IE0000032	Dromore Woods and Loughs
IE0002187	Drongawn Lough
IE0002280*	Dunbeacon Shingle*
IE0000455*	Dundalk Bay*
IE0000138	Durnesh Lough
IE0000495	Duvillaun Islands
IE0001926	East Burren Complex
IE0001501	Erris Head
IE0000607	Errit Lough
IE0002189	Farranamanagh Lough
IE0000140	Fawnboy Bog/Lough Nacung
IE0000268*	Galway Bay Complex*
IE0000142	Gannivegil Bog
IE0001879	Glanmore Bog
IE0001430	Glen Bog
IE0001919	Glenade Lough
IE0000500*	Glenamoy Bog Complex*
IE0000090*	Glengarriff Harbour and Woodland*
IE0001058*	Great Island Channel*
IE0001141*	Gweedore Bay and Islands*
IE0000764	Hook Head
IE0000147	Horn Head and Rinclevan
IE0002328	Hovland Mound Province
	Howth Head
IE0000404	Hugginstown Fen
IE0000036	Inagh River Estuary
IE0000278	Inishbofin and Inishshark
IE0001275	Inisheer Island
IE0000507	Inishkea Islands
IE0000212	Inishmaan Island
IE0000213*	Inishmore Island*
IE0002193	Ireland's Eye
IE0001513	Keel Machair/Menaun Cliffs

All SACs in Ireland SCREENED IN on the basis that they host a habitat or species which has also been screened IN (188 SACs in total).

*denotes SAC where aquaculture activities occur

CODE	SITENAME SCREENED IN BY HABITAT & SPECIES
IE0002158*	Kenmare River*
IE0002263	Kerry Head Shoal
IE0002264	Kilkee Reefs
IE0001061	Kilkeran Lake and Castlefreke Dunes
IE0002111*	Kilkieran Bay and Islands*
IE0000458	Killala Bay/Moy Estuary
IE0000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment
IE0001741	Kilmuckridge-Tinnaberna Sandhills
IE0001742	Kilpatrick Sandhills
IE0001786	Kilroosky Lough Cluster
IE0001151	Kindrum Lough
IE0002265*	Kingstown Bay*
IE0000725	Knocksink Wood
IE0000516	Lackan Saltmarsh and Kilcummin Head
IE0000704	Lady's Island Lake
IE0000204	Lambay Island
IE0002176*	Leannan River*
IE0002161	Long Bank
IE0001673	Lough Arrow
IE0002120	Lough Bane and Lough Glass
IE0001529	Lough Cahasy, Lough Baun and Roonah Lough
IE0001774	Lough Carra/Mask Complex
IE0000297	Lough Corrib
IE0002177	Lough Dahybaun
IE0002241	Lough Derg, North-East Shore
IE0000163*	Lough Eske and Ardnamona Wood*
IE0001818	Lough Forbes Complex
IE0001976	Lough Gill
IE0000633	Lough Hoe Bog
IE0000097	Lough Hyne Nature Reserve and Environs
IE0002121	Lough Lene
IE0000428	Lough Melvin
IE0002135	Lough Nageage
IE0002119	Lough Nageeron
IE0000164	Lough Nagreany Dunes
IE0000165	Lough Nillan Bog (Carrickatlieve)
IE0000007	Lough Oughter and Associated Loughs
IE0000688	Lough Owel
IE0000304	Lough Rea
IE0000440	Lough Ree
IE0002287*	Lough Swilly*
IE0000370	Lough Yganavan and Lough Nambrackdarrig

CODE	SITENAME SCREENED IN BY HABITAT & SPECIES
IE0002165*	Lower River Shannon*
IE0002137	Lower River Suir
IE0002261	Magharee Islands
IE0001766	Magherabeg Dunes
IE0000205	Malahide Estuary
IE0002008	Maumturk Mountains
IE0000057	Moyree River System
IE0000470	Mullet/Blacksod Bay Complex
IE0002159*	Mulroy Bay*
IE0002129	Murvey Machair
IE0001932	Mweelrea/Sheeffry/Erriff Complex
IE0002144	Newport River
IE0000206	North Dublin Bay
IE0002012*	North Inishowen Coast*
IE0002330	North-West Porcupine Bank
IE0001309	Omey Island Machair
IE0000534	Owenduff/Nephin Complex
IE0002006	Ox Mountains Bogs
IE0000181	Rathlin O'Birne Island
IE0000710*	Raven Point Nature Reserve*
IE0002281	Reen Point Shingle
IE0002162*	River Barrow and River Nore*
IE0002299	River Boyne and River Blackwater
IE0002301*	River Finn*
IE0002298	River Moy
IE0000216	River Shannon Callows
IE0000101*	Roaringwater Bay and Islands*
IE0000208	Rogerstown Estuary
IE0001312	Ross Lake and Woods
IE0001311	Rusheenduff Lough
IE0002283*	Rutland Island and Sound*
IE0000707	Saltee Islands
IE0000708	Screen Hills
IE0000185	Sessiagh Lough
IE0001190*	Sheephaven*
IE0000781*	Slaney River Valley*
IE0000412	Slieve Bloom Mountains
IE0000189	Slieve League
IE0000190*	Slieve Tooey/Tormore Island/Loughros Beg Bay*
IE0000328*	Slyne Head Islands*
IE0002074*	Slyne Head Peninsula*
IE0000210	South Dublin Bay

CODE	SITENAME SCREENED IN BY HABITAT & SPECIES
IE0002329	South-West Porcupine Bank
IE0000191	St. John's Point
IE0001680	Streedagh Point Dunes
IE0000709	Tacumshin Lake
IE0000636	Templehouse and Cloonacleigha Loughs
IE0001195	Termon Strand
IE0000108	The Gearagh
IE0002249	The Murrough Wetlands
IE0002031*	The Twelve Bens/Garraun Complex*
IE0002252	Thomastown Quarry
IE0002259	Tory Island Coast
IE0002070	Tralee Bay and Magharees Peninsula, West to Cloghane
IE0000671	Tramore Dunes and Backstrand
IE0000194	Tranarossan and Melmore Lough
IE0002130	Tully Lough
IE0001898	Unshin River
IE0001571	Urlaur Lakes
IE0002262*	Valencia Harbour/Portmagee Channel*
IE0000197*	West of Ardara/Maas Road*
IE0001810	White Lough, Ben Loughs and Lough Doo
IE0002122	Wicklow Mountains
IE0002274	Wicklow Reef

6.4 SPAS IN IRELAND AND BIRD SPECIES FOR WHICH THEY HAVE BEEN DESIGNATED

SPA SITENAME SCREENED IN / SCREENED BIRD SPECIES	NPWS CODE	Arctic Tern	Barnacle Goose	Bar-tailed Godwit	Bewick's Swan	Black-headed Gull	Black-tailed Godwit	Chough	Common Gull	Common Scoter	Common Tern	Coot	Cormorant	Corncrake	Curlew	Dunlin	Eider	Fulmar	Gadwall	Gannet	Golden Plover	Goldeneye	Great Crested Grebe	Great Northern Diver	Greenland White-fronted goose	Greenshank	Grey Heron	Grey Plover	Greylag Goose	Guillemot	Hen Harrier	Herring Gull	Kingfisher
All-Saints Bog	004103																								X								
Ardbolin Island & Horse Island	004135		X										X																				
Aughris Head	004133																																
Baldoyle Bay	004016			X																	X							X					
Ballintemple and Ballygiligan	004234		X																														
Ballyallia Lough	004041						X					X							X														
Ballycotton Bay	004022			X			X		X						X						X							X					
Ballykenny-Fisherstown Bog	004101																								X								
Ballymacoda Bay*	004023			x		X	X		X						X	X					X							X					
Ballysadare Bay*	004129			X												X												X					
Ballyteigue Burrow	004020			X			X														X							X					
Bannow Bay*	004033			X			X								X	X					X							X					
Beara Peninsula*	004155							X										X															
Bellanagare bog	004105																								X								
Bills Rocks	004177																																
Blacksod Bay / Broadhaven*	004037			X						X					X	X								X									
Blackwater Callows	004094						X																										
Blackwater Estuary	004028			X			X								X	X					X												
Blasket Islands	004008	X						X										X														X	
Boyne Estuary	004080						X														X							X					
Cahore Marshes	004143																				X				X								
Carlingford Lough (cross border)*	004078																																
Carrowmore Lake	004052								X																								
Castlemaine Harbour*	004029			X				X		X			X													X							
Clare Island	004136							X	X									X												X			
Cliffs of Moher	004005							X										X												X			

All information in the tables in Section 6.4.1 collated from NPWS web page http://www.npws.ie/protectedsites/
SPA site name* denotes SPA where aquaculture activities occur.
All details correct Decembert 2014.

SPA SITENAME SCREENED IN / SCREENED BIRD SPECIES	NPWS CODE	Kittiwake	Knot	Lapwing	Leach's Petrel	Lesser Black-backed Gull	Light-bellied Brent Goose	Little Grebe	Little Tern	Mallard	Manx Shearwater	Merlin	Oystercatcher	Peregrine	Pintail	Pochard	Puffin	Purple Sandpiper	Razorbill	Red-breasted Merganser	Redshank	Red-throated Diver	Ringed Plover	Roseate Tern	Sanderling	Sandwich Tern	Scaup	Shag	Shelduck	Shoveler	Storm Petrel	Teal	Tufted Duck	Turnstone	Whooper Swan	Wigeon
All-Saints Bog	004103																																		
Ardbolin Island & Horse Island	004135																																		
Aughris Head	004133	X																																	
Baldoyle Bay	004016						X																X						X						
Ballintemple and Ballygiligan	004234																																		
Ballyallia Lough	004041									X																				X		X			X
Ballycotton Bay	004022			X		X																	X									X		X	
Ballykenny-Fisherstown Bog	004101																																		
Ballymacoda Bay*	004023			X		X															X		X		X							X		X	
Ballysadare Bay*	004129						X														X														
Ballyteigue Burrow	004020			X			X																						X						
Bannow Bay*	004033		X	X			X						X		X						X								X						
Beara Peninsula*	004155																																		
Bellanagare bog	004105																																		
Bills Rocks	004177																X													X					
Blacksod Bay / Broadhaven*	004037						X													X			X		X	X									
Blackwater Callows	004094																															X		X	X
Blackwater Estuary	004028			X																	X														X
Blasket Islands	004008	X				X					X						X		X									X			X				
Boyne Estuary	004080		X	X					X				X								X								X						
Cahore Marshes	004143			X																															X
Carlingford Lough (cross border)*	004078						X																												
Carrowmore Lake	004052																								X										
Castlemaine Harbour*	004029						X			X			X		X						X	X	X		X		X							X	X
Clare Island	004136	X																	X									X							
Cliffs of Moher	004005	X															X		X																

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All details correct Decembert 2014.

