PRIORITISED ACTION FRAMEWORK (PAF)
FOR NATURA 2000 in Ireland

pursuant to Article 8 of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive)

for the *Multiannual Financial Framework* period 2021 – 2027

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Contact address: National Parks and Wildlife Service, Department of Housing, Local Government and Heritage
90 King Street North, Dublin 7, D07 N7CV, Ireland

A. Introduction

A.1 General introduction

Prioritised Action Frameworks (PAFs) are strategic multiannual planning tools, aimed at providing a comprehensive overview of the measures that are needed to implement the EU-wide Natura 2000 network and its associated green infrastructure, specifying the financing needs for these measures and linking them to the corresponding EU funding programmes. In line with the objectives of the EU Habitats Directive[1] on which the Natura 2000 network is based, the measures to be identified in the PAFs shall mainly be designed "*to maintain and restore, at a favourable conservation status, natural habitats and species of EU importance, whilst taking account of economic, social and cultural requirements and regional and local characteristics*".

The legal basis for the PAF is Article 8 (1) of the Habitats Directive[2], which requires Member States to send, as appropriate, to the Commission their estimates relating to the European Union co-financing which they consider necessary to meet their following obligations in relation to Natura 2000:

- *to establish the necessary conservation measures involving, if need be, appropriate management plans specifically designed for the sites or integrated into other development plans,*
- *to establish appropriate statutory, administrative or contractual measures which correspond to the ecological requirements of the natural habitat types in Annex I and the species in Annex II present on the sites.*

Prioritised Action Frameworks shall therefore focus on the identification of those financing needs and priorities that are directly linked to the specific conservation measures established for Natura 2000 sites, in view of achieving the site-level conservation objectives for those species and habitat types for which the sites have been designated (as required by Article 6(1) of the Habitats Directive). Given that the Natura 2000 network also includes the Special Protection Areas (SPAs) designated pursuant to the EU Birds Directive 2009/147/EEC[3], the financing needs and priority measures associated with bird species in SPAs are therefore also considered here.

Member States are invited to also present in their PAFs additional measures and their financing needs related to wider green infrastructure (GI)[4]. Such green infrastructure measures are to be included in the PAF where they contribute to the ecological coherence of the Natura 2000 network, including in a cross-border context, and to the objective of maintaining or restoring favourable conservation status of the targeted species and habitats.

In its Special Report N° 1/2017 on Natura 2000[5] the European Court of Auditors concluded that the first completed PAFs (for the MFF period 2014-2020) did not present a reliable picture of the actual costs of the Natura 2000 network. The report therefore highlighted the need for updating the PAF format and providing further guidance for improving the quality of information that Member States provide in their PAFs. The recent

[1] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:01992L0043-20130701

[2] Article 8 (1): "In parallel with their proposals for sites eligible for designation as special areas of conservation, hosting priority natural habitat types and/or priority species, the Member States shall send, as appropriate, to the Commission their estimates relating to the Community co- financing which they consider necessary to allow them to meet their obligations pursuant to Article 6 (1)."

[3] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0147

[4] Green infrastructure is defined as 'a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services'.

[5] Special Report No 1/2017: More efforts needed to implement the Natura 2000 network to its full potential https://www.eca.europa.eu/en/Pages/DocItem.aspx?did=40768

EU Action plan for nature, people and the economy[6] commits to this process, with a view to ensuring that Member States provide more reliable and harmonised estimates of their financing needs for Natura 2000.

In its conclusions on this action plan[7], the Council of the European Union recognises the need for further improving the multiannual financial planning for investments in nature and agrees that there is a need to update and improve the PAFs. The importance of better forecasting the financing needs for Natura 2000 ahead of the next EU Multiannual Financial Framework is also recognised in a resolution by the European Parliament[8].

A.2 Structure of the current PAF format

The current PAF format is designed to provide reliable information about the priority Natura 2000-related financing needs, with a view to their incorporation in the relevant EU funding instruments under the next Multiannual Financial Framework (MFF) 2021-2027. To this aim, the PAF requires a level of breakdown of financing needs that would allow for an effective allocation of the Natura 2000 funding under the relevant EU funds for the MFF 2021-2027. With a view to that goal, the PAF also takes into consideration the experience that EU Member States and regions have gained so far with the MFF 2014-2020.

An essential component of the current PAF format is the required breakdown of the Natura 2000- and green infrastructure-related conservation and restoration measures per broad ecosystem category. The proposed ecosystem typology of 8 classes is very largely based on the MAES typology, which was established as a conceptual basis for an EU wide ecosystem assessment[9]. A comprehensive database allocating individual species and habitat types of EU importance to the MAES ecosystems is available for download from the European Environment Agency website[10]. It is recommended that the allocation of measures and costs to ecosystem types should largely follow this typology. [The authors of the PAF for Ireland found the MAES typology unwieldy and recommend its use be reconsidered at a suitable stage in preparations for the next PAF.]

The presentation of priority measures and costs of the current PAF requires a distinction between running costs and one-off expenditure. Whereas running costs are typically associated with recurring measures that need to be continued in the long term (f. ex. staff costs for site management, annual payments to farmers for agri-environmental measures on grasslands, etc.), one-off expenditures are typically related to non-recurring actions such as habitat restoration projects, large infrastructural investments, purchase of durable goods, etc. The correct allocation of costs to either category ("running" versus "one-off") will be highly relevant for a correct allocation of measures under different EU funds.

Finally, priority measures under this PAF will not only contribute to the specific objectives of the EU nature directives, but will also provide important socio-economic and ecosystem service benefits to the society. Examples of benefits may include climate mitigation and adaptation, or other ecosystem services such as those related to tourism and culture. The Commission has already provided an overview of ecosystem services benefits related to Natura 2000.[11]

This aspect should be emphasized where possible, with a view to promote and communicate the wide societal benefits of funding nature and biodiversity.

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[6] COM(2017) 198 final: An Action Plan for nature, people and the economy http://ec.europa.eu/environment/nature/legislation/fitness_check/action_plan/communication_en.pdf

[7] http://www.consilium.europa.eu/en/press/press-releases/2017/06/19/conclusions-eu-action-plan-nature/

[8] European Parliament resolution of 15 November 2017 on an Action Plan for nature, people and the economy (2017/2819(RSP)) http://www.europarl.europa.eu/sides/getDoc.do?type=TA&language=EN&reference=P8-TA-2017-0441

[9] https://biodiversity.europa.eu/maes

[10] Linkages of species and habitat types to MAES ecosystems https://www.eea.europa.eu/data-and-maps/data/linkages-of-species-and-habitat#tab-european-data

[11] http://ec.europa.eu/environment/nature/natura2000/financing/

A.3 Introduction to the specific PAF of Ireland

Ireland's PAF encompasses the Natura 2000 network in the entire administrative area of the State including all terrestrial and marine sites in its Natura 2000 network (*i.e*. there are no smaller administrative regions).

The Department of Housing, Local Government and Heritage (DHLGH) through the National Parks and Wildlife Service (NPWS) is responsible for the legislative and policy framework for the conservation of nature and biodiversity in Ireland, and also oversees its implementation. The responsibilities of the Department's National Parks and Wildlife Service (NPWS) include:

•To secure the conservation of a representative range of ecosystems and maintain and enhance populations of flora and fauna in Ireland;

•To designate and protect Special Areas of Conservation and Special Protection Areas in accordance with the EU Habitats and Birds Directives;

Action 6.1.9 of Ireland's 3rd National Biodiversity Action Plan is to "Review and update the Prioritised Action Framework for Natura 2000".

During the development of this PAF, input and feedback was sought from a number of key stakeholders. These comprised the Department of Agriculture Food and the Marine (DAFM), including the Agriculture, Forestry, Sea Fisheries and Aquaculture Divisions within that Department and other bodies under its aegis, namely Coillte, Teagasc, the Marine Institute; the Department of the Environment, Climate and Communications (DECC), and other bodies under its aegis, namely the Environmental Protection Agency (EPA) and Inland Fisheries Ireland; the Office of Public Works (OPW); other sections in DHLGH, and Local Authorities (via the County and City Management Association (CCMA)) and the Heritage Council, which are under its aegis. Farming representative bodies and environmental NGOs, via the Irish Environmental Network (IEN), were also invited to give feedback on a draft of this document.

The Department of Agriculture, Food and the Marine (DAFM), is the Managing Authority for Ireland's Rural Development Programme (RDP). The Programme is co-funded by the EU's European Agricultural Fund for Rural Development (EAFRD) and the national exchequer. DAFM is also the Managing Authority for the European Maritime and Fisheries Fund (EMFF) (European Maritime Fisheries and Aquaculture Fund (EMFAF) post-2020) in Ireland.

Teagasc (Agriculture and Food Development Authority) is the national body providing integrated research, advisory and training services to the agriculture and food industry and rural communities.

Coillte is a commercial State company, which operates forestry, land management and renewable energy businesses. It manages an estate of some 440,000 hectares throughout the country.

The Marine Institute is the State agency responsible for marine research, technology development and innovation in Ireland. It carries out environmental, fisheries, and aquaculture surveys and monitoring programmes to meet Ireland's national and international legal requirements.

The Department of the Environment, Climate and Communications is responsible for the delivery of policies and programmes in the fields of communications, climate, environment, energy and natural resources.

The Environment Protection Agency's (EPA) main function is to protect and improve the natural environment for present and future generations. Its primary responsibilities encompass environmental licensing, enforcement of environmental law, environmental planning, education and guidance, monitoring, analysing and reporting on the environment and environmental research and development.

Inland Fisheries Ireland (IFI) is the state agency responsible for the protection, management and conservation of Ireland's inland fisheries and sea angling resources.

The Office of Public Works (OPW) is the government office that delivers public services for flood protection, managing government properties and heritage services. It is overseen by the Department of Public Expenditure and Reform (DPER).

The Department of Housing, Local Government and Heritage, in addition to being the parent department for NPWS, is responsible for spatial planning on land and in Ireland's maritime area, for sustainable development, and for the management of water resources from source to sea. National implementation of the Water Framework Directive (WFD), the Maritime Spatial Planning Directive and the Marine Strategy Framework Directive (MSFD) also fall within its remit, as does the Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention). The extension of Ireland's network of marine protected areas (MPAs) in accordance with national and international targets and agreed objectives is also a responsibility of this Department.

Local Authorities are responsible at county level for planning and development and also provide important heritage functions at county level. Work undertaken by local authorities that relates to the Natura 2000 network and associated green infrastructure includes the preparation of Biodiversity Action Plans and Climate Change Action Plans; ownership and management of sites for nature conservation; management, design and planning of green infrastructure; commissioning and dissemination of biodiversity research and monitoring, including citizen science initiatives; and operation of environmental education and visitor facilities.

Irish Water is Ireland's national water utility, responsible for providing water and wastewater services throughout Ireland.

The Heritage Council is a public body which provides policy advice for government on heritage issues including sustainability, landscape management, high nature value farming, forestry and climate change.

The National Planning Framework (NPF) 2040, published in 2018, is the Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040. It is an objective of the NPF that integrated planning for Green Infrastructure and ecosystem services will be incorporated into the preparation of statutory land use plans.

Regional Spatial and Economic Strategies (RSES) being developed by the regional tier of governance in Ireland – the Southern, the Eastern and Midland and the North and Western Regional Assemblies, to replace existing regional planning guidelines, will support relevant environmental plans and policy, including the NPF, through the development of strategic environment and sustainability policy goals by among other things, integrating green infrastructure into regional planning.

An eight week period of public consultation followed the completion of the draft PAF document. This period was advertised in the national media and online, and encouraged any interested party to submit suggestions and comment on the document. All submissions were reviewed by NPWS and where appropriate, this document was amended to reflect the views put forward by respondents.

B. Summary of priority financing needs for the period 2021-2027

		Priority financing needs 2021-2027	
1.	**Horizontal measures and administrative costs related to Natura 2000**	Annual running costs (Euros / year)	One-off / project costs (Euros / year)
1.1.	Site designation and management planning	11,705,525	171,000
1.2.	Site administration and communication with stakeholders	40,765,000	140,000
1.3.	Monitoring and reporting	3,543,900	0
1.4.	Remaining knowledge gaps and research needs	3,000,000	0
1.5.	Natura 2000-related communication and awareness raising measures, education and visitor access	1,103,000	71,000
	Sub-total	60,117,425	382,000

2.a	**Natura 2000 site-related maintenance and restoration measures for species and habitats**	Annual running costs (Euros / year)	One-off / project costs (Euros / year)
2.1.a	Marine and coastal waters	570,000	324,800
2.2.a	Heathlands and shrubs	22,708,491	228,571
2.3.a	Bogs, mires, fens and other wetlands	8,375,035	6,517,623
2.4.a	Grasslands	8,042,222	49,817
2.5.a	Other agroecosystems (incl. croplands)	4,365,000	8,571
2.6.a	Woodlands and forests	487,962	313,049
2.7.a	Rocky habitats, dunes & sparsely vegetated lands	0	0
2.8.a	Freshwater habitats (rivers and lakes)	15,025,000	185,550
2.9.a	Others	0	0
	Sub-total	59,573,710	7,627,981

2.b	**Additional "Green infrastructure" measures beyond Natura 2000 (further improving coherence of the Natura 2000 network, including in a cross-border context)**	Annual running costs (Euros / year)	One-off / project costs (Euros / year)
2.1.b	Marine and coastal waters	0	0
2.2.b	Heathlands and shrubs	5,179,500	35,714
2.3.b	Bogs, mires, fens and other wetlands	8,164,285	13,925,657
2.4.b	Grasslands	138,579	17,857
2.5.b	Other agroecosystems (incl. croplands)	1,902,500	0
2.6.b	Woodlands and forests	1,430,824	177,205
2.7.b	Rocky habitats, dunes & sparsely vegetated lands	0	0
2.8.b	Freshwater habitats (rivers and lakes)	0	1,285,714
2.9.b	Others (caves, etc.)	0	0
	Sub-total	16,815,688	15,442,147

3.	**Additional species-specific measures not related to specific ecosystems or habitats**	Annual running costs (Euros / year)	One-off / project costs (Euros / year)
3.1	Species-specific measures and programmes not covered elsewhere	2,567,530	28,190
3.2.	Prevention, mitigation or compensation of damage caused by protected species	0	0
	Sub-total	2,567,530	28,190

	Annual total	139,074,353	23,480,318
	Total (2021-2027)	1,137,882,697	

C. Current state of the Natura 2000 network

C.1. Area statistics of the Natura 2000 network

Some 13% of Ireland's terrestrial area is included in the Natura 2000 network. This amounts to 9,060km^2, which accounts for overlapping SAC and SPA designations. 10,420km^2 has been encompassed by marine SACs and SPAs.

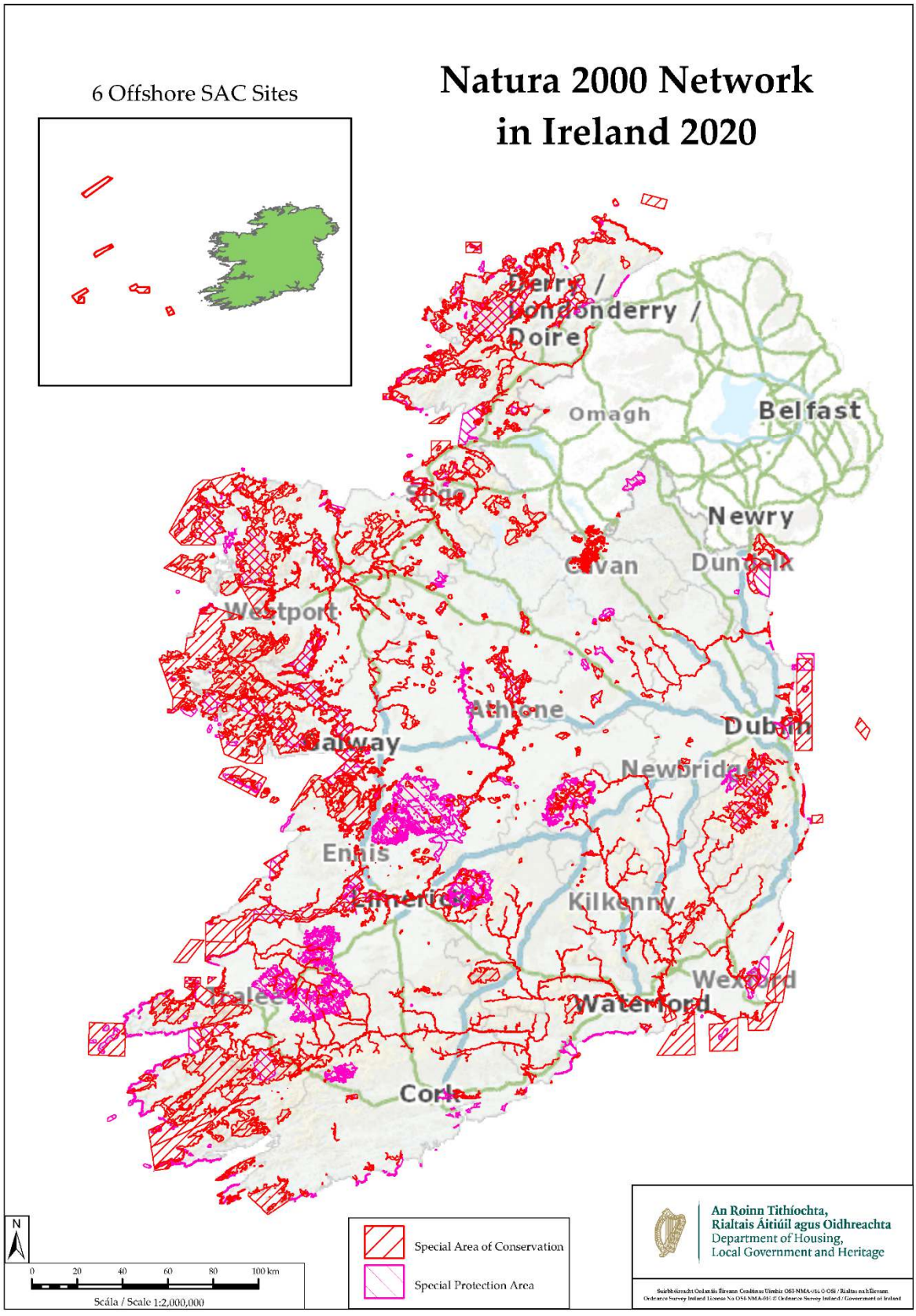
Ireland currently has a network of 439 sites adopted by the Commission as Sites of Community Importance. The total area of these sites is 16,947km^2, including marine areas. The marine component, which includes six large offshore SACs, comprises 9,867km^2.

In accordance with the National Raised Bog Special Areas of Conservation Management Plan 2017-2022, two additional sites (with a combined area of 15.25 km^2) are to be proposed for designation as SACs for active raised bogs (7110). This will complete Ireland's SAC network.

Ireland has 154 Special Protection Areas (SPAs) covering some 5,894 km^2. This includes marine areas totalling 1,717km^2. 150 sites have been formally classified, with the remaining four expected to be formally classified in 2020.

	Natura 2000 area data per EU Member State (in km²)						Proportion (in %) of the land area covered by:		
	Terrestrial			Marine					
Name of region	SCI	SPA	N2K	SCI	SPA	N2K	SCI	SPA	N2K
Ireland	7080	4177	9060	9867	1717	10420	10%	6%	13%

C.2. Map of the Natura 2000 network in Ireland



D. EU and national financing of the Natura 2000 network during the period 2014 – 2020

This section provides a comprehensive overview of the funding allocated to Natura 2000, protection of species of EU interest and green infrastructure during the period 2014-2020. This data should help the Commission and national/regional authorities assess to what extent the financial needs of Natura 2000 are currently met and what the funding gap is.

D.1 European Agricultural Fund for Rural Development (EAFRD)

(information compiled in January 2021 with data provided up to end of 2019)

Total allocation from the EAFRD to the Member State/region: **€2.19bn**

National allocation **€1.8bn**

Total: **€4bn**

Measure	**Total current allocation to the EAFRD measure**		**Current allocation to actions or sub-measures relevant for Natura 2000**		**Current spending on actions or sub-measures relevant for Natura 2000**		**Comments** (relevance, experience to-date, challenges for the next period)
	EU	**National**	**EU**	**National**	**EU**	**National**	
M10 Agri-environment climate measures							Excludes other M10 schemes with no Natura designation payments
GLAS SCHEME	513,677,153	406,773,477	233,084,040	183,137,460	55,385,033	43,516,812	Natura 2000 allocation based on indicative expenditure sums for Farmland Birds & Farmland Habitat actions in Table 11.4 of the RDP
Burren programme	7,198,800	5,656,200	n/a	n/a	1,934,340	1,519,838	Expenditure to end 2019 includes €584,189 for capital investments in site enhancement works such as scrub removal, habitat restoration, access tracks, stone wall repair, feed, fencing and water equipment
M12 Natura 2000 payments	46,248,500	27,001,500	46,248,500	27,001,500	31,065,231	13,602,974	Includes €15.73m claimed at 100% EAFRD as per RDP
Other measures – M16 European Innovation Partnership	34,510,000	27,490,000	19,474,333	15,301,261	3,107,642	2,441,719	Natura allocation refers to the aggregate budget for farmer payments in respect of 10 relevant locally-led environmental projects
Subtotal	601,634,453	466,921,177	298,806,873	225,440,221	91,492,246	61,081,343	
TOTAL	**€1,068,555,630**		**€524,247,094**		**€152,573,589**		

D.2 European **Regional Development Fund (ERDF) / Cohesion Fund (CF)**

Total allocation from ERDF to the Member State: **€821,000,000**

Total allocation from Cohesion Fund to the Member State: **€1,200,000,000 (Cohesion Policy Funding)**

Category of intervention	**Allocation to measures relevant for Natura 2000**		**Current spending on measures relevant for Natura 2000**		**Comments** (relevance, experience to-date, challenges for the next period)
	EU	**National**	**EU**	**National**	
85 Protection and enhancement of biodiversity, nature protection and green infrastructure					
86 Protection, restoration and sustainable use of Natura 2000					
Other categories					
Subtotal					
TOTAL	Nil		Nil		

D.3 European Maritime and Fisheries Fund (EMFF)

(information compiled in February 2019)

Total allocation from the EMFF to the Member State: **€147.6m**

National allocation: **€91.6m**

Total Operational Programme Funding**: €239.2m**

Measure	**Allocation to measures relevant for Natura 2000**		**Current spending on measures relevant for Natura 2000**		**Comments** (relevance, experience to-date, challenges for the next period)
	EU	**National**	**EU**	**National**	
Management and monitoring of fisheries and aquaculture activities in Natura 2000 sites	€2,779,500	€2,779,500	€1,279,126	€1,279,126	The Marine Biodiversity Scheme was implemented under Ireland's EMFF Programme for the purpose of supporting implementation of the Habitats, Birds, MSFD Directives and CFP Regulation. The Scheme is implemented under articles 29, 40 and 80 of the EMFF. The Scheme has an overall financial allocation of €9.4m for the EMFF period 2014-20 and this is expected to be fully used. A similar level of investment in Natura 2000 is anticipated in the period 2021-27. The Marine Institute, Ireland's marine research agency, is the sole eligible beneficiary. Some 23 Natura 2000 related projects have been approved to date under the Marine Biodiversity Scheme. A further 15 projects, while not specifically for Natura 2000, may benefit habitats and species in Natura 2000 sites.
Subtotal					
TOTAL	**€5,559,000**		**€2,558,252**		

D.4 LIFE Programme

(information compiled in February 2019)

Type of project or financing instrument	Current allocation to measures relevant for Natura 2000		Comments (number of projects, relevance, experience to-date, challenges for the next period)
	EU	National	
Traditional projects	**€5,594,109**	**€2,889,986***	*Raised bog and Raptor LIFE are the only projects funded in current MFF so far. In addition, the LIFE+ project (KerryLIFE – land use management for the conservation of Freshwater Pearl Mussel) with a total cost of €4.9m, and 50% funding via LIFE+ programme, commenced in 2014. Use of the LIFE fund is inhibited by access to seed funding for applicants preparing bids and availability of funding to match the LIFE contribution.
Subtotal	**€5,594,109**	**€2,889,986**	
TOTAL	**€8,484,095**		

D.5 Other EU funds, including Interreg:

(information compiled in February 2019)

Total EU co-funding allocated from other EU programmes for the implementation of EU nature policy and associated green infrastructure in the Member State/region: **€75,226,024 (Interreg)**

Total national/regional funding allocated for the co-funding of these measures: **€17,150,670 (Interreg)**

Six projects with a total value of €29,975,788 have or are being funded through the Interreg programme. Two of these – CABB (Cooperation across borders for biodiversity) and CANN (Collaborative action for the Natura network) are directly connected to the protection and restoration of Natura 2000 sites) have a combined value of €13,120,419 and are co-financed at a rate of 85% by the EU. The remaining projects fall into the category of protection/enhancement of biodiversity.