SPA SITENAME SCREENED IN	NPWS CODE	Arctic Tern	Barnacle Goose	Bar-tailed Godwit	Bewick's Swan	Black-headed Gull	Black-tailed Godwit	Chough	Common Gull	Common Scoter	Common Tern	Coot	Cormorant	Corncrake	Curlew	Dunlin	Eider	Fulmar	Gadwall	Gannet	Golden Plover	Goldeneye	Great Crested Grebe	Great Northern Diver	Greenland White-fronted goose	Greenshank	Grey Heron	Grey Plover	Greylag Goose	Guillemot	Hen Harrier	Herring Gull	Kingfisher
Clonakilty Bay	004081						X								X	X																
Connemara Bog Complex	004181								X				X								X											
Coole-Garryland	004107																															
Cork Harbour*	004030			X		X	X		X		X		X		X	X					X		X				X	X				
Corofin Wetlands	004220						X																									
Courtmacsherry Bay	004219			X		X	X		X						X	X					X			X								
Cregganna Marsh	004142																								X							
Cross Lough (Killadoon)	004212																															
Cruagh Island	004170		X																													
Cummeen Strand*	004035																															
Dalkey Island	004172	X									X																					
Deenish Island & Scariff Island*	004175	X																X														
Derryveagh and Glendowan Mountains*	004039															X					X											
Dingle Peninsula	004153							X										X														
Donegal Bay*	004151									X														X								
Doogort Machair	004235															X																
Dovegrove Callows	004137																							X								
Drumcliff Bay*	004013			X																												
Dundalk Bay*	004026			X		X	X		X	X					X	X					X		X				X	X			X	
Dungarvan Harbour*	004032			X			X								X	X					X		X				X					
Durnesh Lough	004145																							X								
Duvillaun Islands	004111		X															X														
Eirk Bog	004108																							X								
Falcarragh to Meenlaragh	004149													X																		
Fanad Head SPA	004148													X																		
Four Roads Turlough	004140																				X			X								
Galley Head to Duneen Point	004190							X																								
Garriskil Bog	004102																							X								

All information in the tables in Section 6.4.1 collated from NPWS web page http://www.npws.ie/protectedsites/
SPA site name* denotes SPA where aquaculture activities occur.
All details correct Decembert 2014.

SPA SITENAME SCREENED IN / SCREENED BIRD SPECIES	NPWS CODE	Kittiwake	Knot	Lapwing	Leach's Petrel	Lesser Black-backed Gull	Light-bellied Brent Goose	Little Grebe	Little Tern	Mallard	Manx Shearwater	Merlin	Oystercatcher	Peregrine	Pintail	Pochard	Puffin	Purple Sandpiper	Razorbill	Red-breasted Merganser	Redshank	Red-throated Diver	Ringed Plover	Roseate Tern	Sanderling	Sandwich Tern	Scaup	Shag	Shelduck	Shoveler	Storm Petrel	Teal	Tufted Duck	Turnstone	Whooper Swan	Wigeon
Clonakilty Bay	004081																											X							
Connemara Bog Complex	004181											X																							
Coole-Garryland	004107																																	X	
*	004030			X		X		X					X		X					X	X							X	X		X			X
Corofin Wetlands	004220							X																							X			X	X
Courtmacsherry Bay	004219			X																X								X						X
Cregganna Marsh	004142																																		
Cross Lough (Killadoon)	004212																								X										
Cruagh Island	004170										X																								
Cummeen Strand*	004035						X						X								X														
Dalkey Island	004172																						X												
Deenish Island & Scariff Island*	004175					X					X																			X					
Derryveagh and Glendowan Mountains*	004039											X		X								X													
Dingle Peninsula	004153													X																					
Donegal Bay*	004151						X																	X											
Doogort Machair	004235																																		
Dovegrove Callows	004137																																		
Drumcliff Bay*	004013																							X											
Dundalk Bay*	004026		X	X			X			X			X		X					X	X		X					X			X				
Dungarvan Harbour*	004032		X	X			X						X							X	X							X					X		
Durnesh Lough	004145																																	X	
Duvillaun Islands	004111																													X					
Eirk Bog	004108																																		
Falcarragh to Meenlaragh	004149																																		
Fanad Head SPA	004148																																		
Four Roads Turlough	004140																																		
Galley Head to Duneen Point	004190																																		
Garriskil Bog	004102																																		

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SPA site name* denotes SPA where aquaculture activities occur.
All details correct Decembert 2014.

SPA SITENAME SCREENED IN	NPWS CODE	Arctic Tern	Barnacle Goose	Bar-tailed Godwit	Bewick's Swan	Black-headed Gull	Black-tailed Godwit	Chough	Common Gull	Common Scoter	Common Tern	Coot	Cormorant	Corncrake	Curlew	Dunlin	Eider	Fulmar	Gadwall	Gannet	Golden Plover	Goldeneye	Great Crested Grebe	Great Northern Diver	Greenland White-fronted goose	Greenshank	Grey Heron	Grey Plover	Greylag Goose	Guillemot	Hen Harrier	Herring Gull	Kingfisher
Glen Lough	004045																																
Greers Isle*	004082					X			X																								
Helvick Head to Ballyquinn	004192							X					X																			X	
High Island, Inishshark & Davillaun	004144	X	X															X															
Horn Head to Fanad Head*	004194		X					X					X					X							X					X			
Howth Head Coast	004113																																
Illancrone & Inishkeeragh*	004132	X	X								X																						
Illanmaster	004074																																
Illaunnanoon	004221																																
Illaunonearaun	004114		X																														
Inishbofin, Inishdooey & Inishbeg	004083	X	X						X					X																			
Inishbofin, Omey Island & Turbot Island	004231													X																			
Inishduff	004115																																
Inishglora & Inishkeeragh	004084	X	X										X																			X	
Inishkea Islands	004004	X	X						X							X															X	
Inishkeel	004116		X																														
Inishmore*	004152	X																												X			
Inishmurray	004068	X	X																													X	
Inishtrahull	004100		X						X																								
Inner Galway Bay*	004031			X		X			X		X		X		X	X					X			X			X						
Ireland's Eye	004117												X																	X		X	
Iveragh Peninsula*	004154							X										X												X			
Keeragh Islands	004118												X																				
Kerry Head	004189							X										X															

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SPA site name* denotes SPA where aquaculture activities occur.
All details correct Decembert 2014.

SPA SITENAME SCREENED IN / SCREENED BIRD SPECIES	NPWS CODE	Kittiwake	Knot	Lapwing	Leach's Petrel	Lesser Black-backed Gull	Light-bellied Brent Goose	Little Grebe	Little Tern	Mallard	Manx Shearwater	Merlin	Oystercatcher	Peregrine	Pintail	Pochard	Puffin	Purple Sandpiper	Razorbill	Red-breasted Merganser	Redshank	Red-throated Diver	Ringed Plover	Roseate Tern	Sanderling	Sandwich Tern	Scaup	Shag	Shelduck	Shoveler	Storm Petrel	Teal	Tufted Duck	Turnstone	Whooper Swan	Wigeon
Glen Lough	004045																																	X	
Greers Isle+	004082																								X										
Helvick Head to Ballyquinn	004192	X												X																					
High Island, Inishshark & Davillaun	004144																																		
Horn Head to Fanad Head*	004194	X												X					X									X							
Howth Head Coast	004113	X																																	
Illancrone & Inishkeeragh*	004132								X																										
Illanmaster	004074																X														X				
Illaunnanoon	004221																								X										
Illaunonearaun	004114																																		
Inishbofin, Inishdooey & Inishbeg	004083					X																													
Inishbofin, Omey Island & Turbot Island	004231																																		
Inishduff	004115																										X								
Inishglora & Inishkeeragh	004084					X																					X			X					
Inishkea Islands	004004								X									X					X		X		X						X		
Inishkeel	004116																																		
Inishmore*	004152	X							X																										
Inishmurray	004068																										X								
Inishtrahull	004100																										X								
Inner Galway Bay*	004031			X			X													X	X		X			X				X		X		X	X
Ireland's Eye	004117	X																	X																
Iveragh Peninsula*	004154	X												X																					
Keeragh Islands	004118																																		
Kerry Head	004189																																		

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Kilcolman Bog	004095																															
Killala Bay/Moy Estuary*	004036			X											X	X					X							X				
Killarney National Park	004038																							X								
Lady's Island Lake	004009	X				X					X								X													
Lambay Island	004069												X					X											X	X		X	
Loop Head	004119																												X			
Lough Arrow	004050																															
Lough Carra	004051								X																							
Lough Conn and Lough Cullin SPA	004228								X	X														X								
Lough Corrib	004042	X				X			X	X	X	X							X		X				X						X	
Lough Croan Turlough	004139																				X				X							
Lough Cutra	004056												X																			
Lough Derg (Donegal)*	004057																														X	
Lough Derg (Shannon)	004058										X		X									X										
Lough Derravaragh	004043											X																				
Lough Ennell	004044											X																				
Lough Fern	004060																															
Lough Foyle (cross border)	004087			X	X	X			X						X	X	X				X		X						X			X	
Lough Gara	004048																															
Lough Iron	004046											X									X				X							
Lough Kinale & Derragh Lough	004061																															
Lough Mask	004062					X			X		X														X							
Lough Nillan	004110															X					X				X							