One such project is MarPAMM which is a €6.4 million EU funded cross-border environment project to develop new tools for monitoring and protocols for managing a number of protected coastal marine environments in Ireland, Northern Ireland and Western Scotland. The project's remit includes one cross-border location containing Natura 2000 designations and associated shared conservation interests that lend themselves to improved coordination between respective statutory authorities

Under the Natural Capital Financing Facility (NCFF), the European Investment Bank (EIB) provides loans and investments in funds to support projects which promote the preservation of natural capital. DAFM advise that there is an allocation towards a fund that will acquire and manage approximately 4,500 ha of commercial conifer forest properties in Ireland. The European Investment Bank announced a €12.5 million investment in the fund under the NCFF in May 2018. DAFM also advise that where possible, plantation management will be transformed from a clearfell-replant regime to Continuous Cover Forestry. This is expected to improve cash yield, maintain asset values, mitigate risks and generate environmental benefits.

D.6 Other (mainly national) funding for Natura 2000, green infrastructure and species protection in 2014-2020:

Total financing allocated to implementation of EU nature policy and associated green infrastructure, for measures or projects not benefiting from any EU co-funding: **€160,651,430**

Type of project or financing instrument	National
NPWS Farm Plan Scheme and other NPWS agri-ecology related projects	€10,117,040
NPWS capital expenditure (National Parks and Nature Reserves)	€17,720,000
Species Protection projects in Natura 2000	€1,747,000
Scientific monitoring and research	€19,164,000
Inland Fisheries Ireland Habitats Directive programme	€1,825,576
Bog restoration, relocation, compensation	€54,753,814
NPWS staffing costs related to Natura 2000	€55,324,000
Total	**€160,651,430**

E. Priority measures and financing needs for 2021 – 2027

E.1. Horizontal measures and administrative costs related to Natura 2000

E.1.1. Site designation and management planning

Current status and progress made so far in terms of site identification, designation and management planning (situation: 23/10/2020)

Ireland currently has a network of 439 sites selected for conservation as Special Areas of Conservation and adopted by the Commission as sites of community importance. As of 14/07/2020, 276 sites have been formally designated by Statutory Instrument (S.I.) as SACs. The formal designation process for the remaining 163 candidate SACs is ongoing. Consideration is currently being given to the designation of further SACs in the offshore for Annex I Reef habitat, following the collection of extensive new data from the SeaROVER programme 2017-2019.

Ireland has 154 Special Protection Areas for birds. 150 sites have been formally classified with the remaining four expected to be formally classified by the end of 2020. Ireland is undertaking a significant body of work to meet designation requirements for marine birds. This work includes the ObSERVE programme (Phase I), ObSERVE (Phase II) as well as extensive analyses of collated data in order to determine where further SPAs should be designated for seabirds at sea. It is expected that there will be further SPA designations for birds in the marine between 2020 and 2025.

Ireland has an established process for preparing detailed site-specific conservation objectives (SSCOs) for a particular habitat or species that is based on setting targets for attributes that together define favourable conservation condition at site-level. Attributes are based on the ecological requirements of the feature in question and are linked to the parameters that define Favourable Conservation Status at a national scale. Where detailed SSCOs are available for a habitat or species in a site or suite of sites, the SSCO targets are/will be used to identify the necessary measures required to achieve them. Additional supporting information (such as that derived from detailed mapping and survey) is used to develop a tailored programme for their delivery.

Detailed SSCOs have been prepared and published thus far for 364 SACs and 37 SPAs. These are available for download from site-specific pages at https://www.npws.ie/protected-sites. Work is on-going to publish detailed SSCOs for all remaining SACs on a prioritised basis and the intention is to complete detailed SSCOs for all SACs by the end of 2020.

Ireland has developed a management planning process for raised bogs whereby conservation measures necessary to achieve a site's conservation objective targets are identified and mapped. Individual site-specific restoration plans have been prepared for 53 raised bog SACs based on this process. The National Raised Bog Special Areas of Conservation Management Plan 2017-2022 (published in December 2017 (NPWS, 2017)) sets the overall context and vision for how raised bog SACs are to be managed, conserved and restored.

The INTERREG VA Programme is funding the delivery of measures under the heading "Recovery of Protected Habitats & Priority Species, Objective 2.1" in three jurisdictions, including Ireland. One of outputs of this programme is to deliver 25 conservation action plans. In Ireland this programme is being delivered in the border counties of Monaghan, Leitrim, Cavan, Louth, Sligo and Donegal.

An application under the EU-funded LIFE programme for an Integrated Project (Wild Atlantic Nature) was successful in 2019. This project is aiming to improve the conservation condition of protected habitats in a large proportion of Ireland's blanket bog Natura 2000 network. This network comprises complexes dominated by blanket bog and interspersed with heaths, fens, grasslands and aquatic habitats and supporting a range of species including those listed for protection under the Habitats and Birds Directives. The project will operate from 2020 until 2028 a d will include preparation of restoration plans.

The River Basin Management Plan 2018-2021 for Ireland sets out the targets and measures required to achieve the objectives of the Water Framework Directive (WFD). That Directive recognises the importance of the "water dependent" habitats and species listed in the Birds and Habitats Directive, thus there are natural synergies between all three Directives. Planning for the new River Basin Management Plan (2022-2027) is currently underway. One of the key measures to address the decline in high status waterbodies is the setting up of the Blue Dot Catchments Programme and associated Steering Group to specifically target the maintenance and restoration of high status waterbodies, many of which overlap with Natura 2000 sites. In 2019, a second application under the EU-funded LIFE programme for an Integrated Project was successful. The LIFE-IP Waters of Life project aims to protect and restore high ecological status waterbodies and will act as a river basin-scale demonstration project, testing the effectiveness of the plan's best practice measures across a range of landscapes.

Ireland is currently identifying conservation measures required for each Annex I habitat and Annex II species within Natura 2000, which will be listed on a site-by-site basis for all SACs. A suitable data infrastructure is also being developed for managing and developing this dataset.

NPWS applied for and received funding to develop a Strategic Nature Project (SNaP) application for EU funding in the period 2021-2027. If successful, SNaP funding will be used in the integration of biodiversity policy across diverse sectors. The SNaP will facilitate the delivery of result-based approaches, the creation of a data hub for the management of conservation measures nationally, and will seek to integrate and co-ordinate conservation actions in the biodiversity, water, agriculture and marine sectors. The SNaP will seek to integrate elements from LIFE, European Innovation Partnerships (EIPs) and other novel approaches for biodiversity management, and institutional and external capacity for the delivery of conservation measures in Ireland will be enhanced.

		Number of sites with:		
Sites of Community Importance (SCIs) under the EU Habitats Directive	**Number of sites**	**legal site designation (SAC or equivalent)**	**specific site level conservation objectives**	**specific site-level conservation measures**
Ireland	439	276	327	53 (raised bog restoration plans)
Total	**439**	276	327	

		Number of sites with:		
Special Protection Areas (SPAs) under the EU Birds Directive	**Number of sites**	**legal site designation (SPA or equivalent)**	**specific site level conservation objectives**	**specific site-level conservation measures**
Ireland	154	150	37	
Total	**154**	150	37	

Further measures needed

Detailed site-specific conservation objectives for all Natura 2000 sites are required as a tool for appropriate assessment and conservation planning. Review and update of published conservation objectives will need to be ongoing.

Post 2021, management planning work will continue, including the development of mechanisms by which implementation of all necessary conservation measures can be delivered. This will require the ongoing cooperation and agreement of multiple government departments including the Department of Agriculture, Food and the Marine, Department of Communications, Climate Action and Environment and Department of Housing, Planning and Local Government. Strategic joined-up planning between all relevant players will be essential to deliver optimum results for nature conservation and all the other benefits this will bring.

A suite of flexible options for the delivery of conservation measures is needed in order to ensure the ecological requirements of habitats and species can be met as well as fulfilling the varying needs of landowners and other stakeholders (e.g. long-term (50+ years) management plans for woodlands; agri-environment schemes that integrate elements of woodland creation and management).

If the funding application is successful, the previously mentioned Strategic Nature Project (SNaP) will facilitate the development and expansion of integrated approaches for the delivery of necessary conservation measures.

Prioritization of measures to be implemented during the next MFF period

A programme for setting detailed site-specific conservation objectives for any remaining SPAs will be put in place during this period.

Published detailed site-specific objectives will be reviewed and amended as necessary as new information becomes available.

As stated above, development of programmes and mechanism to deliver the prioritised conservation measures, as outlined in later sections of this document will continue. Restoration measures will be prioritised largely based on habitats and species that are reported by the 2019 Article 17 and Article 12 processes as being in bad declining status. Mechanisms for delivering ongoing management measures required to maintain features will also be further developed.

List of prioritized measures to be carried out, and estimated costs for these measures

Name and short description of the measures	Type of measure*	Estimated cost in Euros (annualised)	Possible EU co-funding source
Review National Raised Bog SAC Plan and develop next phase	one-off	€171,000	National
Preparation of detailed site-specific conservation objectives Natura 2000 (including review and update (staff costs included in E.1.2)	recurring	0	National
Development of processes and programmes to integrate and co-ordinate nature conservation actions in the biodiversity, water, agriculture and marine sectors	recurring	€1,500,000	LIFE/National
Development and delivery of programmes to deliver conservation measures (10% of measures under E.2. and E.3.)	recurring	€10,205,525	EAFRD/EAGF/ ERDF/LIFE/ National

* indicate whether the measure is recurring or one-off

Expected results

The publication of detailed site-specific conservation objectives for all Natura 2000 sites will provide a tool for identifying necessary conservation measures and for measuring their efficacy. Ongoing development of mechanisms to deliver conservation measures will enable effective delivery of maintenance and restoration programmes for the Natura 2000 network in Ireland.

E.1.2. Site administration and communication with stakeholders

Current status and progress made so far in terms of site administration and communication with stakeholders

The European Communities (Birds and Natural Habitat) Regulations 2011 ("2011 Regulations") transpose the Birds Directive and the Habitats Directive into Irish law. Other legislation, such as the Planning and Development Acts also transpose certain aspects of the Directives into Irish law.

The 2011 Regulations set out the protection regime for European sites, including the regulation of activities that may affect such sites. This includes the role of public authorities in relation to their consents to plans and projects and the Article 6(3) screening and appropriate assessment requirements. Regulatory regimes, which may be sector specific, are the mechanisms by which many management measures are implemented in Ireland.

In tandem with the formal designation of each Natura 2000 site (by Statutory Instrument), a comprehensive notification process is undertaken to inform all identifiable stakeholders including landowners, property rights holders, statutory/consent bodies, state agencies and local and regional authorities, and political representatives both local and national, of the conclusion of the designation process.

Letters and site boundary maps are issued to individual landowners identified as having an interest in land in, or adjacent to, a site. Owners are identified through a search of the national land ownership database. A link to the SI for the site, information on why the site was selected for inclusion in the network and details of activities that have potential to damage the site and require the consent of the Minister (Activities Requiring Consent (ARCs)) before they can be undertaken are included. Details on the Site Specific Conservation Objectives (SSCOs) for the site are also provided. A freephone contact number for any enquiries and a link to the website of the National Parks and Wildlife Service is included.

These letters to landowners also contain an advisory note on management of farming activities within these sites. This includes information on compliance with the Nature Directives such as the need for planning permission or other consents for certain activities (including ARCs, as outlined above) and agri-environment schemes.

Finally, with a view to informing those who for some reason do not receive a direct notification, public notices are placed in the national and local media (newspapers) advising of the formal designation by SI and providing web links to further information as set out in the individual letters

All nature conservation projects now recognise that early and ongoing engagement is essential to successful outcomes. Each recent LIFE project (e.g. AranLIFE, KerryLIFE and The Living Bog) has had a strong communications element embedded in the project. The Living Bog has a fulltime public awareness officer.

The operation of schemes and programmes by relevant Departments in Natura 2000 sites includes ongoing interaction with stakeholders and knowledge transfer between departmental staff, Teagasc staff, farm advisors and landowners. This includes schemes such as the NPWS farm plan scheme, the Curlew Conservation Programme, the Corncrake Conservation Project, EIP projects, the Green, Low-Carbon, Agri-Environment Scheme (GLAS) and the Local Authority Waters Programme (LAWPRO), which has a team of 58 people operating from 13 separate Local Authority centres across the country.

An "Agreement between the Government and Farming Organisations on Review of Implementation of the Habitats Regulations 1997" has been in place since 2004. A Designated Areas Monitoring Committee, comprising representatives from DCHG (now DHLGH), DAFM and the farming organisations was established with a view to resolving issues arising from designations. In late 2017, all the parties involved agreed to review the agreement with a view to updating it in line with current legislation and practice. This review is at an advanced stage and is expected to conclude in 2020.

Further measures needed

As programmes for delivery of conservation measures for the network are progressed, it will be essential to continue to develop and implement communications and engagement strategies with stakeholders to ensure that their experience and expertise is built into such programmes. This includes landowners, agricultural advisors and farm planners.

There is also a need for improved communication, cooperation and coordination between Government Departments, Local Authorities and other State bodies in relation to the policy and governance of Natura 2000.

In conjunction with the completion of the formal designation process of the Natura 2000 network in 2020, a communication strategy for the national promotion of the network will be developed by DHLGH.

Guidance and training is required on the Nature Directives consent processes to improve capacity levels and skills for staff in those bodies that have key responsibilities in ensuring compliance with the Directives.

Prioritization of measures to be implemented during the next MFF period

A Natura Governance and Co-ordination Group to improve communication and cooperation among key stakeholders (Government Departments/State Agencies, farmers, landowners, tourism and leisure interests) involved in Natura 2000 policy and governance will be established as part of the Wild Atlantic Nature IP.

In order to conduct a national promotion campaign to increase public awareness and appreciation of the Natura 2000 network generally, it will be necessary, in the first instance, to develop a communications strategy to underpin the delivery of that campaign.

An extensive community engagement programme will be undertaken using a team specifically dedicated to this purpose under the Wild Atlantic Nature IP, this will proceed as preparation for the commencement of concrete conservation actions on a selection of blanket bog Natura 2000 sites.

In addition, preferably as part of the LIFE IP, it is proposed to engage in a capacity building and resource provision programme in bodies/agencies that have key responsibilities in achieving compliance with the Nature Directives. This will involve in the first instance the development of a series of tailored guidance advices and booklets, concentrating on the requirements of the Habitats Directive for consent bodies and their staff.

Building on the above, the proposed SNaP will assist in developing and expanding the communication and capacity building actions of other projects, programmes and schemes, should it be funded.

Key staffing shortages, key training requirements, inadequate resources for specific management measures and inadequate collaboration with key stakeholders in Natura 2000 policy and governance have been identified as limiting factors, and this institutional capacity could be further enhanced by the SNaP.

List of prioritized measures to be carried out, and estimated costs for these measures

Name and short description of the measures	Type of measure*	Estimated cost in Euros (annualised)	Possible EU co-funding source
Payment relating to the administrative cost to farmers for managing Natura 2000 lands	recurring	€15,000,000	National/ERDF/ EAFRD/EAGF
Establish a Natura Governance and Coordination Group	one-off	€10,000	National
Establish and run a peatland public awareness programmes	recurring	€300,000	National/LIFE/ ERDF/NCFF
Develop a communication strategy for the national promotion of the Natura network. (market research consultants to undertake baseline research, identify themes etc.) (WAN IP)	one-off	€130,000	LIFE/National
Ongoing communication with stakeholders relating to Natura 2000	recurring	€100,000	National
Pilot a community engagement programme with stakeholders on a selection of Natura sites. (community engagement officers (€100,000 per year) over the MFF period) (WAN IP)	recurring	€100,000	LIFE/National
Guidance/training on Nature Directive processes for consent bodies (WAN IP)	recurring	€19,000	LIFE/National
NPWS staff time in relation to development and delivery of all measures for the management of the Natura 2000 network (NB this does not currently include other state authority staff time)	recurring	€25,246,000	National

* indicate whether the measure is recurring or one-off

Expected results

A new inter-departmental/inter-agency Coordination Group will have been established at national level during the first year of the Wild Atlantic Nature Integrated Project (WAN IP) to improve communication and cooperation among the key stakeholders involved in Natura 2000 policy and governance, to improve integration and coordination in the mobilisation of complementary funding for the eventual full implementation of the PAF and to serve as the steering group for the IP. This will be built on by other processes and projects.

As part of the WAN IP, preparatory market research will have been carried out to determine the preferred themes for the Natura 2000 national promotion campaign. This will have involved a three-stage process to (1) establish a baseline reference for the level of general public awareness of the Natura 2000 network nationally; (2) research and identify the most effective themes on which to base the promotional campaign and (3) to test those themes against each other in order to determine the optimum emphases in the promotional campaign.

Ongoing and new projects and programmes will be involved in key communications with landowners, such as facilitating knowledge transfer and best practice guidance. Capacity building through provision of guidance and training requirements on the consent processes for Natura 2000 and an improvement in stakeholder communication and cooperation in the policy and governance of Natura 2000 be facilitated by bringing together consent process decision makers from around the country.

As part of WAN, a pilot community engagement scheme will have been established to help promote Natura around selected sites. Up to €100,000 will have been allocated to the Local Support Groups as seed funding to enable them to apply for and drawn down complementary funding or to provide match funding for same. The outcomes of this pilot seed funding scheme will have influenced the potential development of a similar state-funded scheme at national level. In addition, the work of the Community Engagement Officers will have enabled the implementation of the range of concrete conservation actions which are to be carried out on the 24 blanket bog Natura 2000 sites selected for inclusion in the project.

E.1.3. Monitoring and reporting

Current status and progress made so far in terms of monitoring and reporting

For the Habitats Directive, monitoring methodologies have been designed to facilitate reporting on the attributes required to assess conservation status as per guidelines agreed at EU level, i.e. indicators are derived to assess area, structure & functions and future prospects; population and habitat for the species. Representative samples are selected across the natural range to cover areas/populations both inside and outside the Natura 2000 network.

Data from other sectors/agencies that may inform the conservation status of habitats or species are also collated and integrated into monitoring assessments where appropriate, e.g. data relating to agriculture and forestry. Some datasets are used as a proxy for status e.g. incidental species records; biodiversity and water quality data collected as part of the Water Framework Directive Rivers and Lakes programmes; Local Authority habitat surveys.

Collaborations with other government departments and agencies have also been utilised to make the best use of opportunities to gather data to inform reporting and regulatory programmes (e.g. the ObSERVE programme: https://www.dccae.gov.ie/en-ie/natural-resources/topics/Oil-Gas-Exploration-Production/observe-programme/Pages/ObSERVE-Programme.aspx; and the offshore reef survey programme https://www.infomar.ie/galleries/node/518).In cases where the extent of a listed habitat or species is not well known, national surveys are undertaken to gain an understanding of the distribution and/or ecology of the species or habitat in question. When the full range of variation is realised, indicators of condition are derived and targets are set to assess conservation status. These surveys are considered baseline monitoring surveys. In the case where the drivers which influence conservation status are poorly understood, more detailed research is undertaken. The data derived from these research programmes are also used as a monitoring baseline.

The Irish Wetland Bird Survey (I-WeBS) is the primary nationwide survey for monitoring coastal and wetland waterbirds during the non-breeding season covering terrestrial, intertidal and subtidal areas.

Species-specific goose surveys are also undertaken under this programme. Other species-specific surveys include those for Hen Harrier (*Circus cyaneus*) and Merlin (*Falco columbarius*).

Breeding seabird census work occurs around the coast on a rolling programme while the Countryside Bird Survey (CBS) is a national programme that monitors population trends of Ireland's common and widespread breeding birds and has been running since 1998. The main aim of the CBS is to monitor changes in breeding bird populations from year to year and over long term periods.

Information on the major activities that impact the integrity of protected areas is collected by Conservation Rangers, through a Site Inspection Reporting surveillance programme. Summary reports on these activities are collated every three to six years. This programme uses the Natura Standard Data Form and Article 17/Article 12 standardised activity codes.

Responses to management measures (e.g. invasive species clearance, restoration, agri-environmental schemes) are monitored at a local or regional level and the data are incorporated into monitoring assessment results where available.

The frequency of monitoring depends on the ecology of the species or habitat in question, with long-lived or less vulnerable species and habitats requiring less frequent monitoring.

The programmes often cover several habitats or species. Most of the reports arising from the monitoring programmes are published via the publications link on the npws.ie website (see section E.1.6. of this document for a list of relevant reports).

Further information on the various programmes is synopsised as part of the audit/notes report accompanying each species and habitat conservation status assessment for the Article 17 reports; these are available on the NPWS website (https://www.npws.ie/publications/article-17-reports/article-17-reports-2019).

Further measures needed

1. Ongoing monitoring of all species and habitats listed in the Nature Directives.
2. Development of mobile apps and infrastructure to collect real time pressure data.

As the implementation of conservation measures increases, more targeted site based monitoring will be required, particularly to assess the efficacy of measures undertaken.

The list of research needs given under E.1.4. includes identified gaps in survey and monitoring programmes that need to be filled/augmented, much of which ties-in with the programmes listed below.

Prioritization of measures to be implemented during the next MFF period

All monitoring measures listed in the previous sections above are considered to be a priority for habitats and species listed in the Habitats and Birds Directives The following tables outline the monitoring programmes that are necessary to fulfil the requirements of the Birds and Habitats Directives for the next MFF period.

Habitats Directive - habitats

Code(s)	Habitat(s)	Type of programme	Further detail
1110	Sandbanks	National survey	Nationally representative sample of sites surveyed once every six years
1130, 1140, 1160	Estuaries, tidal mudflats, large shallow inlets and bays	Rolling national programme	In collaboration with EPA WFD monitoring programme-sites sampled twice in a six year period. Monitoring at previously surveyed sites; baseline survey at new sites
1150	Coastal lagoons	National survey	In collaboration with EPA WFD monitoring programme. Nationally representative sample of sites surveyed once every six years. Monitoring at previously surveyed sites; baseline survey at new sites
1170	Reefs - inshore	National survey	Nationally representative sample of sites surveyed once every six years. Monitoring at previously surveyed sites; baseline survey at sites with different exposures and pressures
1170	Reefs - offshore	National survey	Nationally representative sample of sites surveyed once every six years. Monitoring at previously surveyed sites
1180	Submarine structures formed by leaking gas	Survey	Monitoring of known site. Baseline surveys should other sites come to light
1210, 1220, 1310, 1330, 1410, 1420, 2110, 2120, 2130, 2140, 2150, 2170, 2190, 21A0	Driftlines, shingle, *Salicornia* mud, Atlantic salt meadows, halophilous scrub, Embryonic shifting dunes, Marram dunes (white dunes), Fixed dunes (grey dunes), *Empetrum* dunes, dune heath, dunes with creeping willow, dune slack, machair	Rolling national programme	Monitoring surveys to cover multiple habitats in coastal systems. Nationally representative sample of sites achieved by 2025
1230	Sea cliffs	National survey	Nationally representative sample of sites surveyed once every six years. Monitoring at previously surveyed sites
3130	Soft water lakes with base rich influences	Rolling national programme	Monitoring of vegetation and species at previously surveyed sites; baseline survey at new sites
3140	Hard water lakes	Rolling national programme	Monitoring of vegetation and species at previously surveyed sites; baseline survey at new sites
3150	Natural eutrophic lakes	Rolling national programme	Baseline surveys to classify and characterise natural vegetation and identify environmental drivers

Code(s)	Habitat(s)	Type of programme	Further detail
3110, 3160	Oligotrophic soft water lakes, dystrophic lakes	Rolling national programme	Baseline surveys. Invertebrates and vegetation (including bryophytes). Ties in with National Survey of Upland Habitats (NSUH) programme and Wild Atlantic Nature Integrated Project (WAN IP) in the relevant geographical area
3180, 3270	Turloughs; Chenopodion rubri	National survey	Nationally representative sample of sites surveyed once every 12 years
3260	Floating river vegetation	Rolling national programme	Baseline surveys. Invertebrates and vegetation
4010, 7130, 7140, 7150	Wet heath, blanket bog, transition mires (blanket bogs and uplands), Rhynchosporion depressions (on blanket bog)	Rolling national programme	Ongoing National Survey of Upland Habitats (NSUH) programme. Monitoring at previously surveyed sites; baseline survey at new sites. Ties in with WAN IP in the relevant geographical area. Other elements to be considered include ecotope mapping, hydrological surveys
4030, 4060, 8110, 8120, 8210, 8220	Dry heath, alpine and subalpine heath, Siliceous scree, eutric scree, calcareous rocky slopes, silceous rocky slopes	Rolling national programme	Ongoing National Survey of Upland Habitats (NSUH) programme. Monitoring at previously surveyed sites; baseline survey at new sites. Ties in with WAN IP in the relevant geographical area
6130	Calaminarian grassland	National survey	Nationally representative sample of sites surveyed once every five years
6210, 6410, 6510	Orchid-rich calcareous grassland, *Molinia* meadows, hay meadows	Rolling national programme	Monitoring at previously surveyed sites; baseline survey at new sites
6230	Species-rich *Nardus* grassland	Rolling national programme	Ties in with National Survey of Upland Habitats (NSUH) programme and WAN IP in the relevant geographical area
6430	Hydrophilous tall herb (upland)	Rolling national programme	Ongoing National Survey of Upland Habitats (NSUH) programme. Monitoring at previously surveyed sites; baseline survey at new sites. Ties in with WAN IP in the relevant geographical area
6430	Hydrophilous tall herb (lowland)	National survey	Nationally representative sample of sites surveyed once every five years
7110, 7120, 7150	Raised bog, degraded raised bog and rhynchosporion depressions (raised bog)	Rolling national programme	Monitoring surveys will cover multiple habitats
7140, 7210, 7230	Transition mires (lowlands), *Cladium* fen and alkaline fen	Rolling national programme	National baseline survey programme
7220	Petrifying springs	National survey	Nationally representative sample of sites surveyed once every six years
8240	Limestone pavement	National survey	Nationally representative sample of sites surveyed once every 12 years
8310	Caves	Proxy	Lesser horseshoe bat winter monitoring programme will inform assessment of this habitat
8330	Sea caves	Rolling national programme	Baseline survey of new sites to expand knowledge of the variability of the cave fauna within the geographical range
91A0, 91DO, 91E0, 91J0	Old oak woodland, bog woodland, alluvial woodland, yew woodland	National survey	Nationally representative sample of sites surveyed once every six years
91A0, 91J0	Old oak woodland, yew woodland	Permanent plots	Permanent monitoring plots in Killarney National Park. Surveyed once every five years

Habitats Directive- species

Code	Species		Type of programme	Further detail
1376	*Lithothamnion corallioides*	Maërl	National survey	Representative sample once every six years
1377	*Phymatolithon calcareum*	Maërl	National survey	Representative sample once every six years
1378	*Cladonia (Cladina) subsp.*	Cladonia subgenus cladina	Collection of incidental records	No specific survey programme
1395	*Petalophyllum ralfsii*	Petalwort	National survey	Nationally representative sample of sites surveyed once every six years
1400	*Leucobryum glaucum*	White cushion moss	Collection of incidental records	No specific survey programme
1409	*Sphagnum spp.*	Sphagnum (genus)	Relevant habitat survey programmes	No specific survey programme
1413	*Lycopodium species*	Lycopodium group	Rolling national programme	Monitoring at previously surveyed sites; baseline survey at new sites; use of incidental records
1421	*Vandenboschia speciosa*	Killarney fern	Rolling national programme	Monitoring at previously surveyed sites; baseline survey at new sites; use of incidental records
1528	*Saxifraga hirculus*	Marsh saxifrage	National survey	Nationally representative sample of sites surveyed once every six years
1833	*Najas flexilis*	Slender naiad	Rolling national programme	Monitoring of species at previously surveyed sites; baseline survey at new sites; ties in with monitoring of lake habitat 3130
6216	*Hamatocaulis vernicosus*	Slender green feather moss	National survey	Nationally representative sample of sites surveyed once every six years
1024	*Geomalacus maculosus*	Kerry slug	Rolling national programme	Collection of incidental records; surveillance of species within range
1029	*Margaritifera margaritifera*	Freshwater pearl mussel	Rolling national programme	Monitoring programme across catchments, including adult and juvenile counts, host fish surveys and detailed habitat assessments. To align with EPA monitoring programme and supplement with dedicated monitoring as required
1065	*Euphydryas aurinia*	Marsh fritillary	Rolling national programme	Annual monitoring of sample of sites using web counts; use of incidental records from butterfly atlas surveys
1092	*Austropotamobius pallipes*	White-clawed crayfish	Rolling national programme	Monitoring at previously surveyed sites; baseline survey at new sites; use of records from EPA triennial water quality monitoring surveys
1092	*Austropotamobius pallipes*	White-clawed crayfish	Disease surveillance programme	Annual surveillance using eDNA of species in combination with surveillance of crayfish plague
1013, 1014, 1016	*Vertigo geyeri, Vertigo moulinsiana, Vertigo angustior*	Geyer's whorl snail, Desmoulin's whorl snail, Narrow-mouthed whorl snail	Rolling national programme	Nationally representative sample of sites surveyed once every six years
1095	*Petromyzon marinus*	Sea lamprey	SAC programme	Float-over surveys of SAC main channels; annual nest counts at a number of spawning sites

Code	Species		Type of programme	Further detail
1096	*Lampetra planeri*	Brook lamprey	Rolling national programme	Survey programme across catchments at a national scale for larval *Lampetra* spp., including habitat assessments
1099	*Lampetra fluviatilis*	River lamprey	Rolling national programme	Investigative surveys for adult spawning activity and dedicated juvenile electro-fishing surveys with a focus on SACs
1103	*Alosa fallax*	Twaite shad	Rolling national programme	Netting for juveniles as part of WFD fish stock surveys of transitional waters and dedicated sea bass surveys; egg sampling of spawning locations; eDNA surveys of SAC channels and a selection of non-SAC channels
1106	*Salmo salar*	Salmon	Rolling national programme	Annual 5 min electrofishing programme
5046	*Alosa killarnensis*	Killarney shad	Regional programme	Rolling three year programme of dedicated hydroacoustic surveys and netting surveys as part of WFD surveillance monitoring of fish stocks in Lough Leane
5076	*Coregonus pollan*	Pollan	Rolling national programme	Rolling three year programme of dedicated hydroacoustic surveys and netting surveys as part of WFD surveillance monitoring of fish stocks in Lough Derg, Lough Ree and Lough Allen
6284	*Epidalea calamita*	Natterjack toad	Regional programme	Repeat of three year monitoring programme at all Kerry sites
1303	*Rhinolophus hipposideros*	Lesser horseshoe bat	Annual national programme	Annual monitoring of summer and winter roosts; Monitoring every three years of peripheral roosts to track changes in range
	All other bats species		Annual national programme	Multi-species Irish Bat Monitoring Programme
1334	*Lepus timidus hibernicus*	Irish hare	National survey	Nationally representative sample of sites surveyed
1355	*Lutra lutra*	Otter	National survey	Nationally representative sample of sites surveyed
1355	*Lutra lutra*	Otter	Ad hoc survey	Site-specific presence/absence surveys for range analysis
1357	*Martes martes*	Pine marten	National survey	Nationally representative sample of sites surveyed
1364	*Halichoerus grypus*	Grey seal	Rolling national programme	Rolling programme of regional breeding site surveys
1364	*Halichoerus grypus*	Grey seal	National survey	National survey every seven years
1365	*Phoca vitulina*	Harbour seal	Rolling national programme	Rolling programme of regional haul out surveys
1365	*Phoca vitulina*	Harbour seal	National survey	National survey every seven years
1349	*Tursiops truncatus*	Bottlenose dolphin	Rolling national programme	SAC population trend monitoring
1351	*Phocoena phocoena*	Harbour porpoise	Rolling national programme	SAC population trend monitoring
	All cetaceans		National survey	ObSERVE II survey acoustic and aerial survey programme (jointly funded by DHLGH, DECC) (see also marine birds)

Code	Species	Type of programme	Further detail
	All cetaceans	Incidental records	Marine Institute funded Marine Mammal Observer work; Irish Whale and Dolphin Group stranding scheme

Birds Directive

Species/species groups	Type of programme	Further detail
Wintering waterbirds	Annual national programme	Irish Wetland Bird Survey; an ongoing long-term dataset
Wintering waterbirds	Rolling national programme	To monitor bird use of agricultural habitats; Aims to develop new protocols and data capture technologies for standardised monitoring of wintering waterbird habitat use outside wetland areas
Migratory swans- Whooper Swan; Bewick Swan	National survey	Periodic census
Wintering Greenland White-fronted Goose	Annual national programme	Annual census
Wintering Barnacle Goose	National survey	Census every 3 years; to support international conservation assessments
Swans and geese- Light bellied Brent Goose; Pink-Footed Goose; Greylag Goose	Annual national programme	Surveys to derive population estimates and other parameters (e.g. breeding success)
Breeding seabirds- cliff and island-nesting species	Rolling national programme	Vantage point and boat-based surveys of key seabird colonies
Breeding Black Guillemot	National survey	To update 2018 - 2020 national survey
Burrow-nesting seabirds- Puffin, Storm Petrel; Leach's Petrel; Manx Shearwater	Rolling national programme	Baseline survey at new sites; monitoring at previously surveyed sites
Marine birds	National survey	ObSERVE II aerial survey programme (jointly funded by DHLGH, DECC) (see also cetaceans); Marine Institute programme
Seabirds	Rolling national programme	Standardised data collection of seabirds at sea data from boat-based surveys from Marine Institute and other vessels
Urban gulls	Targeted survey	Primary species are Herring Gull and Lesser Black-backed Gull
Riverine birds- Kingfisher; Dipper; Grey Wagtail	National survey	Re-survey and expansion of the 2010 Kingfisher Survey. Boat-based survey and walked-transects
Breeding waterbirds- including Red-breasted Merganser; Shoveler	Rolling national programme	New monitoring programme for key wetland sites
Breeding Common Scoter	National survey	Breeding census and productivity assessment
Red-throated Diver	Annual national programme	Species census and productivity assessment in conjunction with ongoing Red-throated Diver conservation project
Breeding waders	Rolling national programme	Surveys of key sites across a number of habitats (including machair and uplands)
Breeding Corncrake	Annual national programme	Survey of core corncrake areas; part of ongoing conservation efforts for this species including LIFE Atlantic Crex
Breeding Curlew	National survey	Survey of breeding pairs
Post-breeding terns	Annual national programme	Vantage point surveys of key wetlands

Species/species groups	Type of programme	Further detail
Colonial tree nesting birds- Little Egret; Grey Heron; Cormorant; Rook	Rolling national programme	Co-ordination and collection of breeding data
Twite	National survey	Survey of core area/s and co-ordination of volunteer surveys to contribute to the national dataset
Hen Harrier	National survey	Breeding survey every 5 years
Non-breeding raptors (including over-wintering Short-eared Owl; Marsh Harrier; resident species)	Annual national programme	Expansion of existing winter roost survey programme for Hen Harrier to capture records for other roosting raptor species
Chough	National survey	Breeding census to update data last collected in 2002/2003
Ring Ouzel	National survey	Survey of core area/s and co-ordination of volunteer surveys to contribute to the national dataset
Red Grouse	National survey	Repeat of 2006-08 survey over two winters i.e. 2021/22 and 2022/23
Rock Dove	National survey	Collection of data required for separate assessments for feral and wild populations
Common and widespread breeding birds	Annual national programme	Countryside Bird Survey: citizen-science based survey following defined methods; an ongoing long-term dataset
Rare species (24+ species)	Rolling national programme	Co-ordination of submission of breeding evidence by skilled volunteers

List of prioritized measures to be carried out, and estimated costs for these measures

Name and short description of the measures	Type of measure*	Estimated cost in Euros (annualised)	Possible EU co-funding source
Ongoing monitoring of all listed species and habitats	recurring	€3,000,000	National
Collection of real time pressure data	recurring	€43,900	National
Monitoring of measures	recurring	€500,000	National

* indicate whether the measure is recurring or one-off

Expected results

Ongoing monitoring will build up more statistically robust trends and ensure measures are targeted appropriately. An understanding of the impact of measures will determine their effectiveness and value for money. The collection of real time pressures enables a better understanding of cumulative impacts.

E.1.4. Remaining knowledge gaps and research needs

Current status

Programmes of work are commissioned and supported by NPWS and other bodies of the State on an ongoing basis to fill knowledge gaps and ensure appropriate measures are identified to restore/maintain protected habitats and species both within and beyond the Natura 2000 network. Examples of this include the aforementioned offshore reef survey programme and other projects undertaken as part of the EMFF biodiversity strand (https://emff.marine.ie/marine-biodiversity) and the ObSERVE project.

The EPA funds research to increase national understanding of the environment, the challenges it faces and responses to these. It develops high quality research capacity and supports innovation. The EPA's 2014-2020 research programme provided funding under three pillars- Sustainability, Climate and Water, facilitated through an annual EPA research call. The EPA also provides funding to support the participation of the Irish research community in transnational research proposals.

Teagasc supports science-based innovation through research and knowledge transfer in the agri-food sector and wider bio-economy that aims to underpin profitability, competitiveness and sustainability. Programme areas include environment, soils and land use.

The Marine Institute carries out research, as well as stimulating, funding and coordinating marine research and innovation programmes to support the sustainable development of Ireland's marine resources. This is underpinned by the national Marine Research and Innovation Strategy, which covers the period 2017-2021 and includes biodiversity, ecosystems and food-webs as one of its research themes.

The National Platform for Biodiversity Research was set up under the auspices of NPWS and the EPA in 2003. The aims of NPBR included defining national biodiversity research needs, improving the exchange of information between the research community and policy makers, and linking with European initiatives through the European Platform for Biodiversity Research Strategy (EPBRS). This resulted in the publication in 2006 of a biodiversity knowledge programme (https://www.epa.ie/pubs/reports/research/biodiversity/EPA_biodiversity_knowledge_programme.pdf). In 2012, reports outlining enabling actions and research priorities were produced for the following thematic areas: marine; freshwater; uplands, peatlands and wetlands; agriculture, grasslands and soil; and non-native invasive species.

Further measures needed

The following is a list of studies/research that has been identified as being required to enable effective management and monitoring of habitats and species listed in the Birds and Habitats Directive. Note that it is not necessarily comprehensive. It also includes work that may crossover with/be relevant to monitoring programmes listed in E.1.3. There is a need to review, update and publish new research priorities to inform national policy on an ongoing basis.

Theme	Research need
Marine	Work to develop the use of high resolution vessel monitoring systems reporting for inshore fisheries.
Marine	Further research to investigate the sources of marine eutrophication and other pollutants, focusing on those that introduce chemicals that are particularly problematic for marine flora and fauna.
Marine	Development of Site Inspection Reporting system for marine SACs and SPAs so that pressures can be more effectively monitored, captured and understood.
Marine	Development of techniques to enable changes in habitat condition to be detected, as well as the causes of such change.
Reefs	Research to investigate biogenic and geogenic reef habitats and to characterise their constituent biological communities.

Theme	Research need
Reefs	Investigations and trial of methods for monitoring change in reef communities.
Large shallow inlets and bays	Research to investigate the effects of climate change on *Zostera* and Maerl.
Large shallow inlets and bays	Surveys to establish the distribution of the *Edwardsia delapiae* community and research to establish what measures are necessary for its restoration.
Large shallow inlets and bays, Estuaries	Research to investigate invasive species associated with marinas, recreational boating and aquaculture.
Coastal systems	Research to understand the roles of different aspects of coastal ecosystems, including the role of the microbiome, below and above ground invertebrates, plants mammals and birds in coastal ecosystems.
Coastal systems	Monitoring programmes to detect changes in abundance or diversity of invertebrates in coastal habitats.
Coastal systems	Research to investigate nutrient profiles of forage on coastal systems nationally in order to gauge livestock carrying capacities and mineral requirements.
Coastal systems	Research to investigate the effects of climate change on coastal habitats, and the potential for these systems to mitigate impacts of climate change.
Sand dune habitats	Research to investigate the degree to which sand dune habitats and species are affected by chemical inputs including veterinary products and atmospheric nitrogen.
Sand dune habitats	Establishment of a national groundwater monitoring network in coastal sites to enable better assessment of the impacts of climate change and water abstraction.
Saltmarsh habitats	Research into factors that may promote the spread of *Spartina*, its rate of spread and options for control.
Lakes	Study of long-term landscape change and its effects on lake ecology.
Annex I lake habitats 3130 and 3140	Study of water colour and organic matter, their origins, natural background levels and impacts of increased loads on protected lake habitats, particularly marl lakes (3140) and *Najas*-type lakes (3130).
Annex I lake habitats 3130 and 3140	Study of the ecological impacts of abstractions on protected lake habitats, particularly marl lakes (3140) and *Najas*-type lakes (3130).
Lakes	Research into status and distribution of charophyte species in lake and related habitats.
Annex I lake habitats	Investigations of sub-types of lake habitats, e.g. machair and kettlehole sub-types of 3140.
Annex I lake habitat 3140	Investigation of potential 3140 lakes in good conservation condition and of high conservation importance.
Wetlands	Research into wetland loss. Comparing 1980s data with contemporary data using a combination of GIS modelling/mapping and ground-truthing.
Annex I grassland habitats	Comprehensive habitat mapping and condition assessment at site-level.
Annex I grassland habitats	Research investigating drivers of change and loss of grassland habitats.
Peatlands	Research to assess the vulnerability of peatland ecosystems to a changing climate, including increases in the frequency and severity of droughts.
Blanket bog and heaths	Research to improve understanding of the influence of topography and hydrology on the condition of peatlands in order to devise appropriate cost-effective rehabilitation plans.
Blanket bog	Research to better define "active" blanket bog and corroborate with research on GHG balance for plant communities on blanket bog.
Blanket bog and heaths	Work to identify areas of peatlands with high restoration potential, both inside and outside designated sites.
Blanket bog and heaths	Investigations to quantify livestock and other herbivore grazing on blanket bog and associated habitats.
Blanket bog and heaths	Investigations to develop and trial the most appropriate methods for arresting peat erosion and restoring habitats.
Blanket bog and heaths	Work to develop mitigation measures for peatland areas identified as being vulnerable to landslides.

Theme	Research need
Raised bog	Work to develop techniques to use satellite imagery for mapping Active Raised Bog on intact raised bog to aid monitoring.
Raised bog	Development of a monitoring programme for peat-forming habitats developing on cutover and cutaway areas after restoration works are implemented.
Fens	Development of a suite of measures for inclusion into fen restoration plans.
Annex I woodlands	Further development of effective methods for invasive plant species control
Annex I woodlands	Research to investigate optimal grazing regimes in woodlands
Lycopodiaceae spp.	Lycopodiaceae baseline surveys of recently discovered and other unmonitored sites.
Killarney fern	*Vandenboschia speciosa* baseline surveys of recently discovered and other unmonitored population/colonies for which such surveys have not yet been carried out to record baseline population, locational, site and habitat details and information on impacts, activities, threats, necessary conservation measures, etc.
Slender naiad	Seed-bank study, which is important for informing necessary conservation measures such as translocation, promotion of germination.
Slender naiad	Research on population genetics to inform necessary conservation measures.
Slender naiad	Studies of ecological requirements (e.g. sediment and seepage water chemistry, light intensity tolerances) to inform necessary conservation measures.
Annex II *Vertigo* species	Study of genetic diversity of *Vertigo angustior*, *V. geyeri* and *V. moulinsiana* populations in Ireland to provide understanding of the population structure and inter-relationships of sites.
Vertigo geyeri	Study of habitat condition for *V. geyeri* and drivers affecting habitat stability, including detailed hydrological study of each site.
White-tailed crayfish	Research into the impact of crayfish plague, including control and detection of outbreaks, monitoring of spread and persistence of plague outbreaks, recovery of crayfish stocks after plague outbreaks, and detection and control of non-indigenous crayfish species (NICS).
Freshwater pearl mussel	Research on population genetics to inform decisions on captive breeding and other ex situ measures.
Freshwater pearl mussel	Baseline surveys of less-well known SAC populations.
Freshwater pearl mussel	Studies of hydrological and morphological requirements, both at reach and catchment scale and how to link the two.
Freshwater pearl mussel	Studies of fish distribution and glochicial attachment in Owenriff.
Sea lamprey	eDNA surveys for sea lamprey, which could potentially greatly improve scope of monitoring, including gathering information on distribution, timing and duration of spawning runs, impact of barriers (and other pressures) and effects of conservation measures.
Pollan	Acoustic telementry study of Lough Ree would provide an invaluable insight into spatio-temporal behaviour and would identify important habitats and lake regions for spawning, feeding, aggregation and refuge.
Killarney shad	Acoustic telemetry study and spawning study to increase knowledge of ecology and behavior.
Fish	Utilise existing network of acoustic receivers in Waterford harbour to gather data on spatial and behavioural ecology of Habitats Directive and other fish species.
Seals	Work to investigate the origins and movements of seals in bycatch using genetic or tagging studies to explain the dynamic of improving favourable conservation status and known bycatch levels.
Seals	Population modelling or forecasting of population growth to help predict where conflict with sectors may occur.
Seals	Research to investigate potential solutions to seal and fisheries interactions.

Theme	Research need
Marine mammals, seabirds, turtles	Research to understand the distribution, population trends and habitat preferences of Ireland's marine mammals, seabirds and waterbirds at sea. For some bird species (including divers, grebes and sea ducks), more intensive focus on Ireland's inshore areas is needed. The ObSERVE project has demonstrated effective survey methodologies which can be built upon over the coming years. These methods, with some modifications, can also help fill gaps in the understanding of the ecology and migration patterns of leatherback turtles. Supplementing the aerial based ObSERVE surveys with ship based monitoring and other more novel techniques including tracking studies will allow greater precision with regard to the spatiotemporal abundance and distribution of particular species in Irish waters.
Lesser horseshoe bat	Research to understand the movements, foraging patterns and population dynamics of lesser horseshoe bats. This data is required to inform landscape level conservation measures and to reverse range contractions.
Whiskered and Natterer's bats	Research and field trials to develop and test appropriate technologies and techniques to establish an effective monitoring scheme for Whiskered and Natterer's bats.
Greater horseshoe bat	Research to investigate the status and distribution of Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) in Ireland, which is currently considered to be a vagrant species here.
Birds	Research to improve understanding of the implications of climate change on the distribution of common and widespread bird species and future predictions, including a review of the impacts of burning on ground-nesting birds.
Birds	Research to improve understanding of the impacts of the application of fertilisers, herbicides, pesticides and veterinary medicines/treatments on invertebrate communities and thus impacts upon both insectivorous and granivorous bird species (e.g. effects on egg production and chick rearing), particularly those compounds used in agriculture and forestry.
Birds	Research to develop processes to quantify direct and indirect impacts of hunting, with a view to establishing monitoring programmes (e.g. by using bag statistics).
Birds	High level analysis of the overlap between recreational activities and sensitive bird sites and potential mitigation measures.
Birds	Research on potential impacts (positive and negative) of feral goose populations on birds of conservation concern/priority species, particularly ground-nesting birds, with the aim of informing management decisions for feral populations.
Passerines	Widespread transect based surveys to monitor the abundance and distribution of skylark (*Alauda arvensis*) and meadow pipit (*Anthus pratensis*) and the quality of their habitats (but also other potential prey species) is needed at a range of heath, upland and grassland sites across Ireland which could be used as an indicator of the quality and trends of habitats of certain bird species particularly Merlin (*Falco columbarius*) and Hen Harrier (*Circus cyaneus*).
Waterbirds	Research to investigate the prey requirements of breeding waterbirds and the availability of these prey resources for both adults and young (e.g. Common Scoter (*Melanitta nigra*), breeding waders).
Farmland birds	Research on the value of hedgerows as both nesting and feeding resources for Ireland's avifauna including, in particular, the acquisition and compilation of breeding bird phenological data.
Farmland birds	Research to investigate how arable farming systems can be adapted to provide increased benefits for Ireland's bird species.
Woodcock	Research on woodcock numbers, habitat use and current pressures and threats.
Hen harrier	Research to improve understanding and provide more robust data on population dynamics of Hen Harrier in Ireland including juvenile overwinter survival rates and population trends; how the species uses the agricultural landscape.
Raptors	Research to investigate the prevalence of secondary poisoning in top avian predators.