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SPA SITENAME SCREENED IN	NPWS CODE	Kittiwake	Knot	Lapwing	Leach's Petrel	Lesser Black-backed Gull	Light-bellied Brent Goose	Little Grebe	Little Tern	Mallard	Manx Shearwater	Merlin	Oystercatcher	Peregrine	Pintail	Pochard	Puffin	Purple Sandpiper	Razorbill	Red-breasted Merganser	Redshank	Red-throated Diver	Ringed Plover	Roseate Tern	Sanderling	Sandwich Tern	Scaup	Shag	Shelduck	Shoveler	Storm Petrel	Teal	Tufted Duck	Turnstone	Whooper Swan	Wigeon
Kilcolman Bog	004095																												X		X			X	
Killala Bay/Moy Estuary*	004036																				X		X		X											
Killarney National Park	004038											X																								
Lady's Island Lake	004009																							X		X										
Lambay Island	004069	X				X											X		X									X							
Loop Head	004119	X																																		
Lough Arrow	004050							X																									X			
Lough Carra	004051																																			
Lough Conn and Lough Cullin SPA	004228																																X			
Lough Corrib	004042															X													X			X			
Lough Croan Turlough	004139																												X						
Lough Cutra	004056																																			
Lough Derg (Donegal)*	004057					X																														
Lough Derg (Shannon)	004058																																X			
Lough Derravaragh	004043															X																	X		X	
Lough Ennell	004044															X																	X			
Lough Fern	004060															X																				
Lough Foyle (cross border)	004087		X	X			X			X			X							X	X	X						X			X			X	X
Lough Gara	004048																																		X	
Lough Iron	004046																												X		X			X	X
Lough Kinale & Derragh Lough	004061															X																	X			
Lough Mask	004062					X																											X			
Lough Nillan	004110											X																								

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SPA SITENAME SCREENED IN	NPWS CODE	Arctic Tern	Barnacle Goose	Bar-tailed Godwit	Bewick's Swan	Black-headed Gull	Black-tailed Godwit	Chough	Common Gull	Common Scoter	Common Tern	Coot	Cormorant	Corncrake	Curlew	Dunlin	Eider	Fulmar	Gadwall	Gannet	Golden Plover	Goldeneye	Great Crested Grebe	Great Northern Diver	Greenland White-fronted goose	Greenshank	Grey Heron	Grey Plover	Greylag Goose	Guillemot	Hen Harrier	Herring Gull	Kingfisher
Lough Oughter Complex	004049																						X									
Lough Owel	004047											X																				
Lough Rea	004134											X																				
Lough Ree	004064									X	X	X									X	X										
Lough Sheelin	004065																					X	X									
Lough Swilly*	004075					X			X		X	X			X	X						X	X		X	X	X		X			
Magharee Islands	004125	X	X						X		X																					
Malahide Estuary	004025			X			X									X					X	X	X					X				
Malin Head SPA	004146													X																		
Mid-Clare Coast	004182		X										X			X																
Middle Shannon Callows	004096					X	X							X							X											
Mid-Waterford Coast	004193							X					X																		X	
Mongan Bog	004017																							X								
Mullaghanish to Musheramore Mountains	004162																													X		
Mullet Peninsula SPA	004227													X																		
North Bull Island	004006			X		X	X								X	X					X						X					
Old Head of Kinsale	004021																												X			
Owenduff/Nephin Complex	004098																				X			X								
Pettigo Plateau Nature Reserve	004099																							X								
Poulaphouca Reservoir	004063																											X				
Puffin Island	004003																	X														
Rahasane Turlough	004089						X														X			X								
Rathlin O'Birne Island	004120		X																													

All information in the tables in Section 6.4.1 collated from NPWS web page http://www.npws.ie/protectedsites/
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All details correct Decembert 2014.

SPA SITENAME SCREENED IN	NPWS CODE	Kittiwake	Knot	Lapwing	Leach's Petrel	Lesser Black-backed Gull	Light-bellied Brent Goose	Little Grebe	Little Tern	Mallard	Manx Shearwater	Merlin	Oystercatcher	Peregrine	Pintail	Pochard	Puffin	Purple Sandpiper	Razorbill	Red-breasted Merganser	Redshank	Red-throated Diver	Ringed Plover	Roseate Tern	Sanderling	Sandwich Tern	Scaup	Shag	Shelduck	Shoveler	Storm Petrel	Teal	Tufted Duck	Turnstone	Whooper Swan	Wigeon
Lough Oughter Complex	004049																																	X	X
Lough Owel	004047																												X						
Lough Rea	004134																												X						
Lough Ree	004064			X				X		X																			X		X	X		X	X
Lough Sheelin	004065															X																X			
Lough Swilly*	004075		X							X			X							X	X				X	X		X	X		X			X	X
Magharee Islands	004125								X																			X			X				
Malahide Estuary	004025		X				X						X		X					X	X								X						
Malin Head SPA	004146																																		
Mid-Clare Coast	004182																	X					X		X									X	
Middle Shannon Callows	004096			X																														X	X
Mid-Waterford Coast	004193													X																					
Mongan Bog	004017																																		
Mullaghanish to Musheramore Mountains	004162																																		
Mullet Peninsula SPA	004227																																		
North Bull Island	004006		X				X						X		X						X				X				X	X		X		X	
Old Head of Kinsale	004021	X																																	
Owenduff/Nephin Complex	004098											X																							
Pettigo Plateau Nature Reserve	004099																																		
Poulaphouca Reservoir	004063					X																													
Puffin Island	004003					X					X						X		X												X				
Rahasane Turlough	004089																																	X	X
Rathlin O'Birne Island	004120																																		

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All details correct December 2014.

SPA SITENAME SCREENED IN / SCREENED BIRD SPECIES	NPWS CODE	Arctic Tern	Barnacle Goose	Bar-tailed Godwit	Bewick's Swan	Black-headed Gull	Black-tailed Godwit	Chough	Common Gull	Common Scoter	Common Tern	Coot	Cormorant	Corncrake	Curlew	Dunlin	Eider	Fulmar	Gadwall	Gannet	Golden Plover	Goldeneye	Great Crested Grebe	Great Northern Diver	Greenland White-fronted goose	Greenshank	Grey Heron	Grey Plover	Greylag Goose	Guillemot	Hen Harrier	Herring Gull	Kingfisher
River Boyne and River Blackwater	004232																															X
River Little Brosna Callows	004086					X	X														X				X							
River Nanny Estuary & Shore	004158																				X										X	
River Nore	004233																															X
River Shannon & River Fergus Estuaries*	004077			X		X	X						X		X	X					X					X		X				
River Suck Callows	004097																				X				X							
Roaninish	004121		X																												X	
Rockabill	004014	X									X																					
Rogerstown Estuary	004015						X									X												X	X			
Saltee Islands	004002												X					X		X										X	X	
Seven Heads	004191							X																								
Sheep's Head to Toe Head*	004156							X																								
Sheskinmore Lough	004090																							X								
Skelligs	004007																	X		X									X			
Skerries Islands	004122												X																		X	
Slieve Aughty Mountains*	004168																													X		
Slieve Beagh	004167																													X		
Slieve Bloom Mountains	004160																													X		
Slievefelim to Silvermines Mountains	004165																													X		
Sligo/Leitrim Uplands	004187							X																								
Slyne Head to Ardmore Point Islands*	004159	X	X																													
South Dublin Bay & River Tolka Estuary*	004024	X		X		X					X					X											X					
Sovereign Islands	004124												X																			

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SPA SITENAME SCREENED IN	NPWS CODE	Kittiwake	Knot	Lapwing	Leach's Petrel	Lesser Black-backed Gull	Light-bellied Brent Goose	Little Grebe	Little Tern	Mallard	Manx Shearwater	Merlin	Oystercatcher	Peregrine	Pintail	Pochard	Puffin	Purple Sandpiper	Razorbill	Red-breasted Merganser	Redshank	Red-throated Diver	Ringed Plover	Roseate Tern	Sanderling	Sandwich Tern	Scaup	Shag	Shelduck	Shoveler	Storm Petrel	Teal	Tufted Duck	Turnstone	Whooper Swan	Wigeon
River Boyne and River Blackwater	004232																																		
River Little Brosna Callows	004086			X											X															X		X			X	X
River Nanny Estuary & Shore	004158		X										X										X		X										
River Nore	004233																																		
River Shannon & River Fergus Estuaries*	004077		X	X			X								X						X		X				X		X	X		X			X	X
River Suck Callows	004097			X																															X	X
Roaninish	004121																																			
Rockabill	004014																	X						X												
Rogerstown Estuary	004015		X				X						X								X		X						X	X						
Saltee Islands	004002	X				X											X		X									X								
Seven Heads	004191																																			
Sheep's Head to Toe Head*	004156													X																						
Sheskinmore Lough	004090																																			
Skelligs	004007	X									X						X														X					
Skerries Islands	004122						X											X										X						X		
Slieve Aughty Mountains*	004168											X																								
Slieve Beagh	004167																																			
Slieve Bloom Mountains	004160																																			
Slievefelim to Silvermines Mountains	004165																																			
Sligo/Leitrim Uplands	004187													X																						
Slyne Head to Ardmore Point Islands*	004159								X																	X										
South Dublin Bay & River Tolka Estuary*	004024		X				X						X								X		X	X	X											
Sovereign Islands	004124																																			

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Stabannan - Braganstown	004091																											X				
Stack's to Mullaghareirk Mountains, West Limrick Hills, Mount Eagle	004161																													X		
Stags of Broadhaven	004072																															
Tacumshin Lake	004092				X		X					X							X		X							X				
Termoncarragh Lake & Annagh Machair	004093		X					X						X		X									X							
The Bull & Cow Rocks	004066																			X												
The Gearagh	004109											X																				
The Murrough	004186					X																						X			X	
The Raven*	004019									X			X											X			X					
Tory Island SPA	004073								X					X				X														
Tralee Bay Complex	004188			X		X	X		X						X	X					X						X					
Tramore Back Strand	004027			X			X								X	X					X						X					
Trawbreaga Bay*	004034		X					X																								
West Donegal Coast*	004150												X					X													X	
West Donegal Islands SPA*	004230		X					X	X					X																	X	
Wexford Harbour & Slobs*	004076			X	X	X	X					X	X		X	X					X	X	X		X		X	X			X	
Wicklow Head	004127																															
Wicklow Mountains	004040																															

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SPA SITENAME SCREENED IN / SCREENED BIRD SPECIES	NPWS CODE	Kittiwake	Knot	Lapwing	Leach's Petrel	Lesser Black-backed Gull	Light-bellied Brent Goose	Little Grebe	Little Tern	Mallard	Manx Shearwater	Merlin	Oystercatcher	Peregrine	Pintail	Pochard	Puffin	Purple Sandpiper	Razorbill	Red-breasted Merganser	Redshank	Red-throated Diver	Ringed Plover	Roseate Tern	Sanderling	Sandwich Tern	Scaup	Shag	Shelduck	Shoveler	Storm Petrel	Teal	Tufted Duck	Turnstone	Whooper Swan	Wigeon
Stabannan - Braganstown	004091																																		
Stack's to Mullaghareirk Mountains, West Limrick Hills, Mount Eagle	004161																																		
Stags of Broadhaven	004072				X												X													X				
Tacumshin Lake	004092			X				X							X														X		X	X		X	X
Termoncarragh Lake & Annagh Machair	004093			X																														X	
The Bull & Cow Rocks	004066																X													X					
The Gearagh	004109									X																					X				X
The Murrough	004186						X		X													X									X				X
The Raven*	004019																					X			X										
Tory Island SPA	004073																X		X																
Tralee Bay Complex	004188			X			X			X			X		X						X		X		X		X		X		X		X	X	X
Tramore Back Strand	004027			X			X																												
Trawbreaga Bay*	004034						X																												
West Donegal Coast*	004150	X												X					X									X							
West Donegal Islands SPA*	004230																											X							
Wexford Harbour & Slobs*	004076		X	X		X	X	X	X	X			X		X					X	X				X		X		X		X			X	X
Wicklow Head	004127	X																																	
Wicklow Mountains	004040											X		X																					

All information in the tables in Section 6.4.1 collated from NPWS web page http://www.npws.ie/protectedsites/
SPA site name* denotes SPA where aquaculture activities occur.
All details correct Decembert 2014.

6.5 BIOLOGICAL & CONSERVATION ASSESSMENT OF SPECIES OF SPECIAL CONSERVATION INTEREST IN IRELAND

		Conservation		IUCN Red List of Threatened Species 2014		
Species		**Status**	**Trend**	**Status**	**Habitat**	**Ecology**
Atlantic Salmon	*Salmo salar*	Inadequate	Stable	LC*	Atlantic Salmon is an anadromous species indigenous to the North Alantic. Salmon use rivers to reproduce and as nursery areas during their juvenile phase. Adults spend one to three years at sea where growth rates are much greater. The Irish population generally comprises fish that spend two winters in freshwater before going to sea. The majority of Irish fish spend one winter at sea before returning to their natal rivers, mainly during summer, as grilse.^	Eggs are deposited during winter in redds and covered with gravel. They hatch in spring as alevins feeding exclusively from their yolk sac. On depletion they begin to feed primarily on invertebrates and are known as fry. Over autumn the fish turn to Parr. The smoltification process begins when parr reach around 10-25cm in length. Smolts migrate to sea mainly from April to June. At sea salmon feed upon crustaceans, fish and sandeels as they migrate to feeding grounds in the North Atlantic.^
Bottlenose Dolphin	*Tursiops truncatus*	Favourable	n/a	LC	Common Bottlenose Dolphins tend to be primarily coastal, but they can also be found in pelagic waters (Wells and Scott 1999). Where distinct ecotypes are known, the inshore form frequents estuaries, bays, lagoons and other shallow coastal regions, occasionally ranging far up into rivers. The offshore form is apparently less restricted in range and movement. Some offshore dolphins are residents around oceanic islands. In many inshore areas Bottlenose Dolphins maintain definable, long-term multi-generational home ranges, but in some locations near the extremes of the species range they are migratory. Off the coasts of North America, they tend to inhabit waters with surface temperatures ranging from about 10°C to 32°C (Wells and Scott, 1999).	Bottlenose Dolphins are commonly associated with many other cetaceans, including both large whales and other dolphin species (Wells and Scott 1999). Mixed schools with Indo-Pacific bottlenose dolphins have been found, for instance off China and Taiwan (J. Wang pers. comm.). Bottlenose Dolphins consume a wide variety of prey species, mostly fish and squid (Barros and Odell 1990, Barros and Wells 1998, Blanco et al. 2001, Santos et al. 2001). They sometimes eat shrimps and other crustaceans.

		Conservation		IUCN Red List of Threatened Species 2014		
Species		**Status**	**Trend**	**Status**	**Habitat**	**Ecology**
Brook Lamprey	*Lampetra planeri*	Favourable	n/a	LC	Found in the lowland, piedmont and montane zone in clear, well oxygenated brooks. Ammocoetes live in detritus-rich sands or clay sediments	Non-predatory, freshwater resident. Timing of spawning season depends on latitude when temperature exceeds 9°C, starting in February in Italy and mid-June in Finland. Spawning individuals cease their normal daylight avoidance reaction and reproduce on sunny days. Males dig a shallow nest in habitats with moderate current. Spawners form large aggregations. Dies after spawning. Single individuals may survive until September. Ammocoetes stage usually lasts $2^{1}/_{2}$-3 $^{1}/_{2}$ years. Feeds on detritus and micro-organisms, starts metamorphosis in June-July (fully transformed individuals usually found in September), overwinters and spawns following spring. There are indications that *L. planeri* might be a heterogeneous (polyphyletic) assemblage of several lineages evolved independently from different populations of *L. fluviatilis* (see family introduction).
Common/Harbour Seal	*Phoca vitulina*	Favourable	n/a	LC	Harbour seals are mainly found in the coastal waters of the continental shelf and slope, and are also commonly found in bays, rivers, estuaries and intertidal areas. Most harbour seal haul-out sites are used daily, based on tidal cycles and other environmental variables, although foraging trips can last for several days. Although generally considered a non-migratory species with a high degree of site fidelity to a haul out, juvenile dispersal, emigration and establishment of new haul out sites are all possible reasons for long range movements of harbour seals (Burns 2002).	Harbour seals are generalist feeders that take a wide variety of fish, cephalopods, and crustaceans obtained from surface, mid-water, and benthic habitats (e.g. Olesiuk *et al.,* 1990, Payne and Selzer 1989). Generally, a few species dominate the diet at any one location and time of year. Although primarily coastal, dives to over 500 m have been recorded (Burns 2002).

		Conservation		IUCN Red List of Threatened Species 2014		
Species		**Status**	**Trend**	**Status**	**Habitat**	**Ecology**
Grey Seal	*Halichoerus grypus*	Favourable	n/a	LC	Grey Seals are a large sexually dimorphic phocid with a cold temperate to sub-Arctic distribution in North Atlantic waters over the continental shelf (Hall 2002) They are not long-distance migrants. In Europe, they often haulout on land, especially on outlying islands and remote coastlines exposed to the open sea. During foraging trips Grey Seals often target areas with fine gravel/coarse sandy sea-bed sediments, which are the preferred habitat of sandeels, an important part of the Grey Seal's diet.	Grey Seal diet varies by location, though they are largely demersal or benthic feeders, (Hall 2002). In some areas, the food consumed can be over 70% sandeels (*Ammodytes* sp.). In the United Kingdom, sandeels, cod and Dover Sole *(Solea solea)* accounted for 56% of the diet by weight. Grey seals also eat other flatfish, including Dab *(Limanda limanda),* Flounder *(Platichthys plessus)* and plaice *(Pleuronectes platessa)* (Prime and Hammond 1990).
Freshwater Pearl Mussel	*Margaritifera margaritifera*	Bad	Declining	EN	The freshwater pearl mussel is a large bivalve species found in oligotrophic, soft to neutral waters of rivers and, occasionally, in lakes. They are widespread in Ireland, occurring in more than 160 rivers and a handful of lakes.^	The biology and ecology of this species are particularly notable in that individuals can grow to very large sizes relative to other freshwater molluscs and individuals in natural conditions live to over a hundred years of age. They mature between 7 and 15 years of age and can have a prolonged fertile period lasting into old age producing glochidial larvae that use temporary hosts, typically Atlantic Salmon and sea trout in Ireland, but also brown trout.^
Harbour Porpoise	*Phocoena phocoena*	Favourable	n/a	LC^	Harbour porpoises are found in cold temperate to sub-polar waters of the Northern Hemisphere (Gaskin 1992, Read 1999). They are usually found in continental shelf waters, although they occasionally travel over deeper offshore waters. They frequent relatively shallow bays, estuaries, and tidal channels less than about 200 m in depth.	Harbour porpoises eat a wide variety of fish and cephalopods, and the main prey items vary regionally, although small schooling fish (e.g. herring) are important, demersal foraging is characteristic in many areas. Surveys in 1994 and 2005 in the North Sea and adjacent waters have shown a major shift in distribution from northern to southern areas (Hammond et al. 2002, Hammond pers. comm.).
Irish Freshwater Pearl Mussel	*Margaritifera durrovensis*	Bad	Declining	EN	*M. durrovensis* is known only from the lime-rich waters of the River Nore, in contrast to M. *margaritifera* which lives in acid waters. The taxonomic status of *M. durrovensis* remains inconclusive but is probably best described as a rare ecophenotype of *M. margaritifera*.^	

		Conservation		IUCN Red List of Threatened Species 2014		
Species		**Status**	**Trend**	**Status**	**Habitat**	**Ecology**
Otter	*Lutra lutra*	Favourable	n/a	NT	The Eurasian otter has one of the widest distributions of all Palaearctic mammals (Corbet, 1966). Its range covers parts of three continents: Europe, Asia and Africa. It lives in a wide variety of aquatic habitats, including highland and lowland lakes, rivers, streams, marshes, swamp forests and coastal areas independent of their size, origin or latitude. In most parts of its range, its occurrence is correlated with bank side vegetation showing importance of vegetation to otters (Mason and Macdonald 1986).	The Eurasian otter is largely solitary and the adult otters tend not to associate with other adults except for reproduction. Fish is the major prey of Eurasian otters sometimes exceeding more than 80% of their diet. In most of its range the Eurasian otter is predominantly nocturnal.
Petalwort	*Petalophyllum ralfsii*	Favourable	n/a	VU^^	Petalwort is a pale green thalloid liverwort with erect lamellae on its upper surface that grows in open, damp, calcareous dune slacks, often on low hummocks rather than on the very wet ground, on compacted sandy/muddy bryophyte-rich turf with a predominantly Mediterranean distribution. Most localities are referable to Annex I type 2190 Humid dune slacks.^^	
River Lamprey	*Lampetra fluviatilis*	Favourable	n/a	LC	Predatory, with anadromous and landlocked populations. Adults migrate into rivers from autumn to spring. Migration is mainly nocturnal and ceases at low temperatures. Spawning season starts when water temperature rises above 9°C, which depends on latitude. Adults live in coastal waters and estuaries and spawn in strong-current habitats of rivers and streams. Ammocoetes burrow in detritus-rich sands or clay sediments. After metamorphosis (from late summer to late autumn), most juveniles overwinter in freshwater and migrate to the sea in spring.	At sea, adults prey on a wide variety of fish species, mostly Clupeidae and Gadidae. Feeds on body tissues of prey, which is usually killed while its flesh is excavated. Adults feed for 2 (rarely 1) summers before migrating to the spawning grounds. Individuals feeding for only a single summer before breeding are smaller.