Theme	Research need
Ground-nesting birds	Research on the behaviour, habitat use, territory size and other aspects of predators of ground nesting birds to establish minimum levels of effort and optimum techniques to minimise predation risk during sensitive times of the year, across a range of habitats and landscapes.
Breeding seabirds	Research to investigate the effects of invasive mammal species on marine islands holding or potentially holding vulnerable seabird breeding (and other bird) populations, with the aim of developing a risk assessment process and evidence based prioritisation for eradication projects.
Breeding seabirds	Work to investigate breeding productivity of declining species (e.g. *Rissa tridactyla*) and species with little to no detailed baseline data (i.e. *Puffinus puffinus*; *Oceanodroma leucorhoa*; *Hydrobates pelagicus* and *Fratercula arctica*).
Waterbirds	Research to identify sites of national significance for breeding and wintering waterbirds that are likely to be impacted significantly by sea-level rise and related cumulative pressures, with the aim of providing an assessment of the risk level for key sites.
Waterbirds	Research to identify where pollution and nutrient enrichment may be contributing to declines in bird population in riparian and freshwater habitats to identify mitigation measures.
Waterbirds	Research to investigate impact of bivalve dredging (both fisheries and aquaculture) on the foraging habitats, prey base, and food webs of scoter and other subtidal waterbirds.
Wintering waterbirds	Research to test the efficacy of methods to reduce disturbance from human sources at key wintering waterbird sites.
Wintering waterbirds	Increase scope and efficacy of IWeBS and supplement with more bespoke surveys (e.g. low-tide surveys of the intertidal and targeted near shore subtidal surveys).
Breeding waterbirds	Establish monitoring programmes for breeding birds at inland wetland sites and key inland waterways.
General	Work to identify owners and managers of state-owned land in Natura 2000 to enable and encourage optimum management.
General	Work to develop more effective models for environmental enhancement that have increased farmer buy-in.
General	Investigations into the use of new technologies such as remote sensing and UAVs to assess limitations and opportunities for their use.
General	Development of a data information and decision-support system to allow integrated and cumulative effects assessments across sectors, to better inform spatial planning and resource management in Natura 2000.

Prioritization of measures to be implemented during the next MFF period

Monitoring programmes, as outlined in E.1.3, will include elements that aim to fill knowledge gaps in relation to restoration and maintenance of prioritised habitats and species such as those listed above. Elements are also tied into programmes being developed to deliver appropriate management, as described in E.2 and have not been prioritised separately here.

DHLGH will continue to collaborate with bodies that facilitate and fund research programmes, such as the EPA, Marine Institute and Teagasc to ensure, to the greatest extent possible, that research to investigate priority knowledge gaps are included in funding calls and other opportunities for research. For example, the biodiversity elements of the EPA's Research Strategy 2021-2030 and the EMFAF programme for the next MFF will be important for filling relevant knowledge gaps.

List of prioritized measures to be carried out, and estimated costs for these measures

Name and short description of the measures	Type of measure*	Estimated cost in Euros (annualised)	Possible EU co-funding source
Research to fill knowledge gaps	recurring	€3,000.000	National/LIFE/ERDF/EMFAF/Horizon Europe

* indicate whether the measure is recurring or one-off

Expected results

By filling knowledge gaps, monitoring and management programmes for habitats and species will be able to become more effective and fit for purpose.

E.1.5. Natura 2000-related communication and awareness raising measures, education and visitor access

Current status

There are no specific dedicated funding programmes or set of measures aimed exclusively at raising awareness of the Natura 2000 network. However, circa €100,000 is spent annually on a range of initiatives promoting biodiversity awareness in schools and communities generally, although it is not possible to quantify how much of this is focussed directly on awareness of the Natura 2000 network.

Bodies such as Local Authorities, the Heritage Council, LAWPRO and environmental NGOs support and run a wide range of nature-related education and awareness raising programmes throughout the country. National and regional events such as the Young Scientist Exhibition, SeaFest and the National Ploughing Championships provide opportunities for communicating and raising awareness with members of the public.

In addition, a strategic partnership between NPWS and Fáilte Ireland (the national tourism development authority) will see up to €4m in State funding invested in the development and promotion of visitor experiences at two National Parks (both Natura 2000 designated areas) by the end of 2020.

Further investment is anticipated in visitor facilities at the remaining National Parks (also Natura 2000 sites) under this partnership arrangement by 2022, although the amount of funding involved will depend on the outcome of feasibility studies being undertaken.

Further measures needed

The continuation and expansion of ongoing programmes such as those being run by LAWPRO as part of the implementation of the Water Framework Directive, and which will be complemented by the Waters of Life IP are essential for raising awareness and appreciation of nature generally.

As part of the Wild Atlantic Nature IP, a dedicated national promotional campaign to enhance awareness and appreciation of the Natura 2000 network will be developed and implemented. This is intended to address the cultural obstacles of: minimal general public awareness of the existence or value of the Natura 2000 network; low levels of public appreciation of the ecological value of natural habitats; an under-developed sense of community ownership or custodianship towards Natura sites and insufficient stakeholder involvement at community level.

As part of the project, a range of nature documentaries and TV programming, aimed at promoting appreciation of Natura 2000 nationally, will be produced by the national broadcaster (RTÉ). The target audience for this action will be the general public nationwide and farming/rural communities in particular. This measure will closely support the national promotional campaign to develop the Natura 2000 network as an instantly recognisable brand in the general public consciousness.

A schools programme to promote local awareness of, and support for, the Natura 2000 network and the importance of its conservation will be trialled during the MFF period. The target audiences for this initiative are the local schools/communities in the hinterland of the selected Natura 2000 sites but very particularly the children who are the next generation of leaders/stakeholders in these communities. This initiative is intended to foster a long-term appreciation of the importance of the local sites and their value to local communities.

An application for an Integrated LIFE project under the sub-programme for Climate Action is currently under evaluation by the EU Commission. The Eden Ireland IP is a seven year project that aims to go beyond the basic rehabilitation of peatlands to enhance carbon storage potential, and to proceed with best-practice peatland restoration measures where possible/appropriate. Should the application be successful, the project will collaborate locally, regionally, nationally and internationally to generate and to share solutions, knowledge and content for systemic and transformation change to a carbon neutral future. One of the main elements of this project is a self-sustaining business, providing employment, improving climate literacy and providing events, training, education and workshops.

Prioritization of measures to be implemented during the next MFF period

The "natural heritage and biodiversity" section of the Programme for Government includes a number of commitments to the promotion of the importance of biodiversity. This is relevant to land and sea both within and beyond the Natura 2000 network.

A key priority of the Wild Atlantic Nature Integrated Project (WAN IP) is the commencement of dedicated national promotional campaign to enhance awareness and appreciation of the Natura 2000. This is necessary to address the cultural obstacles to the implementation of the PAF, particularly the low levels of awareness and appreciation of the network.

A second priority of the project is the production of nature TV programming to promote the network and will be a key support to the delivery of the first measure in this area. As with the first measure, this is a national level action which will support delivery of the national promotional campaign and has a slightly lesser priority as a consequence.

The schools programme of the IP will target the next generation of stakeholders/landowners in communities living in or close to Natura 2000 sites. This is a pilot or trial initiative but could become the basis for a measure which would be rolled out nationally at a later date.

List of prioritized measures to be carried out, and estimated costs for these measures

Name and short description of the measures	Type of measure*	Estimated cost in Euros (annualised)	Possible EU co-funding source
Measures to promote biodiversity awareness	recurring	€1,000,000	National/LIFE/ERDF
National promotional campaign for Natura 2000. (advertising and promotional campaign for the Natura 2000 brand) (WAN IP)	recurring	€92,000	LIFE/National
TV nature programming (WAN IP)	one-off	€71,000	LIFE/National
Schools education programme where the main costs are related to personnel – the cost of education officers who will deliver the programme (WAN IP)	recurring	€11,000	LIFE/National

* indicate whether the measure is recurring or one-off

Expected results

The national promotional campaign measure, part of the WAN IP, is expected to have a significant impact in raising awareness of the Natura 2000 network. Improved general public awareness of the existence and value of the Natura 2000 network will be achieved by means of a national promotional campaign developed and rolled out by expert media consultants. The low levels of public appreciation of the ecological value of natural habitats will have been increased significantly and the underdeveloped sense of community ownership or custodianship towards local Natura 2000 sites will have been enhanced - as will stakeholder involvement at community level.

The production of TV nature programming is expected to help in promoting the existence and value, locally and nationally, of the Natura 2000 network. Improved general public awareness of the existence and value of the Natura 2000 network will have been achieved through the commissioning and production of nature documentaries and TV (and radio) programming promoting appreciation of the Natura 2000 network. This will complement awareness raising programmes being run by other projects and programmes throughout the country.

Education programmes being run and co-ordinated by a variety of bodies such as NPWS, LAWPRO, Heritage Council, Local Authorities and individual projects will continue to deliver on the theme of biodiversity awareness. The schools programme measure in the WAN IP is expected to promote the existence and local value of the Natura 2000 network to the next generation of local stakeholders in the project area. Up to 3,500 primary school children potentially will have participated in competitions and field days under the measure thereby helping to increase long-term local enthusiasm and support for the conservation of Natura 2000 in local communities.

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E.2 Site-related maintenance and restoration measures, within and beyond Natura 2000

E.2.1. Marine and coastal waters

Current status of habitats and species, conservation measures taken until now and their impact so far, remaining pressures and threats

The following table lists the habitats and species in this group and the numbers of SACs that have been selected for each. The total reported area of each habitat contained in the Natura 2000 network (as a qualifying feature), is also given.

Code	Name	Number of SACs	QI area (ha)
1110	Sandbanks which are slightly covered by sea water all the time	4	11,197
1130	Estuaries	19	52,881
1140	Mudflats and sandflats not covered by seawater at low tide	43	42,351
1150	Coastal lagoons*	25	1,860
1160	Large shallow inlets and bays	22	190,297
1170	Reefs	46	229,925
1180	Submarine structures made by leaking gases	1	30
1310	*Salicornia* and other annuals colonizing mud and sand	25	357
8330	Submerged or partially submerged sea caves	12	1,356
1349	*Tursiops truncatus*	5	
1351	*Phocoena phocoena*	3	
1364	*Halichoerus grypus*	10	
1365	*Phoca vitulina*	13	

Summary statistics for marine and coastal waters group:

Number of SACs containing one or more Annex I qualifying habitat	95	530,254
Number of SACs containing one or more Annex II qualifying species	26	
Total number of SACs in marine and coastal waters group	**101**	

Annex I habitats

Within this category, Ireland hosts nine habitats listed on Annex I of the Habitats Directive. Of the seven marine habitats, reefs is the most widespread, ranging from the intertidal to far offshore, i.e. more than 400km off the coast and at depths extending to 4500m. This habitat includes rocky (geogenic) reefs as well as those formed by animals themselves (known as biogenic reefs). A large portion of the western seaboard of Ireland is heavily indented and within these bays and estuaries there are an abundance of shallow and intertidal habitats which include the Annex I habitats Large shallow inlets and bays, Estuaries, Mudflats and sandflats not covered by seawater at low tide, and Sea caves. All of these are also found around the rest of the coastline, but to a lesser extent. The shallow portions of the Irish Sea include a number of sandbanks which conform to that Annex I habitat type. Ireland has recently selected one SAC for Submarine structures made by leaking gases in the Irish Sea.

In Ireland, coastal lagoons are interspersed around the coastline and range from artificial lagoons to natural features that can be classified by their barrier type, such as shingle, rock, or peat.

Salicornia and other annuals colonizing mud and sand is considered to be a pioneer saltmarsh habitat in Ireland and this and other habitats in this group interface with other Annex I habitats including saltmarshes, sand dunes, stony banks and cliffs, and cannot be managed in isolation from one another.

Annex II species

Four marine mammals (two seal species and two cetaceans) listed on Annex II of the Habitats Directive occur in Irish waters. Grey Seal and Harbour Seal breed, moult, rest and socialise at established haul-out sites around the coast. While SACs are selected for these species, they range widely beyond these sites.

Otter (*Lutra lutra*), which is included in the freshwater group (E2.8) for the purposes of identifying measures, also occurs in coastal waters.

Current status of Annex I habitats

The following table shows national conservation status of the nine Annex I habitats listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf for more detail):

Code	Short/common name	2007	2013	2019
1110	Sandbanks	Inadequate	Favourable	Favourable
1130	Estuaries	Inadequate	Inadequate↑	Inadequate↓
1140	Tidal mudflats	Inadequate	Inadequate↑	Inadequate↓
1150	Lagoons*	Bad	Bad=	Bad↓
1160	Large shallow inlets and bays	Inadequate	Inadequate↑	Bad↓
1170	Reefs	Inadequate	Bad↓	Inadequate=
1180	Submarine structures made by leaking gases			Favourable
1310	*Salicornia* mud	Inadequate	Inadequate↓	Favourable
8330	Sea caves	Favourable	Favourable	Favourable

Recent survey work on the offshore reefs has yielded enough information to enable the conservation status to be assessed as inadequate, rather than bad, as it was in 2013.

The conservation status of sandbanks and marine caves have been assessed as favourable in 2019, as has submarine structures made by leaking gases.

A recent national survey (2016-2018) has indicated that the structure and functions of mudflats and sandflats, estuaries and large shallow inlets and bays have declined, with eutrophication and damage to keystone marine communities being the main issues encountered.

Salicornia and other annuals colonizing mud and sand, has been assessed as favourable, partly due to a lack of evidence for recent spread of the invasive species *Spartina anglica*.

The conservation status of coastal lagoons has again been assessed as bad, with the main pressures affecting structure and functions being water quality and hydrological issues.

Current status of Annex II and Annex IV species

The following table shows national conservation status of the four Annex II species listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol3_Species_Article17.pdf for more detail):

Code	Species name	2007	2013	2019
1349	Bottlenose Dolphin	Favourable	Favourable	Favourable
1351	Harbour Porpoise	Favourable	Favourable	Favourable
1364	Grey Seal	Favourable	Favourable	Favourable
1365	Harbour Seal	Favourable	Favourable	Favourable

Ireland also reports on an additional 16 cetacean species listed on Annex IV. Additional information collected during the reporting period has allowed all but five of these species to be fully reported on and all are considered to be favourable. A further six species are listed as vagrant in Irish waters.

Birds

The following table lists the SPA trigger species in this MAES group and the numbers of SPAs that have been selected for each species. Note that habitats in other MAES categories may also be important for the species listed. The number of SPAs selected for wetlands in this category is also indicated.

Species code	Species name		Season[1]	Number of SPAs	Annex I[2]	BoCCI 2013[3]	Other MAES category[4]
A001	Red-throated Diver	*Gavia stellata*	W	5	Annex I	Amber	
A002	Black-throated Diver	*Gavia arctica*	W	1		Amber	
A003	Great Northern Diver	*Gavia immer*	W	4	Annex I	Amber	
A005	Great Crested Grebe	*Podiceps cristatus*	W	9		Amber	Freshwater habitats (rivers and lakes)
A009	Fulmar	*Fulmarus glacialis*	B	17		Green	Rocky habitats, dunes and sparsely vegetated lands
A013	Manx Shearwater	*Puffinus puffinus*	B	5		Amber	Rocky habitats, dunes and sparsely vegetated lands
A014	Storm Petrel	*Hydrobates pelagicus*	B	11	Annex I	Amber	Rocky habitats, dunes and sparsely vegetated lands
A015	Leach's Storm Petrel	*Oceanodroma leucorhoa*	B	1	Annex I	Red	Rocky habitats, dunes and sparsely vegetated lands
A016	Gannet	*Morus bassanus*	B	3		Amber	Rocky habitats, dunes and sparsely vegetated lands
A017	Cormorant	*Phalacrocorax carbo*	B	18		Amber	Freshwater habitats (rivers and lakes)
A017	Cormorant	*Phalacrocorax carbo*	W	7		Amber	Freshwater habitats (rivers and lakes)
A018	Shag	*Phalacrocorax aristotelis*	B	14		Amber	Rocky habitats, dunes and sparsely vegetated lands
A028	Grey Heron	*Ardea cinerea*	W	4		Green	Freshwater habitats (rivers and lakes)
A046	Light-bellied Brent Goose	*Branta bernicla hrota*	W	24		Amber	Other agroecosystems (incl. croplands)
A048	Shelduck	*Tadorna tadorna*	W	17		Amber	Rocky habitats, dunes and sparsely vegetated lands
A050	Wigeon	*Anas penelope*	W	24		Red	Bogs, mires, fens and other wetlands
A062	Scaup	*Aythya marila*	W	5		Amber	Freshwater habitats (rivers and lakes)
A063	Eider	*Somateria mollissima*	W	1		Amber	Rocky habitats, dunes and sparsely vegetated lands
A065	Common Scoter	*Melanitta nigra*	W	5		Red	
A069	Red-breasted Merganser	*Mergus serrator*	W	10		Green	
A107	Slavonian Grebe	*Podiceps auritus*	W	1		Amber	
A130	Oystercatcher	*Haematopus ostralegus*	W	16		Amber	Rocky habitats, dunes and sparsely vegetated lands
A137	Ringed Plover	*Charadrius hiaticula*	W	15		Green	Rocky habitats, dunes and sparsely vegetated lands
A140	Golden Plover	*Pluvialis apricaria*	W	32	Annex I	Red	Bogs, mires, fens and other wetlands

Species code	Species name		Season[1]	Number of SPAs	Annex I[2]	BoCCI 2013[3]	Other MAES category[4]
A141	Grey Plover	*Pluvialis squatarola*	W	21		Amber	Rocky habitats, dunes and sparsely vegetated lands
A142	Lapwing	*Vanellus vanellus*	W	22		Red	Bogs, mires, fens and other wetlands
A141	Grey Plover	*Pluvialis squatarola*	W	21		Amber	Rocky habitats, dunes and sparsely vegetated lands
A143	Knot	*Calidris canutus*	W	13		Amber	Rocky habitats, dunes and sparsely vegetated lands
A144	Sanderling	*Calidris alba*	W	15		Green	Rocky habitats, dunes and sparsely vegetated lands
A148	Purple Sandpiper	*Calidris maritima*	W	4		Green	Rocky habitats, dunes and sparsely vegetated lands
A149	Dunlin	*Calidris alpina*	W	23		Red	Rocky habitats, dunes and sparsely vegetated lands
A156	Black-tailed Godwit	*Limosa limosa*	W	25		Amber	Rocky habitats, dunes and sparsely vegetated lands
A157	Bar-tailed Godwit	*Limosa lapponica*	W	24	Annex I	Amber	Rocky habitats, dunes and sparsely vegetated lands
A160	Curlew	*Numenius arquata*	W	19		Red	Bogs, mires, fens and other wetlands
A162	Redshank	*Tringa totanus*	W	21		Red	Rocky habitats, dunes and sparsely vegetated lands
A164	Greenshank	*Tringa nebularia*	W	4		Green	Rocky habitats, dunes and sparsely vegetated lands
A169	Turnstone	*Arenaria interpres*	W	11		Green	Rocky habitats, dunes and sparsely vegetated lands
A179	Black-headed Gull	*Chroicocephalus ridibundus*	W	14		Red	Bogs, mires, fens and other wetlands
A182	Common Gull	*Larus canus*	W	9		Amber	Bogs, mires, fens and other wetlands
A183	Lesser Black-backed Gull	*Larus fuscus*	B	9		Amber	Freshwater habitats (rivers and lakes)
A183	Lesser Black-backed Gull	*Larus fuscus*	W	5		Amber	Freshwater habitats (rivers and lakes)
A184	Herring Gull	*Larus argentatus*	B	14		Red	Freshwater habitats (rivers and lakes)
A184	Herring Gull	*Larus argentatus*	W	6		Red	Freshwater habitats (rivers and lakes)
A188	Kittiwake	*Rissa tridactyla*	B	15		Amber	Rocky habitats, dunes and sparsely vegetated lands
A191	Sandwich Tern	*Sterna sandvicensis*	B	9	Annex I	Amber	Rocky habitats, dunes and sparsely vegetated lands
A192	Roseate Tern	*Sterna dougallii*	B	2	Annex I	Amber	Rocky habitats, dunes and sparsely vegetated lands
A192	Roseate Tern	*Sterna dougallii*	P	2	Annex I	Amber	Rocky habitats, dunes and sparsely vegetated lands

Species code	Species name		Season[1]	Number of SPAs	Annex I[2]	BoCCI 2013[3]	Other MAES category[4]
A193	Common Tern	*Sterna hirundo*	P	2	Annex I	Amber	Rocky habitats, dunes and sparsely vegetated lands
A193	Common Tern	*Sterna hirundo*	B	12	Annex I	Amber	Freshwater habitats (rivers and lakes)
A194	Arctic Tern	*Sterna paradisaea*	P	2	Annex I	Amber	Rocky habitats, dunes and sparsely vegetated lands
A194	Arctic Tern	*Sterna paradisaea*	B	14	Annex I	Amber	Rocky habitats, dunes and sparsely vegetated lands
A195	Little Tern	*Sterna albifrons*	B	8	Annex I	Amber	Rocky habitats, dunes and sparsely vegetated lands
A199	Guillemot	*Uria aalge*	B	11		Amber	Rocky habitats, dunes and sparsely vegetated lands
A200	Razorbill	*Alca torda*	B	10		Amber	Rocky habitats, dunes and sparsely vegetated lands
A204	Puffin	*Fratercula arctica*	B	10		Amber	Rocky habitats, dunes and sparsely vegetated lands
	Wetlands[5]			38			

[1] W- wintering; B- breeding; P- passage
[2] Annex I- species listed on Annex I of the Birds Directive
[3] BoCCI- species status on "Birds of Conservation Concern in Ireland" list (Colhoun and Cummins, 2013)
[4] Bird species and SPAs selected for them are not always easily assigned to a single MAES habitat category. This column indicates the second most important habitat group for the species. SPAs may also cover other important habitats not listed here.
[5] This row indicates the number of SPAs in this MAES category where the presence of wetlands has contributed to their selection as SPAs

As indicated in the table above, the bird groups relevant to this marine and coastal waters category include those waterbirds that winter or occur on passage in Ireland and use the intertidal areas and inshore shallow subtidal waters for feeding and roosting purposes. Birds that have been assigned to this group also use other habitats such as cliffs and islands, and so measures cannot be strictly assigned to just this habitat group.

These include waders or shorebirds (e.g. Grey Plover (*Pluvialis squatarola*); Oystercatcher (*Haematopus ostralegus*); Knot (*Calidris canutus*); Dunlin (*Calidris alpina*); and Bar-tailed Godwit (*Limosa lapponica*)). Sea ducks, divers and grebes also overwinter here and are strongly associated with inshore subtidal marine waters (e.g. Red-throated Diver (*Gavia stellata*); Common Scoter (*Melanitta nigra*); and Slavonian Grebe (*Podiceps auritus*).

Several waterbird species breed in Irish coastal areas (e.g. Eider (*Somateria mollissima*); Shelduck (*Tadorna tadorna*); and Ringed Plover (*Charadrius hiaticula*)). Seabirds breed along Ireland's marine coastal areas, often on cliff faces (e.g. Kittiwake (*Rissa tridactyla*), Gannet (*Morus bassanus*); and Guillemot (*Uria aalge*)) whilst others seabird species are more associated with marine islands (Roseate Tern (*Sterna dougallii*); Manx Shearwater (*Puffinus puffinus*); Leach's Storm Petrel (*Oceanodroma leucorhoa*); Storm Petrel *Hydrobates pelagicus*) and Puffin (*Fratercula arctica*)) but all use Irish territorial marine waters out to the Exclusive Economic Zone (EEZ) boundary.

Other seabird species occur in Ireland during the non-breeding period or on passage (e.g. Little Gull (*Larus minutus*)).