		Conservation		IUCN Red List of Threatened Species 2014		
Species		**Status**	**Trend**	**Status**	**Habitat**	**Ecology**
Sea Lamprey	*Petromyzon marinus*	Bad	Stable	LC	The life cycle of *P. marinus* in Ireland contains both a marine phase and a freshwater phase. Adults migrate from the ocean or lake to spawning streams. Landlocked populations in lakes may migrate up to about 50 miles upstream for spawning. Anadromous populations with access to the ocean migrate up to a couple hundred miles.	Females deposit numerous small eggs in nests made by males in gravel, sand, and rubble of streams with moderately strong current. Larvae burrow in sand and silt bottom in quiet water downstream from spawning areas and filter-feed on plankton and detritus.
Slender Najad	*Najas flexilis*	Inadequate	Stable	R^^	Najas flexilis is a submerged rooted macrophyte and can be found in North America, Europe and Asia. Within Eurasia, its climatic region is classified as Boreal-montane by Preston & Hill (1997). The Najadaceae family is classified as elodeid in form (Den Hartog & Segal, 1964). ^^^	N. flexilis is relatively short, rarely reaching above 30cm tall. It does not grow to the water surface and lives its entire life cycle completely submerged and cannot reproduce vegetatively. Reproduction is obligately sexual, with seed produced from monoecious flowers (single sex flowers, where both sexes can be found on the same plant).^^^
Twaite Shad	*Alosa fallax*	Bad	Stable	LC	At sea, pelagic. Juveniles remain close to shore and estuaries. Migrates from sea to rivers, spawns in main river often only few kilometres above limit of brackish water. Spawning also reported from small rivers over gravel bottom.	Anadromous. Males migrate upriver at 2-3 years, females at 3-4. Many individuals spawn 3-4 seasons. Adults congregate near estuaries in April and enter rivers when temperatures reach 10-12°C, mainly in May-June. Spawning starts when temperature reaches about 15°C or more, in May-June. Spawns in large, very noisy schools near surface after midnight. Eggs sink to bottom or are pelagic. Spent fish migrate back to sea. Most juveniles migrate to river mouth during first summer and move to sea at end of second year, where most shads remain until they mature. Individual fish are thought to return to their natal spawning site. At sea, feeds predominantly on crustaceans and small fishes. In freshwater, adults do not feed. Juveniles prey on planktonic crustaceans.

		Conservation		IUCN Red List of Threatened Species 2014		
Species		**Status**	**Trend**	**Status**	**Habitat**	**Ecology**
White-Clawed Crayfish	*Austropotamobius pallipes*	Unfavourable -inadequate	Stable	EN	*Austropotamobius pallipes* has a wide distribution throughout Europe. This is a freshwater species which can be found under submerged cobbles, rocks, logs, tree roots, and amongst fallen leaves in permanent water bodies such as canals, streams, rivers, lakes, reservoirs and water-filled quarries (Holdich 2003). This species is intolerant to pollution and hydrological change and occurs in areas with relatively hard, mineral-rich waters on calcareous and rapidly weathering rocks. Waters containing this species tend to be in the pH range 7-9, with calcium levels above 5 mg l-1.	*A. pallipes* can live for more than 10 years, and usually reaches sexual maturity after three to four years. It will carry 20-160 eggs, but usually less than 100 (Holdich 2003). Declines in this keystone species are said to negatively impact both ecosystem structure and function within freshwater environments through loss of: a) provisioning services – food production from fisheries, recreational fishing, b) regulatory and support services – trophic cascades, water purification, nutrient cycling, primary productivity, c) cultural value – recreational fishing, education, heritage. Crayfish are also an important food source to a range of species including otters, salmonids, and birds such as kingfishers (Kettunen and ten Brink 2006).

IUCN Status Key:
EX Extinct
EW Extinct in the wild
CR Critically Endangered
EN Endangered
VU Vulnerable
NT Near Threatened
LC Least Concern

*ver. 2.3 1996
^ NPWS (2013) *The Status of EU Protected Habitats and Species in Ireland.*
^^ Joint Nature Conservation Committee, DEFRA, UK

^^^ Wingfield, R.A., Murphy, K.J., Hollingsworth, P. and Gaywood, M.J. (2004). The Ecology of Najas flexilis. Scottish Natural Heritage Commissioned Report No. 017 (ROAME No. F98PA02)

6.6 BIOLOGICAL & CONSERVATION ASSESSMENT OF BIRDS OF SPECIAL CONSERVATION INTEREST IN IRELAND

Species		status	SCI	BWI Action Plan	Habitat requirements & diet	Migration & national distribution	BoCCI3	EU25 2004 Conserva-tion status	EU25 Threat status	2004 SPEC Category
Arctic Tern	*Sterna paradisaea*	breeding	Yes	MSCB, SLB, DMB, LFTB	Breeds mainly in coastal areas & offshore islands on sandy beaches, short grass & on shingle. Nests colonially on the ground. Diet: mainly fish, crustaceans & insects.	A summer migrant from Antarctic waters. Irish breeding birds are mainly found along the west coast of Ireland; Co. Kerry, Co. Galway, Co. Mayo & Co. Donegal	Amber	Favourable	Secure	Non-SPEC
Barnacle Goose	*Branta leucopsis*	wintering	Yes	SLB, DMB, LFB	Associated with coastal grasslands & to a lesser extent, intertidal zones. Mainly found on islands in Ireland. Diet: mainly leaves & stems of grasses & herbs.	The Irish population arrives from Greenland from late Sep & return to their breeding grounds in Apr/May. They are found in greatest numbers on the Inishkea Islands Co. Mayo & Ballintemple Co. Sligo. Donegal also holds relatively large flocks.	Amber	Favourable	Secure	Non-SPEC[E]
Bar-tailed Godwit	*Limosa lapponica*	wintering	Yes	SLB	The largest numbers have been recorded on sandy estuaries. Small numbers are also recorded using non-estuarine coastline. Diet: polycaete worms & bivalves in the intertidal zone.	A winter visitor to coastal estuaries from Oct to Apr from Russia & Scandinavia. They can be found all around the coast in suitable habitat.	Amber	Unfavourable	Endangered	Non-SPEC
Bewick's Swan	*Cygnus columbianus*	wintering	Yes	SLB, LFTB, LFB, RB	Uses water bodies near suitable grazing areas, particularly favoured flooded grasslands in the past, now increasingly using tilled land to feed. Diet: vegetation, mainly grasses & weeds. Will eat roots, shoots, leaves, rhizomes & tubers.	Ireland is at the westernmost extent of its migratory range. Breeds in Siberia, birds arrive in Ireland from Oct & remain until Feb. Mainly confined to the southeast of Ireland.	Red	Unfavourable	Vulnerable	SPEC 3W

Black-headed Gull	*Larus ridibundus*	breeding	Yes	MSCB, SLB, LFTB, USB	Mainly breeds inland in wetlands and lagoons particularly in the non breeding season, but some spend a considerable amount of time in marine areas particularly in the winter. Adaptable & can utilise a wide variety of habitats. Diet: catholic & can consist of animal or plant material, also steals & scavenges.	Small numbers of Irish birds migrate to southern Europe in winter but most appear to remain in Ireland. These are joined by large numbers of birds from Britain & the continent. Widespread along the coast.	Red	Favourable	Secure	Non-SPEC[E]
Black-tailed Godwit	*Limosa limosa*	wintering	Yes	LFTB, SLB, LFB	Winters in a variety of habitats, both inland (particularly grassland & river deltas) & coastal (particularly estuaries). Breed in lowland wet grassland & marshes. Nests on the ground in tussocky vegetation. Diet: mainly invertebrates.	Wintering birds arrive from Iceland from as early as Jun (peak Sep) & return to their breeding grounds in Apr/May. It is unknown if the small breeding population is resident. Breeding birds confined to the midlands. Wintering birds more coastal in distribution.	Amber	Unfavourable	Vulnerable	SPEC 2
Chough	*Pyrrhocorax pyrrhocorax*	breeding	Yes	MSCB, DMB, LFB, UB	Nests in caves or crevices along coasts, or less frequently, in old buildings, Diet: Feeds mostly on insects and their larvae, worms and other subterranean invertebrates and, in true crow fashion, pretty much anything else they can find.	Resident along rocky coasts in Munster, as well as parts of Connaght and Ulster, can be found reliably on Dingle Peninsula and at the Cliffs of Moher.	Amber	Unfavourable	Declining	SPEC 3
Common Gull	*Larus canus*	breeding	Yes	MSCB, SLB, DMB, LFTB, USB	Breeds in a wide variety of habitats; marine areas include islands, cliffs & shingle banks, lagoons, dunes and freshwater lakes. Winters along both the coast & further inland. Diet: primarily invertebrates & fish.	Breeding mainly in northwest Ireland. Some Irish migrants fly east & south in winter although most are resident. Continental birds arrive from northern Europe. Breeding birds are mainly found in the northwest. Ireland & Britain may be the most important wintering areas for European breeders.	Amber	Unfavourable	Declining	SPEC 2