This MAES group contains several red-listed species (according to "Birds of Conservation Concern in Ireland 2014 –2019") (Balearic Shearwater (*Puffinus mauretanicus*); Curlew (*Numenius arquata*); Dunlin (*Calidris alpina*)) as

well as species identified (from Article 12 (2019) reporting processes) as having undergone notable declines (either long-term or short-term reductions in estimated population size and/or range). These include:

- Knot (*Calidris canutus*) – wintering: short term population decline of 32%
- Grey Plover (*Pluvialis squatarola*) – wintering: short term population decline of 41%
- Curlew (*Numenius arquata*) – wintering: short term population decline of 21%
- Dunlin (*Calidris alpina*) – wintering: short term population decline of 42%
- Ringed Plover (*Charadrius hiaticula*) – breeding: long term range decline of 24%
- Oystercatcher (*Haematopus ostralegus*) – breeding: long term range decline of 9%
- Kittiwake (*Rissa tridactyla*) – breeding: short term population decline of 32%

Many of Ireland's breeding seabirds species are recorded to be relatively stable and/or increasing; included in this cohort are breeding terns (e.g. Roseate Tern (*Sterna dougallii*)*,* estimated short-term population increase of 131%; Little Tern (*Sterna albifrons*)*,* estimated short-term population increase of 125%; and Common Tern (*Sterna hirundo*)*,* estimated short-term population increase of 90%) all of which are subjected to varying amounts of direct conservation actions – it is considered that such actions areas have directly contributed to the recorded increase in numbers at both the site and national levels.

The threats and pressures identified for bird species in this MAES group include:

Expansion of aquaculture; offshore and coastal windfarm development; interactions with fisheries through direct interaction (bycatch) or indirectly through impairing foraging habitat or through competition for prey resource; recreational disturbance; and climate change (increased storms and coastal squeeze). The colonisation of offshore islands by invasive predatory mammals (e.g. Brown Rat (*Rattus norvegicus*)*,* Mink (*Mustela vison*)) are considered to be an on-going pressure and/or a serious threat for several ground or burrow nesting species in particular Manx Shearwater (*Puffinus puffinus*)*;* Storm Petrel (*Hydrobates pelagicus*) and Puffin (*Fratercula arctica*).

Conservation Measures delivered to date

Ireland has an established process for ensuring the implementation of Article 6.2 and 6.3 in relation to aquaculture and fisheries consents. DAFM is the competent authority for aquaculture and fisheries consents. Seven Fisheries Natura Plans have been undertaken for planned fisheries subject to secondary licensing in Natura 2000 sites, which are screened to determine if an AA is required, or appropriately assessed. The Marine Institute has prepared risk assessments for fisheries that are not subject to secondary authorisations. Risk assessments are intended to identify risks that activities may pose to the Natura 2000 sites, i.e. by causing their deterioration or significant levels of disturbance, in order to inform the development of mitigation measures. For aquaculture, appropriate assessments are undertaken on a bay-by-bay basis, as are the Article 6.2 risk assessments for fisheries.

As of July 2020, assessments of aquaculture have been carried out for 34 Natura sites, comprising 27 SACs and 19 SPAs (https://www.agriculture.gov.ie/seafood/aquacultureforeshoremanagement/aquaculturelicensing/). With respect to fisheries, assessments (whether risk assessments, Natura plans or appropriate assessments) have been undertaken in relation to 26 SACs and 23 SPAs (http://www.fishingnet.ie/sea-fisheriesinnaturaareas/).

DAFM will be commencing a second series of Appropriate Assessments in 2021 to take account of new licence applications and, from about 2022 onwards, the renewal of licences issued under the AAs completed previously.

There is a robust regulatory and management regime for seismic exploration in order to avoid potentially significant impacts on all species of marine mammal both within and beyond Natura 2000 sites. "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters" was published in January 2014 and is available to download from http://www.npws.ie/marine/bestpracticeguidelines/.

See E.2.8 in relation to water quality-related measures being delivered under the Water Framework Directive. These are relevant to transitional waters.

In autumn 2019, DHLGH initiated a process aimed at expanding Ireland's network of Marine Protected Areas (MPAs). An advisory group has provided independent expert advice and recommendations on the processes required and the challenges to be addressed in expanding the MPA network. The Department intends to begin developing legislation on the identification, designation and management of MPAs in 2021. An MPA network that expands beyond Natura 2000 will provide more comprehensive protection for marine biodiversity.

An inter-governmental steering group has been recently appointed (September 2020) to consider the development of a National Coastal Change Management Strategy for Ireland. The aim of the strategy is to provide a framework for key decisions to be taken on how Ireland can best manage its coastline and safeguard coastal communities in light of future risks due to rising sea levels and more frequent extreme sea level events. Protected habitats both inside and outside the Natura 2000 network are at risk from coastal change, but also from measures to protect land from coastal erosion. Taking an integrated approach to managing coastal change offers a way to include habitats protected under the Habitats Directive in coastal planning, thereby reducing the risk of inadvertent damage and loss. Resilient coastal habitats also offer nature-based solutions to counter negative impacts of coastal change on communities, and therefore can form part of an integrated adaptation plan.

NPWS and the Environment Protection Agency are co-funding a project entitled "Coastal Lagoons: Ecology and Restoration", which commenced in 2019. It will deliver a final report in 2022. The outcomes of this project will include methods to quantify excessive nutrient inputs and the impacts of lagoon salinity change and flushing rates on the conservation condition of all Irish lagoons. It will also produce a manual outlining a suite of techniques to restore environmentally degraded lagoons.

As mentioned previously, an ongoing tern conservation programme is being delivered at the most important tern colonies on the east and south coasts. Recurring measures include habitat management, provision of nesting boxes, predator control and wardening.

A five-year EU LIFE-funded programme to boost the conservation status of Roseate Tern (*Sterna dougallii*) in north-west Europe commenced in 2016. Under the project, conservation measures are being delivered on Rockabill and Dalkey Islands (Co. Dublin) and Lady's Island Lake (Co. Wexford).

Island biosecurity plans are being developed for important seabird islands, the first being the Skelligs (SPA 004007).

Work is underway on the development of an invasive mammal eradication programme for islands.

Measures needed to maintain or restore favourable conservation status

The list of conservation measures required to address the threats and pressures to each habitat and species, as reported by the Article 17 process, was reviewed and distilled into a single list of measures for this MAES group. Any additional measures identified for bird species were added. The full list is given below. See also Appendix 1, where necessary measures are listed for each habitat and species. It includes measures that are relevant and may be delivered at different scales (from site-level to national).

CODE	CONSERVATION MEASURE NAME
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities
CA13	Reduce/eliminate marine pollution from agricultural activities
CA15	Manage drainage and irrigation operations and infrastructures in agriculture
CC01	Adapt/manage extraction of non-energy resources
CC02	Adapt/manage exploitation of energy resources
CC03	Adapt/manage renewable energy installation, facilities and operation
CC12	Reduce/eliminate noise, light, thermal and other forms of pollution related to resource exploitation and energy production

CE01	Reduce impact of transport operation and infrastructure
CE06	Habitat restoration of areas impacted by transport
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities
CF03	Reduce impact of outdoor sports, leisure and recreational activities
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities
CF05	Reduce/eliminate diffuse pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities
CF07	Reduce/eliminate marine pollution from industrial, commercial, residential and recreational areas and activities
CF08	Reduce/eliminate marine contamination with litter
CF09	Reduce/eliminate noise, light, heat or other forms pollution from industrial, commercial, residential and recreational areas and activities
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development
CF11	Manage water abstraction for public supply and for industrial and commercial use
CG01	Management of professional/commercial fishing (including shellfish and seaweed harvesting)
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants
CG05	Reduce bycatch and incidental killing of non-target species
CG06	Reduce impact of lead poisoning
CG07	Manage changes in coastal conditions for marine aquaculture
CG08	Reduce/eliminate marine pollution from marine aquaculture
CH03	Reduce impact of other specific human actions
CI01	Early detection and rapid eradication of invasive alien species of Union concern
CI02	Management, control or eradication of established invasive alien species of Union concern
CI03	Management, control or eradication of other invasive alien species
CI05	Management of problematic native species
CL01	Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes
CN02	Implement climate change adaptation measures

Prioritization of measures to be implemented during the next MFF period

Ireland is undertaking a significant body of work to meet designation requirements for marine birds. This work includes the ObSERVE programme (Phase I) and ObSERVE (Phase II). It is expected that there will be further SPA designations for birds in the marine between 2021 and 2025.

Ongoing regulatory measures described above and in section E.1.2 will continue to be delivered, reviewed and improved as necessary throughout the next MFF period. Fisheries risk assessments will be updated when new information and data on conservation objectives, status and fishing pressures become available and as methodologies for assessment of risk, to best evaluate the relationships between status and pressures, are improved through ongoing projects. Mitigations to reduce risks, categorised as high and as identified in the current version of the risk assessment reports, will continue to be developed and implemented with key stakeholders.

The rare burrowing worm anemone *Edwardsia delapiae* was originally discovered at Knight's Town within Valentia Harbour/Portmagee Channel SAC (001482). This is the only known site for this species. Recent monitoring surveys have revealed that the preferred substrate of *Edwardsia delapiae* is no longer present at Knight's Town; neither was the species itself found there, although it was located at Beginish Island. Measures will need to be put in place to stem any further sediment changes that could cause further deterioration to the species, its associated community and the site.

It is recognised that measures are required to improve and restore the conservation status of Coastal lagoons. The high intensity pressures identified for lagoons relate to pollution, drainage and other modifications to hydrological functioning. Thus, the main measures relate to improvement of water quality in lagoon catchments and restoration of hydrological processes, including once-off infrastructural measures to manage water regimes as well as ongoing measures to reduce nutrient inputs. Measures to improve water quality will continue to be

delivered through the river basin planning cycles but specific targeted programmes will be required, particularly for the large sedimentary lagoons of the south-east coast.

Ongoing east coast tern conservation programmes will continue. In an effort to increase the security of the range of the relevant species, other sites around the country will be targeted for measures (for example Inner Galway Bay SPA (004031) and Slyne Head to Ardmore Point Islands SPA (004159).

Predator control/eradication are identified as important measures on breeding seabird islands and the strategy currently being developed will continue to be expanded. This will occur in conjunction with the development and implementation of biosecurity protocols.

List of prioritized measures to be carried out, and estimated costs for these measures

- within Natura 2000 sites designated for the targeted habitats and species

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Infrastructure to restore hydrological functioning of lagoons at two SACs	one-off	681ha	€285,800	National/LIFE
Agri-environment scheme for farmed habitats in prioritised lagoon catchments: including measures such as nutrient management, appropriate grazing regimes, setbacks (average annual cost per hectare: €450) for priority catchments	recurring	1,000ha	€450,000	LIFE/EAFRD/ National
Non-productive investment for the improvement of farmed habitats in prioritised lagoon catchments: incl. fencing; drain management measures	one-off		€7,500	LIFE/EAFRD/ National
Measures to restore the *Edwardsia delapiae* community in Valentia Harbour	recurring		€10,000	National
Measures to prevent/halt water pollution/other water-related impacts in transitional waterbody catchments (costs are covered under E.2.8.)	recurring		0	LIFE/National/ ERDF
Mammalian predator eradication measures for breeding seabird islands: incl. survey, bait boxes, trapping, monitoring on priority islands	one-off	3 islands	€21,500	LIFE/National
Biosecurity measures for islands: monitoring	recurring		€5,000	National
Burrowing sea birds conservation programme: stonework etc. repairs and maintenance	recurring		€5,000	National
Tern conservation programme at current sites and 2 in Co. Galway: incl. wardening; provision of next boxes, predator control; monitoring; habitat management	recurring		€100,000	LIFE/National
Tern conservation programme infrastructure and equipment at current sites and 2 in Co. Galway: e.g. warden accommodation; boats; access	one-off		€10,000	LIFE/National

- additional measures beyond Natura 2000 (wider green infrastructure measures)

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Agri-environment scheme for farmed habitats in lagoon catchments: including measures such as nutrient management, appropriate grazing regimes, setbacks	recurring	Included in catchment area above	0	LIFE/EAFRD/ National
Non-productive investment for the improvement of farmed habitats in lagoon catchments: including fencing; drain management measures	one-off	Included in catchment area above	0	LIFE/EAFRD/ National
Measures to prevent/halt water pollution/other water-related impacts in transitional waterbody catchments (costs are covered under E.2.8.)	recurring		0	

* indicate whether the measure is recurring or one-off

Expected results for targeted species and habitat types

Improvements to hydrological conditions will help to improve the functioning of the prioritised lagoons. This, in tandem with the establishment of regimes designed to improve water quality, including agri-environmental schemes and other measures under the Water Framework Directive, will work towards improving the conservation status of this priority habitat.

In relation to aquaculture and fisheries, continuation of the regulatory measures, combined with monitoring and enforcement will ensure that these activities do not have significant negative effects on marine habitats and species.

The establishment of predator eradication measures will improve breeding seabird productivity on selected islands, while ongoing term conservation measures will ensure the maintenance of these populations. Establishing biosecurity protocols will help to ensure islands remain predator-free and early warning systems are in place should incursions occur.

Expected results: other benefits

Regulatory measures that are in place to protect wide ranging marine mammals and birds have benefits outside the Natura 2000 network and positively impact on species beyond those targeted above. The protection of marine communities helps to conserve fish stocks, such as areas used for spawning.

Improving water quality at catchment level has benefits for biodiversity in general as well as for human health.

E.2.2. Heathlands and shrubs

Current status of habitats and species, conservation measures taken until now and their impact so far, remaining pressures and threats

Within this MAES category, Ireland hosts eight habitats listed in Annex I of the Habitats Directive. Two plant species, four invertebrate species and one mammal species are listed in Annex II of that directive. One species in the standard list (1024) is considered to be true heathland species in Ireland. The other species are not considered further in this group.

The following table lists the habitats and species in this group and the numbers of SACs that have been selected for each. The total reported area of each habitat contained in the Natura 2000 network (as a qualifying feature), is also given.

Code	Name	Number of SACs	QI area (ha)
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	2	1
2140	Decalcified fixed dunes with *Empetrum nigrum**	5	188
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)*	11	354
2170	Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae)	12	455
4010	Northern Atlantic wet heaths with *Erica tetralix*	45	46,758
4030	European dry heaths	58	41,602
4060	Alpine and Boreal heaths	35	12,849
5130	*Juniperus communis* formations on heaths or calcareous grasslands	23	3,865
1024	Kerry Slug (*Geomalacus maculosus*)	7	

*priority habitats

Summary statistics for the heathlands and shrubs group:

Number of SACs containing one or more Annex I qualifying habitat	105	106,072
Number of SACs containing one or more Annex II qualifying species	7	
Total number of SACs in the heathlands and shrubs group	**106**	

Annex I habitats

Of the eight habitat types listed in Annex I of the Habitats Directive that occur in Ireland, all depend on active management, including through agricultural management practices (grazing or mowing). All the above habitats are listed as Qualifying Interests in Special Areas of Conservation (SACs) specifically selected for their conservation. Two are listed as "priority habitats" in Annex I of the Habitats Directive

Annex II species

Kerry Slug (*Geomalacus maculosus*) (1024) is the only Annex II species that has been considered in this MAES group in Ireland. While the species has been recorded in a range of habitats including deciduous forest, blanket bog and heath, for simplicity, it is covered only in the Heathlands and shrubs MAES group. However, it could also be described in the Woodlands and forests group and the Bogs, mires, fens and other wetlands group.

Current status of Annex I habitats

The following table shows national conservation status of the eight Annex I habitats listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf for more detail):

Code	Short/common name	2007	2013	2019
1420	Halophilous scrub	Bad	Bad↓	Bad↓
2140	*Empetrum* dunes*	Bad	Inadequate=	Favourable
2150	Dune heath*	Bad	Inadequate=	Inadequate=
2170	Dunes with creeping willow	Inadequate	Inadequate=	Inadequate=
4010	Wet heaths	Bad	Bad=	Bad↓
4030	Dry heaths	Inadequate	Bad=	Bad=
4060	Alpine and subalpine heath	Inadequate	Bad↑	Bad↑
5130	Juniper scrub	Inadequate	Inadequate=	Favourable

Six of these habitats are reported as being in an unfavourable conservation status in the 2019 Article 17 report.

Empetrum dunes (2140) and Juniper scrub (5130) are in Favourable conservation status.

The "structures and functions" criterion for six of the habitat types in this group has been assessed as unfavourable, indicating that additional efforts will be required to optimise their management regime, at least in some of the areas currently covered by these habitats.

Of the four sites assessed for structure and functions for 1420, only 12% check were assessed as Unfavourable. NPWS (2013) reported a loss of area due to anthropogenic impacts during the last reporting period and further losses have occurred in the intervening period.

During the current reporting period, there were no 2150 sites where more than two assessment criteria failed. At Aghleam, 75% of the 2150 area was assigned as having unfavourable Structure and functions due to a scarcity of sand binding species such as *Carex arenaria* and inadequate sand depth (inadequate was defined as sand that was not > 15 cm deep). At Lough Nagreany, 100% of the 2150 area was assigned as having unfavourable Structure & functions due to a scarcity of sand binding species such as *Carex arenaria*. For Brittas Bay, 100% of the 2150 area was assigned unfavourable Structure & functions due to a high incidence of bracken (*Pteridium aquilinum*) throughout the habitat, including a cover score of 45% in one monitoring stop.

During the current reporting period, two sites for 2170 were assessed; no criteria failed at Sheskinmore (SAC 000197) and one criterion failed at Magherabeg (SAC 001766). At Magherabeg, 25% of the 2170 area was assigned as having unfavourable Structure & functions due to a high incidence of *Senecio jacobaea* throughout the habitat, including a cover score of 15% within four of the 12 monitoring stops.

The three heath habitats are assessed as being in bad status, and despite destocking as part of commonage management plans (drawn up by agricultural advisors to ensure that commonages in GLAS are being managed sustainably; they replace commonage framework plans, which had a focus on destocking where it was required) and ongoing GLAS measures, the conservation status of these three habitats has not recovered sufficiently. Pressures and threats include conversion to forestry, wind farm development as well as damage arising from burning and grazing (including undergrazing), both inside and outside Natura 2000.

Current status of Annex II species

The following table shows national conservation status of the single Annex II species listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol3_Species_Article17.pdf for more detail):

Code	Common Name	2007 Overall	2013 Overall	2019 Overall
1024	Kerry Slug	Favourable	Favourable	Favourable

Kerry Slug is in Favourable conservation status and no specific additional measures are required for this species.

Other species

Cladonia subgenus *cladina*, *Lycopodium* group, *Sphagnum* genus and *Leucobryum glaucum* occur on Annex V of the Habitats Directive and are encountered in this MAES group.

Birds

The following table lists the SPA trigger species in this MAES group and the numbers of SPAs that have been selected for each species. Note that habitats in other MAES categories are also important for the species listed.

Species code	Species name		Season[1]	Number of SPAs	Annex I[2]	BoCCI 2013[3]	Other MAES category[4]
A082	Hen Harrier	*Circus cyaneus*	B	6	Annex I	Amber	Woodlands and forests
A082	Hen Harrier	*Circus cyaneus*	W	3	Annex I	Amber	Other agroecosystems (incl. croplands)
A098	Merlin	*Falco columbarius*	B	6	Annex I	Amber	Woodlands and forests
A140	Golden Plover	*Pluvialis apricaria*	B	4	Annex I	Red	

[1] W- wintering; B- breeding; P- passage
[2] Annex I- species listed on Annex I of the Birds Directive
[3] BoCCI- species status on "Birds of Conservation Concern in Ireland" list (Colhoun and Cummins, 2013)
[4] Bird species and SPAs selected for them are not always easily assigned to a single MAES habitat category. This column indicates the second most important habitat group for the species. SPAs may also cover other important habitats not listed here.

Breeding waders, which are on the Irish Birds of Conservation Concern in Ireland ("BoCCI") red-list i.e. Lapwing (*Vanellus vanellus*), Curlew (*Numenius arquata*) and Redshank (*Tringa totanus*), are also regarded as a particular conservation priority. These breeding waders have been dealt with under E.2.4., with the exception of Golden Plover (*Pluvialis apricaria*), which is dealt with in this MAES group. Curlew has been the subject of conservation measures under a nationally funded Curlew Conservation Programme in recent years. This species is dealt with separately in Section E.3.1.

The most notable breeding bird species relevant to this MAES group that have undergone severe long-term breeding range declines are:

- Curlew (*Numenius arquata*) – breeding: long-term range decline of 89%
- Dunlin (*Calidris alpina*) – breeding: long-term range decline of 67%
- Whinchat (*Saxicola rubetra*) – breeding: long-term range decline of 77%
- Ring Ouzel (*Turdus torquatus*) – breeding: long-term range decline of 62%
- Red Grouse (*Lagopus lagopus*) – breeding: long-term range decline of 52%
- Golden Plover (*Pluvialis apricaria*) – breeding: long-term range decline of 42%

Of further concern are the recent short-term declines in the annual population indices of two widespread species that are monitored through the Countryside Bird Survey (CBS) which are:

- Skylark (*Alauda arvensis*) – breeding: short-term decline of 18%; and
- Meadow Pipit (*Anthus pratensis*) – breeding: short-term decline of 21%

These two species can form an important part of the food of birds of prey such as Hen Harrier (*Circus cyaneus*) and Merlin (*Falco columbarius*). Additionally, upland areas with appropriate abundance level of Red Grouse (*Lagopus lagopus*) and Irish Hare (*Lepus timidus*) would be a very positive support for the re-introduced Golden Eagle (*Aquila chrysaetos*).

Although the long term breeding range decline is considered to be relatively moderate (estimated at 16%), the Hen Harrier (*Circus cyaneus*) breeding population has undergone an estimated 27% decline in the SPAs selected for it since 2005. This was somewhat expected due to plantation forest maturation cycles in those SPAs and the reduction in areas of pre-thicket forest cover. For Merlin (*Falco columbarius*), a recent survey indicates that the actual population breeding in those SPAs listed for it is substantially less than what was originally estimated. These species will be dealt with further in another section.

In addition to plantation forestry, the threats and pressures identified for bird species in this MAES group include land abandonment, overgrazing, uncontrolled and widespread burning and persecution. Windfarm development in these areas is widespread and poses a threat to a variety of upland bird species, including the recently reintroduced raptors (Golden Eagle (*Aquila chrysaetos*) and White-tailed Eagle (*Haliaeetus albicilla*)).

Most of the aforementioned species are ground nesting and are vulnerable to predators such as corvids, Fox and Stoat. Ground nesting birds of open heathlands are considered to be at higher risk of predation if they nest in areas with relatively higher levels of habitat edge, which can be caused by the presence of forest cover.

Conservation Measures delivered to date

Measures undertaken for the habitats in this MAES group include agri-environment measures in the national scheme GLAS, which has actions for privately owned Natura lands and for lands owned in commonage (to deliver sustainable grazing).

Commonage areas (hosting upland and coastal habitats and associated species) overlap considerably with Natura 2000 designations. Destocking and grazing management has previously been delivered in Commonage Framework Plans and sustainable grazing measures are now being delivered in GLAS through Commonage Management Plans. Currently 233,356 ha of commonage is being managed in GLAS, a considerable portion of which is in designated land. Arising from the commonage framework planning exercise, sustainable grazing measures were delivered from 2006 to 2013 in SACs in Counties Mayo and Galway. Recovery of habitats was demonstrated in Co. Mayo, with a consequent recovery in Red Grouse numbers.

8,921 farmers are in current GLAS contracts covering 233,356ha in commonage lands. These commonage management plans are not limited to Natura lands, but habitats 4010, 4030 and 4060 are covered under these plans. The focus of these plans is to deliver sustainable grazing. The efficacy of these measures has yet to be demonstrated.

The INTERREG VA Programme is funding the delivery of measures under the heading “Recovery of Protected Habitats & Priority Species, Objective 2.1” in three jurisdictions, including Ireland. While the focus is on wetland habitats, work in the two projects funded under this instrument is also addressing heath habitats. Further details on the INTERREG VA programme is provided in Section E.2.3.

There is a significant and novel commitment under the Irish Rural Development Programme (RDP) 2014-2020 to invest €74 million in national and European priorities (including for nature and biodiversity) via European Innovation Partnerships (EIPs). See https://www.nationalruralnetwork.ie/eip-agri/ for further information on

EIPs. The Hen Harrier Programme and the Pearl Mussel Project are funded under Article 35 of the Irish RDP, with a combined budget of €35m.

This five-year Hen Harrier Programme has a budget of €25m and is targeted specifically at farmers with land designated for the protection of breeding Hen Harrier in the following SPAs: Slieve Beagh, Slieve Bloom Mountains, Slieve Felim to Silvermines Mountains, Slieve Aughty Mountains, Stacks to Mullaghereirk Mountains, West Limerick Hills & Mount Eagle and Mullaghanish to Musheramore Mountains. While the primary focus of the Hen Harrier Project is in the SPA network, it is expected that improved management of the SPAs for Hen Harrier will also have wider benefits for biodiversity, including in the SAC network, and heathland habitat and species, including Curlew, Snipe and Red Grouse. The Hen Harrier Programme currently has 1,578 participants. These farmers manage 40,061 ha of farmland between them. This accounts for 69.4% of the total designated area (SPA designated for breeding Hen Harrier) declared for the Basic Payment Scheme. The land managed by participants includes 34,678 ha of privately owned land and 5,383 ha of commonage.