Common Scoter	*Melanitta nigra*	breeding	Yes	LFTB	Marine for the majority of the year, but during the breeding season they occur on large inland lakes where there is sufficient scrub & tree cover under which to nest. Nests on the ground. A diving duck. Diet: aquatic plants, insect larvae & crustaceans.	Breeding birds are confined to the west & midlands. Breeding birds may winter locally off the Irish coast and are joined by migrant Scandinavian and Icelandic birds as well as potentially Scottosh birds.	Red	Favourable	Secure	Non-SPEC
Common Tern	*Sterna hirundo*	breeding	Yes	MSCB, SLB, DMB, LFTB, USB	Mostly coastal but can also breed inland. Nest on the ground on shingle beaches, sand dunes, marshes & marine & lake islands. About 500 pairs nest on man-made platforms in Dublin Port. Diet: mainly fish.	A summer migrant from southern Europe & Africa. Widely distributed around the coast & some inland sites of Ireland in summer.	Amber	Favourable	Secure	Non-SPEC
Coot	*Fulica atra*	breeding / wintering	Yes	LFTB, RB	Prefer large shallow nutrient rich freshwater bodies with plenty of submerged vegetation for feeding & nest anchorage. Diet: plant material but also eats invertebrates, small fish & fish eggs.	The Irish population is likely to be resident & often stay close to their breeding territories in winter. Birds from northern & eastern continental Europe overwinter with resident birds. Found through most of the country on large freshwater systems.	Amber	Favourable	Secure	Non-SPEC
Cormorant	*Phalacrocorax carbo*	breeding / wintering	Yes	MSCB, LFTB, RB	Found along marine coasts & freshwater. Occurs on lakes & rivers with sufficient areas for nesting (generally in trees & scrub) & sufficient food resources. Avoids very shallow or deep waters. Fairly sheltered seas avoiding deep water. Nests colonially on cliff ledges, low-lying reefs & skerries (also breeds inland). Diet: fish.	Adults generally non migratory. Juveniles may migrate to northwest France & the Iberian peninsula in winter. Found by the coast throughout the year, though some coastal birds move to inland waters in winter.	Amber	Favourable	Secure	Non-SPEC
Corncrake	*Crex crex*	breeding	Yes	n/a **	Nests on the ground in tall vegetation with most nests in hay fields. Diet: about four-fifths animal food and one-fifth vegetable matter. ** NPWS: A Framework for Conrcrake Conservation to 2021	Summer visitor from April to September, threatened with global extinction. Now only present in small numbers in the Shannon Callows, north Donegal and western parts of Mayo and Connaught.	Red	Unfavourable	Depleted	SPEC 1

Curlew	*Numenius arquata*	breeding / wintering	Yes	SLB, LFTB, LFB, UB, RBB	Found along a variety of different coastal habitats as well as inland wetlands in the winter. Nests on the ground in rough pastures, meadows & heather where they are less visible to predators. Diet: invertebrates, crabs, molluscs & worms.	Resident & winter visitor from Scandinavia & Britain. Now a very rare breeder in Ireland. Over wintering birds are found all along the Irish coastline as well as on some inland wetlands.	Red	Unfavourable	Declining	SPEC 2
Dunlin	*Calidris alpina schinzii*	breeding / wintering	Yes	SLB, DMB, UB	Breed on machair & on upland blanket bogs. Nest on the ground within grass tussocks. Spend the non-breeding season on estuarine mud flats, shingle beaches & salt marsh & also found in low numbers inland by freshwater. Estuarine mud flats, shingle beaches & salt marsh are favoured habitats. They also use adjacent coastal pasture during spring tides or if disturbed. Diet: invertebrates.	Irish birds migrate to northwest Africa/southwest Europe in winter & return in spring. Breeding occurs in the northwest of Ireland. Some sedentary while others may migrate to northwest Africa/southwest Europe. Birds originating from Scandinavia to Siberia join residents in the winter & passage migrants from Greenland. They are found all along the Irish coast.	Red	Unfavourable	Declining	SPEC 3
Eider	*Somateria mollissima*	breeding / wintering	Yes	MSCB	Breeds on sheltered islands or reefs. Nests colonially on ground usually near seashore. Occur mainly in shallow waters in bays & along the coast where food plentiful. Diet: mussels, other molluscs, crustaceans & echinoderms.	Eider are at the southern limit of their range in Ireland. They are sedentary or may undertake short seasonal movements. Eider are mainly found around the north & northwest of the country.	Amber	Favourable	Secure	Non-SPEC[E]
Fulmar	*Fulmarus glacialis*	breeding	Yes	MSCB	Spends much of its time at sea, breeds mainly on sea cliffs and stacs. Diets: fish, offal, crustaceans and carrion inc. fish discards.	Spending much of the non-breeding season at sea there is currently little information on movements. Can still be seen year round along the coast. Easily seen wherever suitable cliff habitat is available.	Green	Favourable	Secure	Non-SPEC

Gadwall	*Anas strepera*	breeding / wintering	Yes	SLB, LFTB	A dabbling duck, winters in a variety of wetlands including estuaries & lagoons. Rare breeder in Ireland they nest on the ground generally in tussocky vegetation near fresh or brackish water. Diet: seeds, aquatic vegetation & insects. Also steals food from other waterbirds e.g. Coot.	Birds migrate to Ireland from Eastern Europe, Iceland & Scotland in the autumn. Breeding birds appear to leave Ireland for continental Europe. Found scattered throughout the country in suitable habitat.	Amber	Favourable	Secure	SPEC 3
Gannet	*Morus bassanus*	breeding	Yes	MSCB	Offshore species coming inshore only to follow fish & to breed. Nests colonially on cliff ledges, steep slopes & flatter ground. Diet: mainly fish.	Found along coast throughout the year, some birds migrate south to southern Europe & the west coast of Africa.	Amber	Favourable	Secure	Non-SPEC[E]
Golden Plover	*Pluvialis apricaria*	breeding / wintering	Yes	SLB, LFTB, LFB	Often found inland during the non-breeding season on agricultural land but can also be seen along the coast especially on nearby lagoons & estuaries. Diet: soil & surface dwelling invertebrates as well as plant material seeds & grasses.	Some of the small Irish breeding population probably remain in the winter, however, most are likely to migrate south. Irish birds are joined by Icelandic & Faroese birds from Oct. They are widespread & found in a variety of inland & coastal sites.	Red	Unfavourable	Depleted	Non-SPEC[E]
Goldeneye	*Bucephala clangula*	wintering	Yes	LFTB	Found in both freshwater lakes & coastal sites in winter. Nests in holes in trees, nest boxes or even burrows generally near water. A diving duck. Diet: insects & less often molluscs & crustaceans in freshwater habitats.	Arrive from Fennoscandia around Oct/Nov & return from Feb. Only one record of breeding & it is unknown if the pair were resident throughout the year. Found throughout Ireland but particularly in the north midlands & Lough Neagh.	Red	Favourable	Secure	Non-SPEC

Great Crested Grebe	*Podiceps cristatus*	breeding/ wintering	Yes	MSCB, LFTB, RB	Found in lakes and large rivers but also occurs in coastal waters outside of the breeding season. Generally stays close to shore. Breeds on inland freshwater lakes. Diet: mainly fish, sometimes supplemented with aquatic invertebrates	Movements from breeding sites to the coast undertaken by a potentially large proportion of the population. Unclear to what extent the Irish population migrates.Likely most Irish birds are resident with perhaps some winter immigration to Ireland due to cold weather movements from the continent or Britain. Can be seen all along the coast, particularly in bays during the winter	Amber	Favourable	Secure	Non-SPEC
Great Northern Diver	*Gavia immer*	wintering	Yes	MSCB	Occur along a variety of coastlines, inc. deeper bays, inlets, & shallow bays with sandy shores. Diet: mainly fish as well as crustaceans & molluscs	Migratory probably originating from Iceland, Greenland & Canada. Found mainly in the west & northwest but occur all along the coast in suitable habitat. Some non breeders may remain over summer but in small numbers.	Amber	Favourable	Secure	Non-SPEC
Greenland White-fronted goose	*Anser albifrons flavirostris*	wintering	Yes	SLB, LFTB, LFB, UB, RBB	Becoming rare on their traditional bog habitats, in recent years favouring more intensively managed farmland & often associates with nearby shores, estuaries & lagoons. Diet: roots & tubers of grassy plants, historically Cotton Grass Eriophorum spp. on peatlands.	Arrives typically in Oct returning to breeding grounds in West Greenland in spring. Very localised distribution in Ireland. Main population is found on the Wexford Slobs. Smaller populations are still found on peatlands scattered around the middle, west & north of the country.	Amber	Favourable	Secure	Non-SPEC
Greenshank	*Tringa nebularia*	wintering	Yes	SLB, UB	Coastal in preference, most wintering along estuaries where they probe the soft substrate for food. Diet: invertebrates, shrimps, crabs as well as small fish.	Winter visitor from Scotland & Scandinavia. Breeding rare in Ireland. Found all along the coast of Ireland predominantly on estuaries.	Green	Favourable	Secure	Non-SPEC
Grey Heron	*Ardea cinerea*	breeding/ wintering	Yes	n/a	Grey Herons breed in large trees and can form large heronries, some of which have been in use for over 100 years. Diet: Fish, amphibians, small mammals, insects and reptiles.	Common resident at wetlands, estuaries and along rivers throughout Ireland, found in the same wetland habitats during the winter as in the breeding season.	Green	Favourable	Secure	Non-SPEC

Grey Plover	*Pluvialis squatarola*	wintering	Yes	SLB	The most coastal wintering plover species in Ireland, especially fond of muddy estuaries. Diet: invertebrates particularly polychaete worms, crustaceans & molluscs.	Ireland is among the most northerly wintering areas for Grey Plover. Birds arrive from Jul mainly on passage from Siberia however some overwinter. They are found along the coast of Ireland particularly in the east & south.	Amber	Favourable	Secure	Non-SPEC
Greylag Goose	*Anser anser*	wintering	Yes	SLB, LFTB, LFB, RB	Found mainly near coastal areas in the winter. Feed mostly in cereal fields but also on estu+l778aries & in shallow waters. Roosts on lakes rivers and estuaries. Diet: cereal stubble, grasses & aquatic plants.	Icelandic birds overwinter in Ireland from late Oct to Mar/Apr. Occasionally seen in large numbers (up to 3,000 but usually a few hundred) in the north & east. A feral population is resident year-round & these flocks are typically smaller & more widely dispersed.	Amber	Favourable	Secure	Non-SPEC
Guillemot	*Uria aalge*	breeding	Yes	MSCB	Breed on sea cliffs, sea stacs along the coast & on offshore islands in large colonies. Nest on cliff ledges, eggs laid directly onto rock. Diet: mainly small fish & some invertebrates caught by surface diving.	A dispersive species that winters inshore & at sea as far south as the Bay of Biscay. Most abundant in the western side of the country on sea cliffs & off shore islands.	Amber	Favourable	Secure	Non-SPEC
Hen Harrier	*Circus cyaneus*	breeding	Yes	LFTB, LFB, WSB, UB, RBB	Breed naturally on moorland but also found in young forestry plantations, where they nest on the ground before canopy closure. Records of tree nesting in Northern Ireland. In winter they disperse to lower altitudes & are more common on farmlands. Roosts in reed beds in freshwater wetlands in winter. Diet: small mammals & small birds such as pipits & larks.	Moves between upland nesting sites to lowland feeding sites in late summer, autumn. Found mainly in the midlands, west & southwest	Amber	Unfavourable	Declining	SPEC 3
Herring Gull	*Larus argentatus*	breeding	Yes	MSCB, SLB, USB	Breeds in colonies on the coast on cliffs, stacs & islets where available but can use other sites such as roof tops in coastal towns & cities. Diet: omnivorous; predator, scavenger & pirate. Often follows fishing boats.	Irish breeding birds appear to be resident. The largest breeding colony occurs on Lambay island, Co. Dublin. Found all along the coast in both the breeding & non-breeding seasons as well as in some inland areas.	Red	Favourable	Secure	Non-SPEC