There are several on-going programmes of culling predatory species and/or translocating protected predatory species in Ireland's upland areas with a view to reducing the risk of predation events on the target conservation bird species.

The Pearl Mussel Project commenced in May 2018 (http://www.pearlmusselproject.ie/). It is also a locally-led European Innovation Partnership (EIP). The six-year project, which has a total budget of €10 million, involves local farmers, species and habitat experts, and agricultural advisors working together to develop and implement a programme to ensure long-term coexistence of farming and Freshwater Pearl Mussel in the top eight priority catchments for the species in seven SACs. While the focus is on the river systems that host Freshwater Pearl Mussel, measures in the wider catchments are delivering sustainable management in heathlands, and will bring benefits to other species that depend on these habitats. The Pearl Mussel project currently has 450 participants (78% of eligible farmers in the catchments). The total area of participating lands is 34,183 ha (21,489 ha of privately owned land, 12,694 ha of commonage), which is 83% of farmland within the eight catchments.

In addition, there were two EIP open calls for access to further funding of €20 million. Additional biodiversity projects have received funding that will deliver conservation measures in a number of areas, including in the uplands (in Wicklow, in the Blackstairs Mountains, in the MacGillycuddy Reeks in Kerry, in Connemara, in Donegal). Many of the projects operate in Natura 2000 sites and it is expected that the outcomes of these projects will inform the design of measures in the next Rural Development period and beyond.

To date very few measures have been implemented in dune heathlands.

Red Grouse (*Lagopus lagopus)* is on the Irish BoCCI red-list and had measures delivered at a local level (e.g. in Boleybrack).

There are measures in the current GLAS scheme that are focussed on birds. These measures are not limited to heathlands and have been described under E.2.4. The uptake of GLAS and GLAS+ for the Hen Harrier measure in the SPAs and other important breeding areas has been high, with 2,617 participants in GLAS contracts, of which 1,506 are in GLAS+. This accounts for c.41,000 ha.

Measures needed to maintain or restore favourable conservation status

The list of conservation measures required to address the threats and pressures to each habitat and species, as reported by the Article 17 process, was reviewed and distilled into a single list of measures for this MAES group. Any additional measures identified for bird species were added. The full list is given below. See also Appendix 1, where necessary measures are listed for each habitat and species. It includes measures that are relevant and may be delivered at different scales (from site-level to national).

CODE	CONSERVATION MEASURE NAME
CA01	Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land
CA02	Restore small landscape features on agricultural land
CA03	Maintain existing extensive agricultural practices and agricultural landscape features
CA04	Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures
CA05	Adapt mowing, grazing and other equivalent agricultural activities
CA06	Stop mowing, grazing and other equivalent agricultural activities
CA07	Recreate Annex I agricultural habitats
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities
CA12	Reduce/eliminate air pollution from agricultural activities
CA15	Manage drainage and irrigation operations and infrastructures in agriculture
CB01	Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation
CB04	Adapt/manage reforestation and forest regeneration
CB05	Adapt/change forest management and exploitation practices
CB06	Stop forest management and exploitation practices
CB08	Restoration of Annex I forest habitats
CB10	Reduce diffuse pollution to surface or ground waters from forestry activities
CC01	Adapt/manage extraction of non-energy resources
CC02	Adapt/manage exploitation of energy resources
CC03	Adapt/manage renewable energy installation, facilities and operation
CC07	Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure
CC08	Manage/reduce/eliminate point pollution to surface or ground waters from resource exploitation and energy production
CC09	Manage/reduce/eliminate diffuse pollution to surface or ground waters from resource exploitation and energy production
CE01	Reduce impact of transport operation and infrastructure
CE06	Habitat restoration of areas impacted by transport
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities
CF03	Reduce impact of outdoor sports, leisure and recreational activities
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development
CF11	Manage water abstraction for public supply and for industrial and commercial use
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants
CH03	Reduce impact of other specific human actions
CI01	Early detection and rapid eradication of invasive alien species of Union concern
CI02	Management, control or eradication of established invasive alien species of Union concern
CI03	Management, control or eradication of other invasive alien species
CI05	Management of problematic native species
CJ03	Restore habitats impacted by multi-purpose hydrological changes
CL01	Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes
CL03	Restore habitats following geological and natural catastrophes
CN02	Implement climate change adaptation measures
CS01	Reinforce populations of species from the directives

A matrix showing the association between the individual features (habitats and species) and this list of conservation measures is provided in Appendix 1.

Prioritization of measures to be implemented during the next MFF period

Conservation measures will be required in all eight habitats to maintain/restore habitat and/or to re-instate a management regime compatible with ecological requirements on areas that are currently subject to abandonment or other inappropriate land uses.

Empetrum dunes (2140) and Juniper scrub (5130) are in Favourable conservation and therefore no specific restoration measures are required for these habitats. Delivery sustainable grazing as part of national agri-environment schemes (AES) is necessary to maintain them.

Measures to address threats and pressures relating to habitats 2150, 2170 and 1420 are not likely to be a significant priority in the MFF period. NPWS (2013) reported a loss of area due to anthropogenic impacts to 1420 during the last reporting period and further losses have occurred in the intervening period, so efforts may be required over small areas of the habitat to improve its conservation status.

There is a need to deliver measures to manage grazing in heaths, including in commonage lands. There are ongoing issues, particularly in relation to land abandonment, the management of undergrazing and overgrazing, and land eligibility (under Basic Payment Schemes). Land clearance, habitat removal and burning need to be managed and regulated, and policies that may unintentionally result in damage to these habitats need to be reviewed. National agri-environmental schemes are required for the habitats and species in this group, and need to improve focus on the conservation objectives of these features. Results-based supports with associated ecological advisory elements could be a very positive incentive in this group and should be considered in the CAP Strategic Plan.

The upland scree and rock-dominated habitats (8110, 8120, 8210, and 8220) also tend to occur in mosaic with habitats included in the heaths category.

Regulatory measures for afforestation and re-forestation need to be further enhanced and implemented, in particular to afford sufficient, robust protection to habitats in undesignated areas and/or species that are not restricted to the Natura 2000 network. DAFM's Land Types for Afforestation procedure (2017) and Environmental Requirements for Afforestation (2016) are significant in this regard, as together they exclude a wide range of sensitive sites and habitats (including non-designated Annex I habitats) from afforestation, and stipulate measures to include existing habitats and undisturbed setback on sites which are deemed eligible. Furthermore, the Felling & Reforestation Policy (2017) provides a range of reforestation options to aid in the restructuring of existing forests, include options for reforestation with native woodland. The policy also clarifies situations where permanent forest removal may be acceptable, on environmental grounds.

Regulatory measures for wind farm development and repowering of existing wind farms need to be enhanced.

The long term approach to maintaining breeding bird populations of open habitats needs to include measures to increase the quality and extent of suitable habitat and this is dependent upon the managed retreat and/or restructuring of forest stands and the rehabilitation and subsequent management of areas of heath and other habitats. Red Grouse (*Lagopus lagopus*), Whinchat (*Saxicola rubetra*), Curlew (*Numenius arquata*), Skylark (*Alauda arvensis*) and Meadow Pipit (*Anthus pratensis*) are not SPA trigger species but they occur in SPAs, SACs and in the wider countryside. Measures for these species will be prioritised in key areas.

The continuance of measures for particular species (e.g. Curlew, Red Grouse, and Hen Harrier) needs to be framed in a national context, and underpinned by a clear policy direction. The Curlew Task Force and the Hen Harrier Threat Response Plan will require ongoing financial support to deliver the conservation measures which they recommend.

List of prioritized measures to be carried out, and estimated costs for these measures

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Agri-environmental scheme for dunes with *Salix repens*, decalcified dunes with ericaceous species and halophilous scrub (1420, 2140, 2150, 2170): extensive grazing, no fertiliser input (average annual cost per hectare: €350)	recurring	100ha	€35,000	EAFRD/National
Agri-environmental scheme for heaths (4010, 4030, 4060): extensive grazing, no fertiliser input (average annual cost per hectare: €350)	recurring	10,000ha	€3,500,000	EAFRD/National
Agri-environmental scheme for heaths (5130): extensive grazing, no fertiliser input (average annual cost per hectare: €350)	recurring	1,000ha	€350,000	EAFRD/National
Non-productive investment for dunes with *Salix repens,* decalcified dunes with ericaceous species and halophilous scrub (1420, 2140, 2150, 2170): Management of scrub, including *Hippophae rhamnoides* (average annual cost per hectare: €200)	one-off	100ha	€2,857	EAFRD/National
Non-productive investment for heaths (4010, 4030, 4060): Exclusion areas to prevent encroachment of livestock (average annual cost per hectare: €400)	one-off	1,000ha	€57,143	EAFRD/National
Non-productive investment for *Juniper* formations (5130): Exclusion areas to prevent encroachment of livestock (average annual cost per hectare: €400)	one-off	150ha	€8,571	EAFRD/National
Non-productive investment for heaths (4010, 4030, 4060): Scrub removal (average annual cost per hectare: €200)	one-off	3,000ha	€85,714	EAFRD/National
Non-productive investment for *Juniper* formations (5130): Scrub removal (average annual cost per hectare: €200)	one-off	200ha	€5,714	EAFRD/National
Agri-environmental scheme for birds (including Red Grouse, Golden Plover, other upland birds) breeding in heathlands where bird species are the priority*:* extensive grazing, low fertiliser input. Curlew is dealt with in E.3.1. and other breeding waders are dealt with in E.2.4. (average annual cost per hectare: €350)	recurring	500ha additional to "heaths" AES	€175,000	EAFRD/National
Agri-environmental scheme for breeding Hen Harrier*:* extensive grazing, low fertiliser input. (average annual cost per hectare: €350)	recurring	25,000ha	€8,750,000	EAFRD/National
Non-productive investment for the restoration of habitat for birds (including Red Grouse, Golden Plover, other upland birds) breeding in heathlands where bird species are the priority*:* creation of scrapes, removal of scrub, predator control. Curlew is dealt with in E.3.1. and other breeding waders are dealt with in E.2.4. (average annual cost per hectare: €400)	one-off	200ha additional to "heaths" NPI	€11,429	EAFRD/National/ LIFE/ERDF
Non-productive investment for the restoration of habitat (breeding and wintering) for Hen Harrier*:* creation of grazing strips, rush management, predator control, retention of stubble etc. (average annual cost per hectare: €400)	one-off	1,000ha	€57,143	EAFRD/National/ LIFE/ERDF
Ongoing cost of the current Hen Harrier Programme (EIP) for 2021-2022 (not paid on a per hectare basis)	recurring	30,000ha	€1,902,711	EAFRD/National
Continuation cost of the Hen Harrier Programme (EIP) from 2023-2027 (not paid on a per hectare basis)	recurring	30,000ha	€4,756,780	EAFRD/National
Agri-environmental scheme for wintering Hen Harrier*:* extensive grazing, low fertiliser input. (average annual cost per hectare: €350)	recurring	500ha	€175,000	EAFRD/National
Forest management measures to improve Hen Harrier habitat as per Hen Harrier Threat Response Plan	recurring	5000ha	€3,064,000	LIFE/ERDF/ National

- additional measures beyond Natura 2000 (wider green infrastructure measures)

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Agri-environmental scheme for heaths (4010, 4030, 4060): extensive grazing, no fertiliser input (average annual cost per hectare: €350)	recurring	2,000ha	€700,000	EAFRD/National
Agri-environmental scheme for heaths (5130): extensive grazing, no fertiliser input (average annual cost per hectare: €350)	recurring	50ha	€17,500	EAFRD/National
Non-productive investment for heaths (4010, 4030, 4060): Scrub removal (average annual cost per hectare: €200)	one-off	100ha	€2,857	EAFRD/National
Non-productive investment for *Juniper* formations (5130): Scrub removal (average annual cost per hectare: €200)	one-off	50ha	€1,429	EAFRD/National
Agri-environmental scheme for birds (including Red Grouse, Golden Plover, other upland birds) breeding in heathlands where bird species are the priority*:* extensive grazing, low fertiliser input. Curlew is dealt with in E.3.1. and other breeding waders are dealt with in E.2.4. (average annual cost per hectare: €350)	recurring	2,000ha additional to "heaths" AES	€700,000	EAFRD/National
Agri-environmental scheme for breeding Hen Harrier*:* extensive grazing, low fertiliser input. (average annual cost per hectare: €350)	recurring	8,000ha	€2,800,000	EAFRD/National
Non-productive investment for the restoration of habitat for birds (including Red Grouse, Golden Plover, and other upland birds) breeding in heathlands where bird species are the priority*:* creation of scrapes, removal of scrub, predator control. Curlew is dealt with in E.3.1. and other breeding waders are dealt with in E.2.4. (average annual cost per hectare: €400)	one-off	50ha additional to "heaths" NPI	€2,857	EAFRD/National/ LIFE/ERDF

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Non-productive investment for the restoration of habitat for Hen Harrier (breeding and wintering): creation of grazing strips, rush management, predator control, retention of stubble etc. (average annual cost per hectare: €400)	one-off	500ha	€28,571	EAFRD/National/ LIFE
Agri-environmental scheme for wintering Hen Harrier: extensive grazing, low fertiliser input. (average annual cost per hectare: €350)	recurring	1,000ha	€350,000	EAFRD/National
Forest management measures (outside of SPAs) to improve Hen Harrier habitat as per Hen Harrier Threat Response Plan	recurring	1,000ha	€612,000	LIFE/National

* indicate whether the measure is recurring or one-off

Expected results for targeted species and habitat types

The implementation of the above conservation measures during the next MFF period is expected, in the long term, to bring about an improving trend in the conservation status of these habitats and species.

Non-productive investments, including scrub removal or control will have increased the area available for these habitats or for species to utilise. This should result in an improving trend for these features. Measures for birds including Red Grouse, Golden Plover and Hen Harrier (breeding and non-breeding) populations, in conjunction with other supporting actions including predator control, will result in increased habitat quality and more stable populations.

Expected results: other benefits

In the context of the Water Framework Directive, the role of upland habitats in the protection and enhancement of water quality is increasingly recognised in national policy, and can also benefit aquatic species such as Freshwater Pearl Mussel, Otter and salmonids.

Healthy habitats in water catchments have a significant function in mitigating the impacts of climate change through flood control and carbon sequestration and storage.

Appropriately managed habitats can stabilise soils and prevent soil erosion.

E.2.3. Bogs, mires, fens and other wetlands

Current status of habitats and species, conservation measures taken until now and their impact so far, remaining pressures and threats

Within this MAES category, Ireland hosts nine habitats listed in Annex I of the Habitats Directive. Four plant species, six invertebrate species and two mammal species are listed in Annex II of that directive. Five species listed in the standard list (1013, 1014, 1016, 1528 and 6216) are considered to be wetland species in Ireland. The other species are not considered further in this group.

The following table lists the habitats and species in this group and the numbers of SACs that have been selected for each. The total reported area of each habitat contained in the Natura 2000 network (as a qualifying feature), is also given.

Code	Name	Number of SACs	QI area (ha)
2190	Humid dune slacks	19	374
7110	Active raised bogs*	55	1,258
7120	Degraded raised bogs still capable of natural regeneration	62	1,181
7130	Blanket bogs (* if active bog)	55	155,103
7140	Transition mires and quaking bogs	20	1,243
7150	Depressions on peat substrates of the Rhynchosporion	63	2,757
7210	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae*	17	1,014
7220	Petrifying springs with tufa formation (Cratoneurion)*	20	1,081
7230	Alkaline fens	39	3,014
1013	*Vertigo geyeri*	14	
1014	*Vertigo angustior*	13	
1016	*Vertigo moulinsiana*	8	
1528	*Saxifraga hirculus*	6	
6216	*Hamatocaulis vernicosus*	9	

Summary statistics for the bogs, mires, fens and other wetlands group:

Number of SACs containing one or more Annex I qualifying habitat	189	167,025
Number of SACs containing one or more Annex II qualifying species	41	
Total number of SACs in the bogs, mires, fens and other wetlands group	**199**	

Annex I habitats

Of the nine MAES wetland habitat types listed in Annex I of the Habitats Directive occurring in Ireland, all depend on active management, including through agricultural management practices (grazing or mowing) in some cases. Four habitats are listed as "priority habitats" in Annex I of the Habitats Directive. All the above habitats are listed as Qualifying Interests in Special Areas of Conservation (SACs) specifically selected for their conservation.

Of the habitats in this MAES group, blanket bog accounts for by far the greatest area. Ireland has 55 SACs for the protection of blanket bog. These include lowland and mountain blanket bog areas, predominantly along the western Atlantic seaboard but also widely distributed in upland areas. Many are extensive and include complexes of other habitats such as dry heath, wet heath, transition mires, fens, petrifying springs, dystrophic lakes, oligotrophic lakes, scree, acid grasslands, rivers and streams. Protected species found include Dunlin (*Calidris alpina*), Golden Plover (*Pluvialis apricaria*), Whooper Swan (*Cygnus cygnus*), Greenland White-fronted Goose (*Anser albifrons flavirostris*), Hen Harrier (*Circus cyaneus*), Merlin (*Falco columbarius*), Lapwing (*Vanellus vanellus*), Redshank (*Tringa totanus*), Red Deer (*Cervus elaphus*), Irish Hare (*Lepus timidus*), Otter (*Lutra lutra*), Freshwater Pearl Mussel (*Margaritifera margaritifera*), Atlantic Salmon (*Salmo salar*) and Marsh Fritillary (*Euphydryas aurinia*).

Annex II species

The following species are considered to fall within this MAES group in an Irish context

- Geyer's Whorl Snail *Vertigo geyeri* (1013)
- Narrow-mouthed Whorl Snail *Vertigo angustior* (1014)
- Desmoulin's Whorl Snail *Vertigo moulinsiana* (1016)
- Marsh Saxifrage *Saxifraga hirculus* (1528)
- Slender Green Feather Moss *Hamatocaulis vernicosus* (6216)

Vertigo geyeri and *Vertigo angustior* (1014) also occur in dune sites, but the measures required in those habitats for these species largely relate to grazing and are covered under the Grassland group. Species described in other MAES groups, e.g. Marsh Fritillary, also occur in the wetlands group.

Current status of Annex I habitats

The following table shows national conservation status of the nine Annex I habitats listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf for more detail):

Code	Short/common name	2007	2013	2019
2190	Dune slacks	Bad	Inadequate↓	Inadequate↓
7110	Raised bog (active)*	Bad	Bad↓	Bad↓
7120	Degraded raised bogs	Bad	Bad↓	Bad↓
7130	Blanket bog (active)*	Inadequate	Bad↓	Bad↓
7140	Transition mires	Bad	Bad x	Bad=
7150	Rhynchosporion depressions	Favourable	Inadequate↓	Bad↓
7210	*Cladium* fens*	Bad	Bad x	Inadequate=
7220	Petrifying springs*	Bad	Inadequate=	Inadequate↓
7230	Alkaline fens	Bad	Bad x	Bad↓

The "Structures and functions" criterion for all nine habitat types has been assessed as being unfavourable, indicating that additional efforts will be required to optimise their management regimes, at least in some of the areas currently covered by these habitats.

Blanket bog habitat in Ireland once covered an estimated area of 773,640ha. Centuries of peat cutting, reclamation, burning, drainage, spread of invasive species and, in recent decades, afforestation, overgrazing/undergrazing, recreation and infrastructural developments have depleted the area of healthy blanket bog. The 2019 national conservation status assessment for 7130 reported its conservation status as unfavourable Bad-Declining.

While considerable resources have been committed to reducing negative impacts on, and restoring, active raised bog, its status is still reported as unfavourable bad. This is due to the length of time it takes for the positive effects of restoration measures to become evident; ongoing issues include drainage, the impacts of air pollution and climate change. Fen habitats are assessed as either inadequate or bad.

For Dune Slacks (2190), no pressures were identified as being of high impact during the last assessment period. 'Walking', 'trampling', 'off-road driving', 'golf courses' and 'drainage' were common medium pressures in this habitat. 'Succession to scrub' at three sites was the third most frequently recorded pressure and could also be linked to the drying-out of dune slacks. A large stand of the alien invasive species *Hippophae rhamnoides* was causing an area of dune slack within the Tralee Bay and Magharees Peninsula, West to Cloghane SAC (site code 002070) to dry out, resulting in a loss of 4.8ha of 2190 habitat.

Current status of Annex II species

The following table shows national conservation status of the four Annex II species listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol3_Species_Article17.pdf for more detail):

Code	Common Name	2007 Overall	2013 Overall	2019 Overall
1013	Geyer's Whorl Snail	Inadequate	Inadequate↓	Bad↓
1014	Narrow-mouthed Whorl Snail	Inadequate	Inadequate↓	Inadequate↓
1016	Desmoulin's Whorl Snail	Bad	Inadequate↓	Inadequate↓
1528	Marsh Saxifrage	Favourable	Favourable	Favourable
6216	Slender Green Feather Moss	Favourable	Favourable	Favourable

Other species

Cladonia subgenus *cladina*, *Lycopodium* group, *Sphagnum* genus and *Leucobryum glaucum* occur on Annex V of the Habitats Directive and occur on in this MAES group.

Birds

The following table lists the SPA trigger species in this MAES group and the numbers of SPAs that have been selected for each species. Note that habitats in other MAES categories may also be important for the species listed. The number of SPAs selected for wetlands in this category is also indicated.

Species code	Species name		Season[1]	Number of SPAs	Annex I[2]	BoCCI 2013[3]	Other MAES category[4]
A001	Red-throated Diver	*Gavia stellata*	B	1	Annex I	Amber	
A182	Common Gull	*Larus canus*	B	14		Amber	Marine and coastal waters
	Wetlands[5]			7			

[1] W- wintering; B- breeding; P- passage
[2] Annex I- species listed on Annex I of the Birds Directive
[3] BoCCI- species status on "Birds of Conservation Concern in Ireland" list (Colhoun and Cummins, 2013)
[4] Bird species and SPAs selected for them are not always easily assigned to a single MAES habitat category. This column indicates the second most important habitat group for the species. SPAs may also cover other important habitats not listed here.
[5] This row indicates the number of SPAs in this MAES category where the presence of wetlands has contributed to their selection as SPAs

In addition to the species listed above, over 50 species of waterbird migrate to Ireland on passage or to spend the entire winter here. They seek out the relatively undisturbed wetland areas for ice-free feeding conditions and for safe roosting opportunities. These species are listed in the tables under sections 2.1 or 2.8 as they principally use coastal waters or freshwater habitats. In some cases significant proportions of the biogeographic populations of waterbird species overwinter here (e.g. Black-tailed Godwit (*Limosa limosa*), Whooper Swan (*Cygnus cygnus*), Greenland White-fronted Goose (*Anser albifrons flavirostris*)).

Ireland's wetlands hold rare and vulnerable breeding waterbird species such as Red-throated Diver (*Gavia stellata*), as well as more common and widespread species some of which have undergone significant breeding range declines:

- Coot (*Fulica atra*) – Breeding: range decline of 38%
- Common Moorhen (*Galinula chloropus*) – Breeding: range decline of 20%

- Teal (*Anas crecca*) – Breeding: range decline of 43%
- Common Snipe (*Gallinago gallinago*) – Breeding: range decline of 32%
- Red Grouse (*Lagopus lagopus*) –Breeding: range decline of 52%

Habitats included in this MAES groups provide roosting opportunities for raptor species as well as providing prey for them, including Golden Eagle (*Aquila chrysaetos*), White-tailed Eagle (*Haliaeetus albicilla*), Hen Harrier (*Circus cyaneus*) and Merlin (*Falco columbarius*) throughout the year.

Significant areas of these habitats have been subjected to peat harvesting, drainage and afforestation which has resulted in direct habitat loss as well as (particularly with regard to the latter) leading to an increase in predator pressures on these ground nesting birds. Recreational disturbance and inappropriate wind farm development are further threats to the avifauna of these wetland habitats.