Kingfisher	*Alcedo atthis*	breeding	Yes	SLB, RB	Found along many of Ireland's rivers & canals where suitable fishing posts & nest banks are available. Nests in holes dug out of steep mud banks along rivers, lakes & lagoons where suitable cover & food are available. Diet: small fish, amphibians & invertebrates.	Non-migratory but may undertake seasonal flights from inland areas to more coastal ones. Juveniles disperse on fledging but probably only small distances (@9km). Widely dispersed around the country, can be highly elusive.	Amber	Unfavourable	Depleted	SPEC 3
Kittiwake	*Rissa tridactyla*	breeding	Yes	MSCB	Breeds on steep sea cliffs where it builds a nesting platform. Will occasionally use man-made structures such as old buildings. Diet: fish & invertebrates caught offshore. Will scavenge from fishing vessels.	Migratory, most spending the winter in the north Atlantic far from shore but can still be seen occasionally. In the breeding season they are found all along the coast in suitable habitat	Amber	Favourable	Secure	Non-SPEC
Knot	*Calidris canutus*	wintering	Yes	SLB	Prefers estuarine sites with extensive areas of muddy sand. They occur mostly in large flocks & on fewer estuaries than other wader species. Diet: bivalves & crustaceans.	The Irish wintering population originates mostly from Greenland & the high Canadian Arctic. Most occur between Oct & Feb. The wintering distribution in Ireland is entirely coastal but patchy.	Amber	Unfavourable	Declining	SPEC 3W
Lapwing	*Vanellus vanellus*	breeding/ wintering	Yes	SLB, DMB, LFTB, LFB, RBB	Wintering in a variety of habitats, inc. most major coastal & inland wetlands. Breed on open farmland open grassland, i.e. wet grassland, tillage, machair & on raised bogs. Prefers relatively bare fields with short swards. Nests on the ground. Diet: invertebrates, particularly small arthropods. Also feeds at night.	Unknown if Irish birds migrate, breeding usually occurs from Apr to Jul. Birds from the continent arrive from May/Jun. Larger numbers arrive in autumn & depart again in Feb.Likely to be thinly distributed as a breeding species across the country, with a few hotspots (such as the Shannon Callows & machair sites). More abundant & widespread in the winter. They are seen around the coast & on inland wetlands in the winter.	Red	Unfavourable	Vulnerable	SPEC 2
Leach's Petrel	*Oceanodroma leucorhoa*	breeding	Yes	MSCB	Most oceanic of Irelands seabirds. Breeds on undisturbed islands. Nests in rocky crevices, burrows, walls & ruins. Diet: mainly crustaceans, molluscs, fish & offal.	Migratory, leave breeding islands in western Ireland & travel south to tropical, subtropical waters. Some overwinter in the north Atlantic	Red	Unfavourable	Localised	SPEC 3

Lesser Black-backed Gull	*Larus fuscus*	breeding	Yes	MSCB, SLB, LFTB, USB	Breeds colonially, often with other gulls e.g. Herring Gull. Nests on the ground. Will use a variety of sites, including off shore islands, islands in inland lakes & coastal cliffs and lagoons. Found in a variety of habitats in winter including coasts & at sea. Diet: omnivorous & catholic.	Both migratory & sedentary. Some Irish birds migrate south as far as north Africa. Sedentary birds are joined by birds from north & northwest Europe in winter. Seen around the coast in summer, most colonies are on the west coast.	Amber	Favourable	Secure	Non-SPEC[E]
Light-bellied Brent Goose	*Branta bernicla hrota*	wintering	Yes	SLB, LFB, USB	Traditionally associated with estuaries, salt marshes & mudflats, etc. many flocks now found on improved grasslands (inc. parks & sports pitches) in coastal areas. Diet: marine vegetation especially Zostera, Enteromorpha, Ulva, Salicornia & grasses.	Birds wintering in Ireland breed in the eastern Canadian Arctic. They are found all along the coast in winter & early spring with largest concentrations found in Strangford Lough in Oct (staging area) before dispersing around the country.	Amber	Branta bernicla Unfavourable	Vulnerable	SPEC 3W7
Little Grebe	*Tachybaptus ruficollis*	breeding / wintering	Yes	LFTB, RB	Found on small shallow lowland lakes, ponds, marshes, canals & on the fringes of larger lakes. Nest on floating vegetation, in reed beds or in other damp areas with dense vegetation by suitable water bodies. Diet: invertebrates, especially insect larvae, & small fish.	Breeding birds probably do not range far from their breeding grounds in the winter mainly moving to more open water systems. They are distributed throughout the country in suitable habitat. Birds probably migrate into the country in the non-breeding season, however, there is little information on these movements.	Amber	Favourable	Secure	Non-SPEC
Little Tern	*Sterna albifrons*	breeding	Yes	MSCB, SLB, DMB	Irish breeding birds appear to be resident. The largest breeding colony occurs on Lambay island, Co. Dublin. Found all along the coast in both the breeding & non-breeding seasons as well as in some inland areas. Nest colonially on the ground in small loose groups on sand, gravel or shingle beaches. Forage over the sea. Diet: mainly fish.	A summer migrant from Africa it breeds in traditional coastal sites around the country, in the east, southeast, west & northwest. The largest population occurs in Co. Wicklow.	Amber	Unfavourable	Declining	SPEC 3

Mallard	*Anas platyrhynchos*	wintering	Yes	n/a	Nest sites vary, mostly in ground where hidden in vegetation, diet highly variable, and plant material, particularly seeds predominate.	Resident, winter migrant from Iceland and parts of the continent, common throughout Ireland. Additional captive-bred birds are released each year for hunting.	Green	Favourable	Secure	Non-SPEC
Manx Shearwater	*Puffinus puffinus*	breeding	Yes	MSCB	Prefers continental shelf to inshore or deeper waters. Breeds on inshore islands in burrows or crevices. Diet: mostly small fish but also cephalopods, crustaceans & surface offal.	Long distance migrant wintering off the coast of Brazil and Argentina. Breeding birds mainly found on Islands off Co. Kerry, they may be seen anywhere off the coast in summer.	Amber	Unfavourable	Localised	SPEC 2
Merlin	*Falco columbarius*	breeding	Yes	UB	A rare breeding bird in Ireland, lives on a diet of small birds.	Local summer visitor to uplands throughout Ireland. Widespread winter visitor at lowland sites from October to April, move away from high ground during winter and can often be seen on the coast.	Amber	Unfavourable	Depleted	Non-SPEC
Oystercatcher	*Haematopus ostralegus*	breeding/ wintering	Yes	SLB, USB	Uses most coastal habitats, but particularly open sandy coasts. Nests principally on shingle beaches, dunes, salt marshes & rocky shores. Diet: bivalve molluscs but also some soft bodied invertebrates.	The Irish breeding population is part of a larger population of birds breeding also in Iceland, the Faroes, & Britain. This population winters in Ireland & Britain. They are easily seen in most coastal areas.	Amber	Favourable	Secure	Non-SPEC[E]
Peregrine	*Falco peregrinus*	breeding	Yes	MSCB, USB, UB	Found around sea cliff where it also nests. Diet: mainly other birds.	Mainly resident. Peregrines are widely distributed throughout the country	Green	Favourable	Secure	Non-SPEC
Pintail	*Anas acuta*	wintering	Yes	SLB, LFTB	A dabbling duck, can be found in large flocks on coastal lagoons, estuaries & large lakes. Diet: mainly seeds & aquatic plants as well as some invertebrates.	Birds wintering in Ireland originate from an area covering Iceland east to western Russia. Birds arrive from around Sep & begin to leave from Feb. They can be found along the coast of Ireland except parts of the northwest & are also found on some inland wetlands.	Red	Unfavourable	Declining	SPEC 3

Pochard	*Aythya ferina*	wintering	Yes	LFTB	Prefers large shallow freshwater lakes in winter that are well vegetated & ideally have slow flowing rivers. Nests on the ground amongst waterside vegetation. A diving ducks. Diet: plant material but also Chironomid larvae & molluscs along the coast.	Migrants begin arriving from northern & continental Europe from late summer & leave again from Feb. May move to coastal areas in winter to avoid freezing temperatures. Males arrive earlier in winter possibly taking the best sites & the species shows sex segregation in the winter. It is presumed breeding birds are mostly resident.	Red	Unfavourable	Declining	SPEC 2
Puffin	*Fratercula arctica*	breeding	Yes	MSCB	Nests in colonies in burrows, or sometimes in boulder scree & in cracks in steep cliffs. Will evict rabbits from burrows. Diet: fish & crustaceans.	Winters far out to sea & not often seen outside of the breeding season. Most common on the west coast.	Amber	Favourable	Secure	SPEC 2
Purple Sandpiper	*Calidris maritima*	wintering	Yes	n/a	Diet: Feed in areas overgrown by seaweed - gastropods and other molluscs mostly.	Winter visitor from NE Canada, Greenland, Scandinavia, Russia & Siberia - most occur between September & April, occurs at many rocky shore sites and harbours all around the coast.	Green	Favourable	Secure	Non-SPEC[E]
Razorbill	*Alca torda*	breeding	Yes	MSCB	Breed in similar sites to Guillemots & often share breeding sites on sea cliffs & offshore islands but less densely & often in crevices. Diet: mainly small fish & some invertebrates, caught by surface diving.	Winters at sea as far south as northwest Africa. Can be seen readily, especially after the breeding season. May remain around the breeding sites or move further south in winter.	Amber	Favourable	Secure	Non-SPEC[E]
Red-breasted Merganser	*Mergus serrator*	breeding/ wintering	Yes	n/a	Nest on sheltered lakes and large rivers throughout the west and north of the country, diet: predominantly fish, also recorded eating crustaceans and molluscs.	Resident and winter visitor from the Continent, Winter exclusively in brackish and marine waters, particularly in shallow protected estuaries and bays and lagoons, and also offshore.	Green	Favourable	Secure	Non-SPEC