Under the Agreement on the Conservation of African-Eurasian Migratory Waterbirds, of which Ireland is a signatory, the phasing out of lead shot over wetlands is an agreed commitment. The ingestion of spent lead shot by waterbirds can cause both lethal and sub-lethal effects. Incidents of waterbird poisoning caused by the ingestion of lead shot on more terrestrial habitats have been reported in Ireland. Secondary lead poisoning is also a threat to birds of prey that ingest lead via the species they prey upon; this is of particular relevance to species that scavenge upon shot animals. The European Commission has published a draft Regulation on banning the use of lead in gunshot in and around wetlands which is currently under discussion by Member States. Measures required and forecasting of associated costs will be undertaken when the Regulations are finalised.

The majority of Ireland's bird species that are listed on the Open Seasons Order are either waterbirds or occur over bog and heath habitats. The precise impacts of hunting on these species are poorly known. The efficacy of Ireland's network of wildfowl sanctuaries as a mitigation tool is also poorly understood.

Several areas with large expanses of blanket bog have been designated as SPAs for the conservation of breeding Merlin, Golden Plover and Dunlin, all of which are listed on Annex I of the Birds Directive. Red Grouse, a red-listed species, is characteristic of blanket bog and associated habitats. Breeding Curlew, another red-listed species, has been traditionally associated with blanket bog habitats. Curlew is dealt with separately under E3.1.

Conservation Measures delivered to date

As mentioned in section E.1.1, Ireland published the "National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017–2022" (NPWS, 2017) in December 2017. This sets out a roadmap for the restoration and conservation of raised bog SACs in Ireland. Within this plan, a programme of conservation measures for the first cycle of the Plan (2017-2022) is outlined and it includes a commitment for protection and restoration activities within all raised bog SACs and the new network of Natural Heritage Areas for Ireland. A significant part of the programme is to restore active raised bog through implementation of best practice restoration techniques within the designated raised bog network. The Plan sets an overall target of achieving 3747 ha of active raised bog within the network of SACs and NHAs. The measures fall into two broad categories: preventative measures including control of activities such as drainage and turf-cutting and active intervention measures including removal of forest stands, drain blocking and bund construction on the high bog and cutover bog. This restoration programme is underway. Under the EU LIFE Living Bog project (http://raisedbogs.ie/), which commenced in 2016 and will conclude at the end of 2020, restoration measures are being undertaken on raised bogs in 12 SACs. In tandem with the LIFE project NPWS is undertaking restoration works on State-owned lands within the designated raised bog network using exchequer funding. €5 million was allocated to raised bog restoration work in the 2020 Budget.

A pilot national survey of Annex I fen habitats will conclude in October 2020, which will provide an evidence base for identifying and implementing necessary conservation measures.

Care-Peat is an INTERREG project (running from 2019-2022) with nine partners working together to reduce carbon emissions and restore the carbon storage capacity of different types of peatlands in north-west Europe.

The main partnership consists of five knowledge institutes and four nature organisations from Belgium, France, Ireland, the Netherlands and the United Kingdom. The project is developing and testing new techniques and socio-economic strategies for carbon reduction. In Ireland, greenhouse gas research is being undertaken on two raised bogs that will have restoration measures implemented in 2020, namely All Saints Bog SAC and Cloncrow Bog NHA.

The INTERREG VA Programme is funding the delivery of measures under the heading "Recovery of Protected Habitats & Priority Species, Objective 2.1" in three jurisdictions, including Ireland. €11m of European Regional Development Funds, which is further supported by national contributions, is currently being provided to promote cross-border co-operation to facilitate the recovery of selected protected wetland habitats and species. The output indicators are to achieve improved conservation condition in 4,500ha and to deliver 25 conservation action plans. In Ireland this is being delivered in the border counties of Monaghan, Leitrim, Cavan, Louth, Sligo and Donegal. Two projects have received funding and these are described in more detail below.

Co-operation across Borders for Biodiversity (CABB) comprises six partner organisations and is operating from January 2017 to December 2021. The total project budget is €4.945 million, and eight conservation action plans (three in Ireland) will be delivered in nine SACs (four in Ireland). Of the 2,228 ha of direct conservation action, 1,349 ha will be delivered in Ireland in the Ox Mountains Bog SAC (002006) and in Dunragh Loughs/Pettigo Plateau SAC (001125). The primary focus is on blanket bog habitat restoration, but there will be additional species work, including for marsh fritillary and breeding waders (Curlew, Lapwing, Redshank and Snipe) on machair and coastal wet grassland sites as well as blanket bog.

Collaborative Action for the Natura Network (CANN) is focusing on seven protected wetland habitats (including blanket bogs and heaths) and seven species, including marsh fritillary, freshwater species such as white-clawed crayfish and breeding wader species. The total project budget is circa €11m and 29 conservation action plans will be delivered. In Ireland conservation efforts will be delivered in Eshbrack NHA (and Slieve Beagh SPA (004167)), Kilroosky Lough Cluster SAC (001786) and Cuilcagh-Anierin Uplands SAC (000584).

The Wild Atlantic Nature project will deliver practical concrete conservation actions in respect of a large proportion of Ireland's blanket bog Natura network and associated habitats and species. This comprises complexes of habitats and species dominated by blanket bog in both lowlands and uplands, interspersed with heath, fen, grassland and aquatic habitats and supporting species also listed for protection under the Habitats and Birds Directives. It is currently being evaluated by the EU and if the application is successful it will operate from 2020-2028.

Measures needed to maintain or restore favourable conservation status

The list of conservation measures required to address the threats and pressures to each habitat and species, as reported by the Article 17 process, was reviewed and distilled into a single list of measures for this MAES group. Any additional measures identified for bird species were added. The full list is given below. See also Appendix 1, where necessary measures are listed for each habitat and species. It includes measures that are relevant and may be delivered at different scales (from site-level to national).

CODE	CONSERVATION MEASURE NAME
CA01	Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land
CA02	Restore small landscape features on agricultural land
CA03	Maintain existing extensive agricultural practices and agricultural landscape features
CA04	Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures
CA05	Adapt mowing, grazing and other equivalent agricultural activities
CA06	Stop mowing, grazing and other equivalent agricultural activities
CA07	Recreate Annex I agricultural habitats
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities

CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities
CA12	Reduce/eliminate air pollution from agricultural activities
CA15	Manage drainage and irrigation operations and infrastructures in agriculture
CB01	Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation
CB04	Adapt/manage reforestation and forest regeneration
CB05	Adapt/change forest management and exploitation practices
CB06	Stop forest management and exploitation practices
CB08	Restoration of Annex I forest habitats
CB10	Reduce diffuse pollution to surface or ground waters from forestry activities
CB14	Manage drainage and irrigation operations and infrastructures
CC01	Adapt/manage extraction of non-energy resources
CC02	Adapt/manage exploitation of energy resources
CC03	Adapt/manage renewable energy installation, facilities and operation
CC04	Reduce impact of hydropower operation and infrastructure
CC07	Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure
CC08	Manage/reduce/eliminate point pollution to surface or ground waters from resource exploitation and energy production
CC09	Manage/reduce/eliminate diffuse pollution to surface or ground waters from resource exploitation and energy production
CC10	Manage/reduce/eliminate air pollution from resource exploitation and energy production
CC13	Manage water abstraction for resource extraction and energy production
CE01	Reduce impact of transport operation and infrastructure
CE02	Manage/reduce/eliminate pollution to surface or ground water from transport
CE06	Habitat restoration of areas impacted by transport
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities
CF03	Reduce impact of outdoor sports, leisure and recreational activities
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities
CF05	Reduce/eliminate diffuse pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities
CF06	Reduce/eliminate air pollution from industrial, commercial, residential and recreational areas and activities
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development
CF11	Manage water abstraction for public supply and for industrial and commercial use
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants
CG06	Reduce impact of lead poisoning
CG10	Manage water abstraction and modifications of hydrological conditions for freshwater aquaculture
CG14	Other measures to reduce impacts of freshwater aquaculture infrastructures and operation
CH03	Reduce impact of other specific human actions
CI01	Early detection and rapid eradication of invasive alien species of Union concern
CI02	Management, control or eradication of established invasive alien species of Union concern
CI03	Management, control or eradication of other invasive alien species
CI05	Management of problematic native species
CJ03	Restore habitats impacted by multi-purpose hydrological changes
CL01	Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes
CL03	Restore habitats following geological and natural catastrophes
CN02	Implement climate change adaptation measures
CS01	Reinforce populations of species from the directives

Prioritization of measures to be implemented during the next MFF period

The Wild Atlantic Nature project provides a summary of the priorities for the period 2021-2017 for blanket bogs and associated habitats. Of particular note are the following (relevant associated measures have been listed in E.1. horizontal measures):

- To secure the support of landowners, land users and other local stakeholders for the preparation of management plans to deal with the multiple threats facing these sites including peat extraction, reclamation, overgrazing/undergrazing, burning, afforestation, recreation and some infrastructural development;
- To undertake surveys of selected blanket bog SACs to assess the current conservation condition
- To carry out baseline site ground surveys to identify specific optimal restoration areas
- To raise water levels by drain blocking with peat/plastic dams on the identified restoration areas of selected project sites to create the necessary conditions for active blanket bog
- To remove planted and naturally regenerating trees and shrubs
- To control invasive species (particularly *Rhododendron ponticum*);
- To improve fire prevention and management on project sites
- To fence key areas of project sites
- To remove inappropriate fencing from limited areas of project sites
- To control grazing on project sites by appropriate means

The above measures will be delivered in 24 SACs whose total area is 225,552 ha. The area of blanket bog within these sites is estimated to be 114, 136 ha.

Coillte will submit an application for LIFE funding to help address the management of forests on peatlands in four forest properties along the western seaboard in 2021. Objectives of the project include forest redesign of riparian zones, forest redesign with partial restocking with native scrub and/or restructuring lodgepole pine, blanket bog restoration, assessment of the effects of management options on carbon fluxes. The four forest properties within the project are all surrounded or adjacent to SACs.

For raised bogs, the priorities for the period 2021-2027 will focus on improving Annex I raised bog habitats (7110, and 7120 and 7150) and associated species through the implementation of measures to restore hydrology and other conservation management measures (. This will be achieved through the implementation of the restoration plans for the 53 raised bog SACs coupled with on-going preventative measures including monitoring of sites, providing alternatives to turf cutting and public engagement programmes.

An extensive rehabilitation programme is planned for 32-35,000ha of peatlands owned by the semi-state company, Bord na Móna, which was previously harvested for peat used as fuel for the purposes of electricity generation.

In respect of Annex I fen habitats the completion of the National Fen Survey will allow an accurate picture of what conservation measures are require at a national and site level. However, research and survey work so far has identified land management (grazing and drainage) as the primary issues to be addressed. There is sufficient information at two sites to advance conservation measures in the near-medium future. Thus, implementation of management measures at several fen sites (including Pollardstown Fen and Tory Hill fen) will commence.

The pressures on many of Ireland's ground nesting birds of wetland and associated habitats are now considered to be severe. Significant declines in range and abundances of various species are evident ultimately caused by habitat loss and degradation; and exacerbated by predators both native and invasive. The strategic identification and long-term sustainable management of key sites where several priority species overlap is now required.

List of prioritized measures to be carried out, and estimated costs for these measures

- within Natura 2000 sites designated for the targeted habitats and species

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Agri-environmental scheme for blanket bog (7130), transition mires (7140) and Rhynchosporion depressions (7150): extensive grazing, no fertiliser input (average annual cost per hectare: €350)	recurring	3500ha	1,225,000	EAFRD/National
Non-productive investment for blanket bog (7130), transition mires (7140) and Rhynchosporion depressions (7150): Exclusion areas to prevent encroachment of livestock (average annual cost per hectare: €400)	one-off	350ha	20,000	EAFRD/National
Non-productive investment for the restoration of dune slack habitat (2190): removal of scrub (*Hippophae rhamnoides)* *average annual cost per hectare: €200)	one-off	10ha	€286	National
Strategic land purchase and compensation payments in blanket bog (WAN IP)	one-off	1300ha purchased/ compensation payments in 620ha	€318,910	LIFE/National
Pilot implementation of knowledge exchange discussion groups for upland sheep farmers in blanket bog (WAN IP)	recurring	Knowledge exchange in IP sites	€7,107	LIFE/National
Pilot implementation of Results Based Agri-environmental Payments Schemes in blanket bog (WAN IP)	recurring	Some of the IP sites	€453,936	LIFE/National
Selected fencing removal / installation in blanket bog (WAN IP)	one-off	24km of fencing will have been erected/removed	€21,162	LIFE/National
Plantation tree felling to recycle and wind-rowing in blanket bog (WAN IP)	one-off		€84,653	LIFE/National
Install and maintain dams in blanket bog (WAN IP)	one-off	up to 2,500ha	€159,238	LIFE/National
Control natural regeneration of trees and shrubs in blanket bog (WAN IP)	one-off	In all 24 IP sites	€36,631	LIFE/National
Control invasive species, especially rhododendron in blanket bog (WAN IP)	one-off	60ha	€36,059	LIFE/National
Pilot implementation of non-commercial re-stocking with native tree species in blanket bog (WAN IP)	one-off	42.9ha	€23,988	LIFE/National
LIFE IP monitoring (WAN IP)	recurring	In all 24 IP sites	€122,594	LIFE/National
LIFE IP habitat, ownership and other surveys (WAN IP)	recurring	In all 24 IP sites	€175,112	LIFE/National
LIFE IP project implementation and staffing (WAN IP)	recurring	In all 24 IP sites	€461,286	LIFE/National
Rehabilitation of cutaway blanket bogs outside of LIFE IP area for *Vertigo* spp	one-off		€10,000	National
Invasive species measures on blanket bog and associated habitats	one-off	1,000ha	€600,983	National
Site restoration, including hydrological works at inland wetland/fen sites for *Vertigo geyeri* and *Vertigo angustior*	one-off		€10,000	National
Payment of compensation to domestic turf cutters affected by cessation of turf cutting on raised bog SACs and relocation of turf cutters to non-designated sites (Various sites in raised bog network €1,500 annually to turf cutter maximum 15 years)	recurring		€5,730,000	National
Restoration and management measures on raised bogs in the SAC network	one-off		€4,664,285	LIFE/ERDF/ National/ Private/NCFF
Raised bog restoration measures (on 6 SACs) as part of Eden IP (including compensation and land ownership investigation)	one-off		€531,428	LIFE/National
Management measures and stakeholder engagement at a number of fen sites	recurring		€200,000	National

- additional measures beyond Natura 2000 (wider green infrastructure measures)

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Agri-environmental scheme for blanket bog (7130), transition mires (7140) and Rhynchosporion depressions (7150): extensive grazing, no fertiliser input (average annual cost per hectare: €350)	recurring	7,000ha	€2,450,000	EAFRD/National
Non-productive investment for blanket bog (7130), transition mires (7140) and Rhynchosporion depressions (7150): Exclusion areas to prevent encroachment of livestock (average annual cost per hectare: €400)	one-off	700ha	€40,000	EAFRD/National
Implementation of restoration plans for prioritised raised bog Natural Heritage Areas	one-off		€642,800	ERDF/National
Rehabilitation measures on peatland previously industrially harvested for peat	one-off	32-35,000ha	€12,285,714	National
Measures to address the management of forests on peatlands	one-off		€957,143	LIFE/National
Measures relating to the rewetting of peat soils	recurring	40,000ha	€5,714,285	National

* indicate whether the measure is recurring or one-off

Expected results for targeted species and habitat types

The LIFE IP aims to improve the conservation status of blanket bog habitat in Ireland, positively affecting about 70% of the blanket bog SAC network which also contains many other Annex I habitats and habitats of Annex II species and important bird species. Benefits to other priorities include the conservation of Freshwater Pearl Mussel, Atlantic salmon, uplands management and conservation of some bird species which are in decline including Curlew and Red Grouse.

Through the redesign and appropriated management of the four forest properties on peatland, Coillte intend to make a significant contribution to the conservation of blanket bog and other associated habitats and species (including wet heath, transition mires, dystrophic lakes, oligotrophic lakes, rivers and streams and associated species, primarily Golden Plover, Greenland White-fronted Goose, Otter, Freshwater Pearl Mussel and Atlantic Salmon).

For the raised bog network, lands purchased/leased or the State entering in agreements with landowners, together with a compensation scheme in place, will enable clear access to the raised bog network to allow conservation actions to take place on selected restoration areas within the protected raised bog network. Drain blocking will allow areas with the right topographical and hydrological conditions to develop active raised bog vegetation.

Rehabilitation of extensive areas of previously exploited peatlands by Bord na Móna will result in complexes of wetland habitats, a proportion of which will develop into Habitats Directive Annex I habitats in the medium to long term (10-30 years) including raised bog, alkaline fen, transition mires, bog woodland and a host of other habitats types, especially shallow water bodies, heath habitats and birch-dominated woodland (that will progress to native woodland in the long term). These areas will form a network of large, discrete areas of high conservation value which will also deliver climate change mitigation benefits.

Expected results: other benefits

Improvement in the conservation status of features in this group will also reduce the vulnerability and increase the resilience of semi-natural systems to predicted climate change effects, and provide elements of mitigation against Greenhouse Gas emissions and climate change.

Once the degraded peatlands have been restored to active bogs, they will become carbon sinks, sequestering carbon from the atmosphere into vegetation which will eventually become peat. Successful rehabilitation of degraded blanket bog will also serve to protect the immense carbon stores that reside in the peat layers that have taken thousands of years to accumulate. Restoration will reverse the current process where degraded blanket and raised bog, a carbon source, is releasing stored carbon into the atmosphere. This can be exacerbated by burning of bog where fires burn into the peat or where peat formation is retarded by burning of the bog vegetation.

In summary, by drain-blocking, conifer-removal, reducing of stock levels to within the correct carrying-capacity, controlling peat-cutting, controlling the extent, intensity and frequency of burning, arresting erosion, and appropriate control of infrastructural development, the proposed IP and raised bog restoration programme aims to rehabilitate and restore an extensive area of degraded peatland, which is a carbon source, to active peat-forming bog, which is a carbon sink. In addition, by reducing peat erosion the carbon store within under-lying peat layers will be protected.

The restoration of peatland hydrological regimes will also improve water retention and slow the release of floodwaters into streams and rivers. Peatland restoration will bring back water related ecosystem services and will also help Ireland meet different regulatory targets such as the Water Framework Directive.

Large conservation projects such as Wild Atlantic Nature IP and Eden IP will have community benefits through local investment, providing employment opportunities and, where appropriate, scope for encouraging visitor and education facilities.

E.2.4. Grasslands

Current status of habitats and species, conservation measures taken until now and their impact so far, remaining pressures and threats

Within this MAES category, Ireland hosts ten habitats listed in Annex I of the Habitats Directive. Two plant species, four invertebrate species and two mammal species in this MAES group are listed in Annex II of that directive. Of this, two species (1065 and 1395) are considered to be true grassland species in Ireland and are described below. The other species are not considered further in this group.

The following table lists the habitats and species in this group and the numbers of SACs that have been selected for each. The total reported area of each habitat contained in the Natura 2000 network (as a qualifying feature), is also given.

Code	Name	Number of SACs	QI area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	40	2,342
1410	Mediterranean salt meadows (Juncetalia maritimi)	34	824
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")*	45	5,752
21A0	Machair (* in Ireland)	22	2,343
6130	Calaminarian grasslands of the Violetalia calaminariae	5	9
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	38	3,370
6230	Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)*	12	598
6410	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	17	3,047
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	6	207
6510	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)	11	950
1065	Marsh Fritillary (*Euphydryas aurinia*)	12	
1395	Petalwort (*Petalophyllum ralfsii*)	21	
Summary statistics for the grasslands group:			
Number of SACs containing one or more Annex I qualifying habitat		124	19,442
Number of SACs containing one or more Annex II qualifying species		29	
Total number of SACs in the grasslands group		**125**	

Natterjack Toad (*Epidalea calamita*) (1202) is listed on Annex IV of the Habitats Directive and is also discussed under this heading.

Annex I habitats

Of the ten MAES grassland habitat types listed in Annex I of the Habitats Directive that occur in Ireland, all depend on active management, including through agricultural management practices (grazing or mowing). Four habitats are listed as “priority habitats” in Annex I of the Habitats Directive. All the above habitats are listed as Qualifying Interests in Special Areas of Conservation (SACs) specifically selected for their conservation.

Annex II species

The following species are considered to fall within this MAES group in an Irish context

- Marsh Fritillary (*Euphydryas aurinia*) (1065)
- Petalwort (*Petalophyllum ralfsii*) (1395)

Marsh Fritillary colonies have been recorded on unimproved wet, neutral or calcareous grasslands, sand dunes, fens, cutover raised bogs, blanket bogs, wet heaths and calcareous and coastal heaths. For simplicity, the species is covered only in the grassland MAES group, but measures supporting the species will also be delivered in other MAES groups.

Current status of Annex I habitats

The following table shows national conservation status of the nine Annex I habitats listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf for more detail):

Code	Short/common name	2007	2013	2019
1330	Atlantic salt meadows	Inadequate	Inadequate=	Inadequate↓
1410	Mediterranean salt meadows	Inadequate	Inadequate=	Inadequate↓
2130	Fixed dunes (grey dunes)*	Bad	Bad=	Bad↓
21A0	Machair*	Bad	Bad=	Inadequate=
6130	Calaminarian grasslands	Inadequate	Inadequate=	Inadequate↓
6210	Orchid-rich calcareous grassland*	Bad	Bad=	Bad↓
6230	Species-rich *Nardus* grassland*	Bad	Bad↓	Bad=
6410	*Molinia* meadows	Bad	Bad↓	Bad↓
6430	Hydrophilous tall herb	Inadequate	Bad=	Bad↓
6510	Hay meadows	Bad	Bad=	Bad↓

The structures and functions criterion for nine of the habitat types (with the exception of 1410) has been assessed as being unfavourable, indicating that additional efforts will be required to optimise their management, at least in some of the areas currently covered by these habitats. Conservation measures will be required in all ten habitats to restore habitat and/or to re-instate a management regime compatible with ecological requirements on areas that are currently subject to abandonment or other inappropriate land uses. This will be necessary to address ongoing declines in conservation status in eight of the ten habitats.

During the current reporting period 91 sites containing Atlantic salt meadows (code 1330) were visited and represent 51% of the total area of 1330 habitat recorded in Ireland. Intensive livestock grazing (A09) was the most frequently recorded pressure, being noted at 78% of sites, and was classed as high intensity on 40 occasions. Paths, tracks, cycling track was considered to include paths created by recreational activities, such walking and use of off-road bikes and is considered to be of high intensity. Invasive non-native species continues to be ranked as a medium pressure and relates to *Spartina anglica*. Pressures relating to infilling, reclamation, embankments, etc., for agriculture or other reasons were recorded in >20% of the sites.

During the current reporting period 81 sites containing Mediterranean salt meadows (1410) were visited, representing 42% of the total area of 1410 habitat recorded in Ireland. Intensive grazing was recorded as a high pressure during the current monitoring period. This was the most frequently recorded pressure, being noted at 40 sites, usually as high or medium intensity, and affecting on average >25% of the habitat. Infilling, reclamation, construction and repair of embankments for agriculture was recorded as a high pressure at three sites. Extensive grazing or undergrazing by livestock was assessed as being of medium importance despite only occurring at one site. This was due to the fact that it accounted for 73% (11.3ha) of the area loss of 1410 recorded. This area of 1410 has been transformed to *Phragmites australis* swamp due to a reduction in, or cessation of, grazing at the site.

The data collected during the most recent reporting period for fixed dunes (code 2130) indicated that the most frequent criteria to fail the assessments were disturbance, sward height, non-native species and lack of positive indicator species. The largest pressures related to undergrazing and problems relating to invasive alien species.

The data collected during the recent national survey for Machair (21A0) indicated that habitat assessments were failing most frequently due to sward height and percentage of bare ground. The largest pressures related to overgrazing and loss of habitats due to intensification or conversion into another land use.

The results from a recent survey show that Calaminarian grassland (6130) is undergoing a continuing decline, as the toxicity of the spoil exposed by mining activities decreases over time. This is leading to succession to other habitats, particularly scrub, heath and acid grassland, and the loss of 6130 habitat and populations of the species that require this habitat to survive. As most old mine sites are considered to be marginal land, human activities are also impacting this habitat, with pollution, land reclamation and recreational and agricultural activities negatively impacting many sites. Of the 29 sites, nine were as assessed as being in Favourable condition, 13 were as assessed as being in Unfavourable-inadequate condition and seven were as assessed as being in Unfavourable-bad condition.

The data collected during the recent national survey for Orchid-rich calcareous grassland (6210) indicated that habitat loss is the largest pressure, with 31% of the surveyed area reported lost due to pressures such as agricultural intensification.