Redshank	*Tringa totanus*	breeding / wintering	Yes	SLB, DMB, LFB, RBB	Will breed on grassland adjacent to lagoons. Found all along the coast in non-breeding season but mostly in muddy estuarine habitats. Nest on the ground in grass tussocks. They forage along the upper shore of estuaries & muddy river channels. Diet: mainly invertebrates.	Many of the Irish breeding population are resident for the winter. These birds are joined by Icelandic, Faroese & continental European birds. They are found all along the coast of Ireland	Red	Unfavourable	Declining	SPEC 2
Red-throated Diver	*Gavia stellata*	breeding	Yes	MSCB, UB	Found in shallow sandy inshore & coastal waters (breeds inland but often feeds off shore). Diet: mainly small fish	Migratory & dispersive. Irish birds probably resident, the breeding population is stable but very small. Joined by Scottish & Scandinavian birds in winter. They are to be found all along the Irish coast in suitable habitat.	Amber	Unfavourable	Rare	SPEC 3
Ringed Plover	*Charadrius hiaticula*	wintering	Yes	SLB	Breeds in coastal areas on exposed wide sandy or shingle beaches. Inland breeding on short-grazed pasture by wetlands. Mostly found along sandy stretches & the upper shores of estuaries & non-estuarine coastline in winter. Diet: invertebrates e.g. polychaete worms & crustaceans.	Mainly sedentary in Ireland some birds may arrive from continental Europe in the winter particularly if escaping severe weather. Ireland & Britain hold about 80% of the breeding nominate subspecies. Winter around the entire coastline, but quite sparse on the north & southeast coasts.	Green	Favourable	Secure	Non-SPEC[E]
Roseate Tern	*Sterna dougallii*	breeding	Yes	MSCB, SLB	Breed colonially on small rocky or sandy offshore islands where food is readily available. Nests are often hidden in rock crevices or vegetation & will readily use nest boxes. Diet: mainly fish.	A summer migrant from west Africa. Ireland contains 40% of the European population or >85% if the Azores sub-population is excluded. Mainly found on the east coast especially in Co. Dublin (Rockabill Island) & Wexford (Lady's Island).	Amber	Unfavourable	Rare	SPEC 3

Sanderling	*Calidris alba*	wintering	Yes	n/a	Mostly found along sandy coastlines, especially non-estuarine and feed predominantly on small invertebrates.	Winter visitor. Most birds wintering in Ireland are of Siberian origin, while birds on passage are Nearctic, and pass through on their way towards more southerly wintering areas as far as South Africa. First seen along the Irish coastline in July or August, though most arrive in Ireland between September & April.	Green	Favourable	Secure	Non-SPEC
Sandwich Tern	*Sterna sandvicensis*	breeding	Yes	MSCB, SLB, DMB	Breeds colonially on the ground, mainly along the coast & islands but with some colonies inland. Nests on shingle spits, low rocky islets & sand dunes. Diet: fish.	A summer migrant from southern Europe & Africa, as far south as South Africa. Widely distributed around the coast & some inland sites of Ireland in summer, the largest breeding colony is on Lady's Island Lake, Co. Wexford.	Amber	Unfavourable	Declining	SPEC 2
Scaup	*Aythya marila*	wintering	Yes	LFTB, MSCB	Occur almost exclusively in coastal waters in winter apart from large population at Lough Neagh. Mostly occurs in small parties & occasionally larger flocks around coastal estuaries & bays in shallow waters. Nests on the ground near freshwater lakes. A diving duck. Diet: largely crustaceans & molluscs as well as Chironomid larvae at Lough Neagh	Ireland's wintering population probably consists of Northern European & Baltic breeding birds. They arrive from Sep & begin to leave from Mar. Found mainly along the coast in shallow bays although Lough Neagh is the single most important site in Ireland.	Amber	Unfavourable	Endangered	SPEC 3W
Shag	*Phalacrocorax aristotelis*	breeding	Yes	MSCB	Rocky coastline, not ranging far from coast. Prefers sheltered bays for fishing. Nests colonially on cliff ledges, among boulders & in rock crevices. Diet: fish.	Found all along the coast throughout the year. Adult birds tend to winter in vicinity of breeding colony.	Amber	Favourable	Secure	Non-SPEC[E]

Shelduck	*Tadorna tadorna*	breeding/ wintering	Yes	SLB	Favours salt or brackish water & is often associated with estuaries & lagoons. Nests in holes (e.g. rabbit burrows, tree holes & old buildings). Feeds mainly in shallow water or intertidal mudflats. Diet: invertebrates e.g. insects, molluscs & crustaceans.	Most adult birds partake in annual movements to moulting grounds (Wadden Sea) from Jun & return from Dec. Some birds may moult in Ireland or Britain. Migration from Scandinavia or western Europe to Ireland may occur in winter. Found all along the coast in suitable habitat.	Amber	Favourable	Secure	Non-SPEC
Shoveler	*Anas clypeata*	wintering	Yes	SLB, LFTB	A dabbling duck, prefer shallow eutrophic waters rich in plankton & occur in a variety of habitats, including coastal estuaries, lagoons & inland lakes & callows. Diet: zooplankton, invertebrates & some plant material.	Wintering birds originate from northwest & central Europe as well as a smaller number from Iceland. They are particularly prone to freezing conditions & cold weather movements are relatively common. Found throughout Ireland both inland & coastal.	Red	Unfavourable	Declining	SPEC 3
Storm Petrel	*Hydrobates pelagicus*	breeding	Yes	MSCB	Pelagic, offshore & sometimes inshore marine waters. Breeds on undisturbed islands. Nests in rocky outcrops, crevices, walls or burrows. Diet: mainly crustaceans, fish, medusa, cephalopods & floating offal.	Migratory, breeding in southwest Ireland & seen throughout the west in summer. In winter moves out to sea, most head south to Africa, some as far as the Cape of Good Hope. Ireland has internationally important breeding numbers	Amber	Favourable	Secure	Non-SPEC[E]
Teal	*Anas crecca*	breeding/ wintering	Yes	LFTB, RB, UB	Usually nest near small freshwater lakes or pools & small upland streams preferring thick cover. Found in a variety of well vegetated wetlands in the winter as well as estuaries & lagoons. A dabbling duck. Diet: small seeds, Enteromopha sp. & molluscs.	Breeding birds are probably resident. Joined in winter by birds from Iceland, Fennoscandia & Russia. Breeding birds are widely distributed throughout the country although natural fluctuations in the population may mean distribution varies between years.	Amber	Favourable	Secure	Non-SPEC

Tufted Duck	*Aythya fuligula*	wintering	Yes	LFTB, RB	Prefer large open lakes in lowland areas but are also found in ponds, canals & slow moving rivers. Nests on the ground in waterside vegetation. A diving duck. Diet: primarily animal matter (mussels, crustaceans & small invertebrates) but also some plant material.	Migrants arrive from Sep/Oct from Iceland, Britain & northwest Europe remaining until around Apr/May. Breeding birds thought to be resident. Widely distributed around the country particularly in the north midlands.	Red	Unfavourable	Declining	SPEC 3
Turnstone	*Arenaria interpres*	wintering	Yes	n/a	Most likely found along rocky shoreline. Diet of sandhoppers & other marine invertebrates, also fish carrion washed up on shore.	Winter visitor from northeast Canada and northern Greenland, occurs late July to late April, almost entirely marine in distribution.	Green	Unfavourable	Declining	Non-SPEC
Whooper Swan	*Cygnus cygnus*	wintering	Yes	SLB, LFTB, RB, LFB, RBB	Wintering on lakes, marshes, lagoons & sheltered inlets, birds are also increasingly found in agricultural fields. Diet: aquatic vegetation within 1m of the surface as well as roots, shoots, leaves, rhizomes & tubers in tillage & grassland.	The population occurring in Ireland breeds in Iceland. Ireland hosts 61% of this population during the winter. They arrive in Sep/Oct & remain until Mar/Apr. Relatively widespread although less common in the south & southeast.	Amber	Favourable	Secure	Non-SPEC^{E}W
Wigeon	*Anas penelope*	wintering	Yes	SLB, LFTB	A dabbling duck, found on coastal marshes, freshwater & brackish lagoons, estuaries, bays & inland freshwater wetlands. Like open, sheltered areas. Diet: mainly herbivorous feeding on plant material on land or in the water e.g. grasses, eel-grass & algae.	Most of the Icelandic breeding population overwinter in Ireland & Britain. They arrive around Oct & return around Mar. They are widely distributed around the country with highest numbers at Lough Foyle.	Red	Favourable	Secure	Non-SPEC^{E}W

Information compiled from: BirdLife International 2004; BirdWatch Ireland Action Plans; Colhoun & Cummins 2013

BirdWatch Ireland Action Plans

MSCB	Marine & Seacliff Birds
SLB	Shore & Lagoon Birds
DMB	Dunes & Machair Birds
LFTB	Lake, Fen and Turlough Birds
RB	Riparian Birds
USB	Urban, Suburban Birds
UB	Upland Birds

SPEC categories

SPEC 1 - Species of global conservation concern,i.e. classified as globaly threatened, Near Threatened or Data Deficient (BirdLife International 2004a; IUCN 2004)

SPEC 2 - Concentrated in Europe and with an Unfavourable Conservations Status.

SPEC 3 - Not concentrated in Europe but with an Unfavourable Conservation Status.

Non-SPEC^{E} - Concentrated in Europe but with a Favourable Conservation Status.

Non-SPEC - Not Concentrated in Europe and with a Favourable Conservation Status.

W indicates that the category relates to the winter population.