Data collected during the current reporting period for Species-rich *Nardus* grassland (6230) indicated that problematic native plants and animals and natural succession resulting in species composition change were the greatest pressures on this habitat.

The data collected during the recent national survey for *Molinia* meadows (6410) indicated that habitat degradation, through pressures such as abandonment, agricultural intensification, and forestry, is the biggest threat to the conservation of this habitat.

The data collected during the recent national survey for Hay meadows (6510) habitat indicated that it is a habitat that is threatened, with 28% of the surveyed area reported lost and a significant decline in the number of sites with Favourable Structure and functions. Pressures such as agricultural intensification and the application of natural fertilisers, such as slurry, are the largest threats to the conservation of the 6510 habitat.

Data collected during the current reporting period for Hydrophilous tall herb (6430) indicated that overgrazing by livestock, drainage and invasive alien species are the biggest current pressure on this habitat.

Current status of Annex II species

The following table shows national conservation status of the four Annex II species listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol3_Species_Article17.pdf for more detail):

Code	Common Name	2007 Overall	2013 Overall	2019 Overall
1065	Marsh Fritillary	Inadequate	Inadequate↓	Inadequate↑
1395	Petalwort	Favourable	Favourable	Favourable

Petalwort has a favourable assessment in the 2019 Article 17 report, with an overall stable trend, but conservation measures will be required to ensure that favourable management conditions are delivered for this species.

Marsh Fritillary has been assessed as unfavourable and additional measures will be required to ensure that suitable habitats are created and maintained for this species, despite the improving status. Sites may be grazed but many appear unmanaged or only subject to occasional management. Marsh Fritillary sites are often found in marginal areas (e.g. upland areas and the edges of wetlands and peatlands) that are not designated. These lands are subject to pressures from agricultural conversion and afforestation. These threats and pressures can

occur anywhere in the range and therefore have been ranked as High. However there are also issues in wetland sites particularly where management ceases and vegetation becomes unsuitable through natural succession.

Other species

Natterjack Toad (*Epidalea calamita*) (1202) is listed on Annex IV of the Habitats Directive. Natterjack Toad is found within four SACs (000343, 000370, 002070 and 002158) in the south west of Ireland. While the status of the species is improving, ongoing conservation measures are required to ensure that this trend continues.

Birds

The following table lists the SPA trigger species in this MAES group and the numbers of SPAs that have been selected for each species. Note that habitats in other MAES categories may also be important for the species listed. The number of SPAs selected for wetlands in this category is also indicated.

Species code	Species name		Season[1]	Number of SPAs	Annex I[2]	BoCCI 2013[3]	Other MAES category[4]
A122	Corncrake	*Crex crex*	B	10	Annex I	Red	Other agroecosystems (incl. croplands)
A346	Chough	*Pyrrhocorax pyrrhocorax*	B	18	Annex I	Amber	Rocky habitats, dunes and sparsely vegetated lands
A466	Dunlin	*Calidris alpina schinzii*	B	6	Annex I	Red	Heathlands and shrubs

[1] W- wintering; B- breeding; P- passage
[2] Annex I- species listed on Annex I of the Birds Directive
[3] BoCCI- species status on "Birds of Conservation Concern in Ireland" list (Colhoun and Cummins, 2013)
[4] Bird species and SPAs selected for them are not always easily assigned to a single MAES habitat category. This column indicates the second most important habitat group for the species. SPAs may also cover other important habitats not listed here.

Corncrake occurs predominantly in the grassland group, although it could also be described in E.2.5. 10 SPAs have been selected for Corncrake in Ireland. The deterioration in conservation status in Corncrake since the 1970s is due to factors including the move from hay-making to silage, the homogenisation of agricultural enterprises, increased fertiliser applications, reseeding of semi-natural grasslands and the use of larger, more efficient agricultural machinery and increased exposure to predation. Increased summer flooding in the Shannon Callows finally led to the extinction of the species, following years of decline due to changes in farming practices.

Chough is predominantly encountered in unimproved grassland used as rough pasture on coastal and upland slopes. This habitat often grades into heath and gorse-dominated habitats but the species is included in the grassland category. The 14 SPAs selected for Chough hold approx. 65% of the Irish breeding population. All the sites are coastal except for one in Co. Sligo. Chough SPAs largely comprise a coastal strip stretching 300m inland, although some sites also include additional roosts and core feeding areas. Altogether the suite of Chough SPAs is circa 26,000ha.

Breeding waders, which are on the Irish BoCCI Red-list i.e. Lapwing (*Vanellus vanellus*), Curlew (*Numenius arquata*) and Redshank (*Tringa totanus*), are regarded as a particular conservation priority having suffered significant declines in recent decades. Dunlin is a Red-listed species that breeds in machair habitats. Curlew has been the subject of conservation measures under a nationally funded Curlew Conservation Programme in recent years. This species will be dealt with separately in Section E.3.1.

All of the birds relevant to this category mentioned here also overlap with several other MAES habitat categories. The most notable breeding bird species relevant to these habitats that have undergone severe long-term breeding range declines are:

- Curlew (*Numenius arquata arquata*) – breeding: long-term range decline of 89%
- Dunlin (*Calidris alpina*) – breeding: long-term range decline of 67%
- Whinchat (*Saxicola rubetra*) – breeding: long-term range decline of 77%
- Ring Ouzel (*Turdus torquatus*) – breeding: long-term range decline of 62%

- Lapwing (*Vanellus vanellus*) – breeding: long-term range decline of 56%
- Redshank (*Tringa tetanus*) – breeding: long-term range decline of 50%
- Common Snipe (*Gallinago gallinago*) – breeding: long-term range decline of 32%

Of further concern are the recent short-term declines in the annual population indices of two widespread species that are monitored through the Countryside Bird Survey (CBS) which are:

- Skylark *(Alauda arvensis*) – breeding: short-term decline 18%; and
- Meadow Pipit (*Anthus pratensis*) – breeding: short-term decline 21%

These two species can form an important part of the traditional prey base for birds of prey such as Hen Harrier (*Circus cyaneus*) and Merlin (*Falco columbarius*).

The extent of these grassland habitats at the national scale is not fully mapped and this constrains the quantification of habitat loss. Most of the aforementioned species are ground nesting and therefore vulnerable to ground predators such as Fox (*Vulpes vulpes*) *and* Pine Marten (*Martes martes*). Ground nesting birds of open habitats are considered to be at higher risk of predation if they nest in areas with relatively higher levels of habitat edge, which can be caused by forest stands.

Other pressures and threats relevant to birds in grassland habitats include land abandonment, overgrazing, changes in the frequency and timing of mowing, the application of chemicals (e.g. fertilisers, herbicides, pesticides), and burning. The grassland habitats immediately adjacent to the SPA network designated for some wintering waterbirds can be an important feeding resource for the respective listed species when the intertidal areas are inundated. Such areas can be subjected to development pressures including urbanisation, coastal pathways, and wind farm development.

Conservation Measures delivered to date

Measures already taken for these habitats include agri-environment measures in the national scheme GLAS, which has actions for traditional hay meadows, low input permanent pasture and for lands owned in commonage (to deliver sustainable grazing). 36,823 farmers are in GLAS contracts for low input permanent pasture inside and outside Natura 2000, covering a total area of 259,784ha. 15,967 farmers are in GLAS contracts for traditional hay meadow inside and outside Natura 2000, covering a total area of 61,742ha. The efficacy of these measures has yet to be demonstrated.

In addition, two LIFE-Nature projects (AranLIFE, BurrenLIFE) have targeted the restoration of Annex I grassland habitats (6210 and 21A0) in five SACs. These measures have already improved the future prospects of grasslands in these sites, but additional measures will be needed to meet the sites' conservation objectives.

The Burren Programme continues to roll-out output-based agri-environmental measures that aim to build on the BurrenLIFE Project (2005-2010) and the Burren Farming for Conservation Programme (2010-2015). This programme is now integrated into the current Rural Development Programme (RDP) for Ireland under Measure 28. Currently circa 70% of the area of the three SACs in question is under this management regime.

The AranLIFE project terminated at the end of 2018 but elements of the project are continuing under a European Innovation Partnership (EIP) (Caomhnú Árann) until the end of 2024. The priority Annex I habitats targeted under this LIFE project were 6210, 8240 and 21A0. 1,016ha of SAC lands were under direct conservation management and contracts were entered into with 67 farmers. 93.71ha of scrub were removed in Annex habitats (6210 and 8240), 27ha of machair (21A0) was improved by rabbit control, with a further 6ha improved by seaweed applications.

The RBAPS project in Ireland developed and trialled results-based payment methods for the improved management of biodiversity on farmland, including in 6210 and 6510. The project ran from January 2015 to June 2018 and engaged a total of 35 farmers in contracts in Ireland, including lands in River Shannon Callows SAC (000216). The following biodiversity measures were delivered: Species-rich grasslands, Marsh fritillary habitat with species-rich grassland, Breeding Wader Habitat; Species-rich Flood Meadows and Species-rich Flood Meadows with ground-nesting birds, as well as measures for Whinchat.

The INTERREG VA Programme is funding the delivery of measures under the heading "Recovery of Protected Habitats & Priority Species, Objective 2.1" in three jurisdictions, including Ireland. The Co-operation across Borders for Biodiversity (CABB) is funded under INTERREG VA and an element of the work focusses on wader species in machair in designated sites and other coastal wet grassland sites in Co. Donegal and Co. Sligo. Further details on the programme are provided in Section E.2.3.

The Corncrake Conservation Project involves census work, delivery of conservation measures, habitat creation, predator control operations and research activities. 151 calling males were confirmed in Ireland during the 2018 breeding season and this was the first recorded increase since 2014. Donegal remains the national stronghold along with the western seaboards of counties Mayo and Galway. For the fourth consecutive year no Corncrakes were recorded in the Shannon Callows. Offshore islands held 53% of the national population. The Corncrake SPA network held 48% of the national population. Conservation measures include habitat management through several schemes: the Corncrake Grant Scheme (CGS), NPWS Corncrake Farm Plans, GLAS and land management agreements. Together the schemes were applied to 69% of breeding corncrakes in SPAs.

Measures have been delivered in the Shannon Callows for Whinchat under RBAPS in recent years, but at a very small scale. BirdWatch Ireland also manage their landholdings on the Callows to benefit Whinchat.

NPWS has created ponds to allow the expansion of Natterjack Toad within four SACs. However 60% of the ponds that have been created are outside the Natura 2000 network. In total, NPWS expenditure on Natterjack Toad is circa €40,000 p.a. A farmer is paid €1,000 in the first year for digging the ponds and €1,000 for each of the next four years for maintaining the ponds and the surrounding land. This scheme has been in operation for eight years and is funded entirely from the national exchequer.

The GLAS scheme has several measures for birds. These measures are not limited to grasslands, but species that occur in grasslands are provided as follows. There are specific measures for breeding waders (160 participants in 1,262ha), Curlew (385 participants in 4,374ha) and Chough (796 participants in 11,823ha), Corncrake (64 participants in 209ha). The majority of these measures are limited to Natura 2000 lands, with the exception of Curlew which also has measures in the wider countryside.

The NPWS farm plan scheme has delivered measures (delayed mowing and the creation and management of ELC) in Corncake SPAs (nine participants in 63ha) and for waders (three participants in 58ha).

Measures needed to maintain or restore favourable conservation status

The list of conservation measures required to address the threats and pressures to each habitat and species, as reported by the Article 17 process, was reviewed and distilled into a single list of measures for this MAES group. Any additional measures identified for bird species were added. The full list is given below. See also Appendix 1, where necessary measures are listed for each habitat and species. It includes measures that are relevant and may be delivered at different scales (from site-level to national).

CODE	CONSERVATION MEASURE NAME
CA01	Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land
CA02	Restore small landscape features on agricultural land
CA03	Maintain existing extensive agricultural practices and agricultural landscape features
CA04	Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures
CA05	Adapt mowing, grazing and other equivalent agricultural activities
CA06	Stop mowing, grazing and other equivalent agricultural activities
CA07	Recreate Annex I agricultural habitats
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities
CA12	Reduce/eliminate air pollution from agricultural activities
CA15	Manage drainage and irrigation operations and infrastructures in agriculture

CB01	Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation
CB14	Manage drainage and irrigation operations and infrastructures
CC01	Adapt/manage extraction of non-energy resources
CC02	Adapt/manage exploitation of energy resources
CC07	Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure
CC08	Manage/reduce/eliminate point pollution to surface or ground waters from resource exploitation and energy production
CC09	Manage/reduce/eliminate diffuse pollution to surface or ground waters from resource exploitation and energy production
CE01	Reduce impact of transport operation and infrastructure
CE06	Habitat restoration of areas impacted by transport
CF01	Manage conversion of land for construction and development of infrastructure
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities
CF03	Reduce impact of outdoor sports, leisure and recreational activities
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development
CF11	Manage water abstraction for public supply and for industrial and commercial use
CH03	Reduce impact of other specific human actions
CI01	Early detection and rapid eradication of invasive alien species of Union concern
CI02	Management, control or eradication of established invasive alien species of Union concern
CI03	Management, control or eradication of other invasive alien species
CI05	Management of problematic native species
CJ03	Restore habitats impacted by multi-purpose hydrological changes
CL01	Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes
CN02	Implement climate change adaptation measures

A matrix showing association between the individual features (habitats and species) and this list of conservation measures is provided in Appendix 1.

Prioritization of measures to be implemented during the next MFF period

Where conservation measures are being developed for areas of Annex I grassland habitat the impact of the proposed measures on other features should also be considered. This is particularly important in the case of sites such as Cullahill Mountain SAC (site code 000831) where 6210 is a QI but the conservation of a large population of Marsh Fritillary must also be considered within any proposed conservation measures.

Agri-environment schemes have a key role to play in the conservation of Annex I grassland habitats and in providing the future funding for the conservation measures that will be required for the listed Annex I grassland habitats to attain favourable conservation status nationally. GLAS has measures for 'traditional hay meadows" and low-input permanent pastures' but schemes that are tailored to the specific needs of the above habitats are required, if improvements are to be delivered to the conservation status of these features. A suite of potential measures for habitats and species, including birds, are provided below. Measures should also be supported by local advisory capacity, where appropriate, and have access to capital funds and non-productive investments to address issues such as scrub encroachments etc.

Measures for Limestone Pavement are covered under the costings for Semi-natural dry grasslands and measures for Vegetated sea cliffs are covered under the costings for Chough.

Agri-environment schemes (AES) for coastal habitats are necessary, in particular for machair. Many sites are suffering from overgrazing, and this needs regulation in both commonage and in private lands. These sites are also important for a range of species, including breeding waders in particular. Ongoing control of rabbits will be necessary considered in some locations (e.g. the Aran Islands). As Petalwort is in Favourable conservation status,

specific measures for this species are not envisaged. However the requirements of the species should be considered as appropriate in any AES delivered in sites that have been selected for Petalwort.

In addition to a national scheme such as GLAS, more specific agri-environment schemes have also been developed within Ireland to target particular regions, such as the Burren Programme, or particular habitats, such as lowland grasslands and meadows, and associated species, within the Results-based Agri-environment Pilot Scheme (RBAPS) in Co. Leitrim and in the Shannon Callows. Schemes such as these would be very beneficial across the Natura 2000 network in grassland sites and in the wider countryside, particularly for where there are populations of breeding waders which have no other protection mechanisms in grassland sites. These types of incentivised approaches could be delivered as a higher-level option to national prescription-based AES.

A range of conservation measures are required to maintain and improve Calaminarian grassland (6130) in Ireland, particularly at sites that are important for rare bryophytes. Clearance of scrub at a number of sites is required to maintain the habitat there, and minimising human impacts such as trampling and dumping would be beneficial across many sites. In order to improve the quality of habitat for rare bryophytes, removal of sources of pollution at one site is required, and removal of trees that are depositing leaf litter on Calaminarian grassland may be required at other sites. A beneficial measure across a number of sites would be to disturb and scrape back the surface of the mine spoil to expose more strongly metalliferous spoil on which metalophyte bryophytes can grow. Even with conservation measures in place, a continued decline of this habitat is likely to take place over time. Two sites in particular, Shallee (Silvermines Mountains West SAC (002258)) and Knockmahon Village (not designated) are of high importance for rare bryophytes, are in poor condition and require conservation effort to improve their conservation condition.

Measures for Marsh Fritillary should be a focus in the period and these measures should also apply outside the designated network.

An expansion of measures for Natterjack Toad is envisaged in Co. Kerry and is not limited to Natura 2000 sites.

A €5.9m budget 'LIFE Atlantic Crex' project has been funded and will run for five years from January 2020. The project will deliver conservation work in eight project sites (nine SPAs, including non-Natura 2000 lands) in Counties Donegal, Mayo and Galway covering 4,358ha. Of the targeted area, it is estimated that circa 1,000ha will have direct conservation works implemented. Working in partnership with landowners, DAFM, Údarás na Gaeltachta, Galway-Mayo Institute of Technology and Fota Wildlife Park, the project aims to deliver a 20% increase on the 2018 population of Corncrake recorded in Ireland by 2024. A target of 154 Corncrake calling males is the aim by project completion.

DHLGH has applied for LIFE-Nature funding for "LIFE on Machair", a project designed to improve the conservation condition of Ireland's machair habitats and the ecological conditions for breeding waders and pollinators within project sites. If successful, the project will employ an integrated management approach; provide education, guidance, and informed management policies for stakeholders, and deliver concrete conservation actions within a network of machair and wader Natura 2000 sites. This project will take place within nine SACs and four SPAs on lands which are predominantly privately owned.

List of prioritized measures to be carried out, and estimated costs for these measures

- within Natura 2000 sites designated for the targeted habitats and species

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Agri-environmental scheme for Fixed coastal dunes (2130): extensive grazing, no fertiliser input (average annual cost per hectare: €490)	recurring	1,500ha	€735,000	EAFRD/National
Agri-environmental scheme for Machair (21A0): extensive grazing, no fertiliser input (average annual cost per hectare: €490)	recurring	1,000ha	€490,000	EAFRD/National
Agri-environmental scheme for Semi-natural dry grasslands (6210): extensive grazing, no fertiliser input (average annual cost per hectare: €350)	recurring	800ha	€280,000	EAFRD/National
Agri-environmental scheme for Species-rich *Nardus* grasslands (6230): extensive grazing, no fertiliser input (average annual cost per hectare: €350)	recurring	100ha	€35,000	EAFRD/National
Agri-environmental scheme for *Molinia* meadows (6410): extensive grazing, no fertiliser input (average annual cost per hectare: €350)	recurring	400ha	€140,000	EAFRD/National
Agri-environmental scheme for Lowland hay meadows (6510) (average annual cost per hectare: €350)	recurring	100ha	€35,000	EAFRD/National
Non-productive investment for the restoration of Fixed coastal dunes (2130): Exclusion areas to prevent encroachment of livestock (average annual cost per hectare: €200)	one-off	10ha	€286	EAFRD/National
Non-productive investment for the restoration of Machair (21A0): Exclusion areas to prevent encroachment of livestock (average annual cost per hectare: €200)	one-off	10ha	€286	EAFRD/National
Land management for Machair (including compensation payments, reestablishment of traditional practices, management of recreation and tourism) (average annual cost per hectare: €456) in 9 SACs and 4 SPAs	recurring	2,200ha	€1,004,522	LIFE/National
Non-productive investment for the restoration of Calaminarian grasslands (6130): Scrub removal (average annual cost per hectare: €200)	one-off	10ha	€286	EAFRD/National
Non-productive investment for the restoration of Semi-natural dry grasslands (6210): Scrub removal and re-instatement of mowing regimes (average annual cost per hectare: €200)	one-off	50ha	€1430	EAFRD/National
Non-productive investment for the restoration of Lowland hay meadows (6510); Green hay strewing (average annual cost per hectare: €1,300)	one-off	5ha	€929	National
Agri-environmental scheme for *Petalophyllum ralfsii* (1395) to be included in costings for Fixed coastal dunes (2130) and Machair (21A0) above	recurring	0	0	EAFRD/National
Agri-environmental scheme for *Euphydryas aurinia* (1065) to be included in costings for *Molinia* meadows (6410)	recurring	0	0	EAFRD/National
Agri-environmental scheme for *Epidalea calamita* (1202) (average annual cost per hectare: €490)	recurring	39ha	€19,200	EAFRD/National
Non-productive investment for the restoration of habitat for *Epidalea calamita* (1202) (pond creation: €1000 per pond)	one-off	5 new ponds pa	€5,000	EAFRD/National
Agri-environmental scheme for birds (including waders, excluding Curlew) breeding in wet pastoral grasslands*:* extensive grazing, low fertiliser input. Curlew is dealt with in E.3.1. (average annual cost per hectare: €430)	recurring	300ha	€129,000	EAFRD/National
Non-productive investment for the restoration of habitat for birds (including waders, excluding Curlew) breeding in wet pastoral grasslands: creation of scrapes, removal of scrub, predator control. Curlew is dealt with in E.3.1.	one-off	50ha	€40,000	EAFRD/ERDF/ National
Agri-environmental scheme for Whinchat in meadows: delayed mowing, low fertiliser input (average annual cost per hectare: €520)	recurring	50ha	€26,000	EAFRD/National
Agri-environmental scheme for Chough*:* extensive grazing, low fertiliser input. (average annual cost per hectare: €365)	recurring	500ha	€182,500	EAFRD/National
Non-productive investment for the restoration of habitat for Chough: removal of scrub, burning. (average annual cost per hectare: €200)	one-off	50ha	€1,429	EAFRD/National
Agri-environmental scheme for Corncrake in meadows: delayed mowing, low fertiliser input (DAFM funded scheme) (average annual cost per hectare: €450)	recurring	200ha	€90,000	EAFRD
Agri-environmental scheme for Corncrake in meadows: delayed mowing, low fertiliser input (NPWS funded scheme) (average annual cost per hectare: €450)	recurring	80ha	€36,000	National
Land management for Corncrake (including compensation payments, purchase, reestablishment of traditional practices, ELC creation) (average annual cost per hectare: €590) on Natura and associated lands	recurring	1,050ha	€442,500	LIFE/National
Management, scientific underpinning, development of precision farming for Corncrake under LIFE (average annual cost per hectare: €530)	recurring	1,050ha	€397,500	LIFE/National
Non-productive investment for the restoration of *Molinia* meadows (6410): Scrub removal and re-instatement of mowing regimes (average annual cost per hectare: €400)	one-off	3ha	€171	EAFRD/National
Ongoing running of the Burren Programme in Years 2021 and 2022	recurring	3 SACs	€2,000,000	EAFRD/National
Continuation of the Burren Programme in Years 2023 to2027	recurring	3 SACs	€2,000,000	EAFRD/National

- additional measures beyond Natura 2000 (wider green infrastructure measures)

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Agri-environmental scheme for *Euphydryas aurinia* (1065); extensive grazing, no fertiliser (average annual cost per hectare: €490)	recurring	75ha	€36,750	EAFRD/National
Agri-environmental scheme for *Epidalea calamita* (1202); maintenance of grazing (average annual cost per hectare: €490)	recurring	59ha	€28,800	EAFRD/National
Captive breeding scheme for *Epidalea calamita* (1202)	recurring		€15,000	National
Non-productive investment for the restoration of habitat for *Euphydryas aurinia* (1065): scrub removal (average annual cost per hectare: €200)	one-off	30ha	€857	EAFRD/National
Non-productive investment for the restoration of habitat for *Epidalea calamita* (1202): pond creation (pond creation: €1000 per pond)	one-off	7 new ponds pa	€7,000	EAFRD/National
Agri-environmental scheme for birds (including waders, excluding Curlew) breeding in wet pastoral grasslands*:* extensive grazing, low fertiliser input. Curlew is dealt with in E.3.1. (average annual cost per hectare: €430)	recurring	90ha	€5,529	EAFRD/National
Non-productive investment for the restoration of habitat for birds (including waders, excluding Curlew) breeding in wet pastoral grasslands: creation of scrapes, removal of scrub, predator control. Curlew is dealt with in E.3.1.	one-off	15ha	€10,000	EAFRD/National
Corncrake Grant Scheme in meadows: delayed mowing, low fertiliser input (average annual cost per hectare: €350)	recurring	150ha	€52,500	EAFRD/National
Land management for Corncrake (including compensation payments, purchase, reestablishment of traditional practices, ELC creation): see the above section where all costs are covered (average annual cost per hectare: €590)	recurring	0	0	LIFE/National
Management, scientific underpinning, development of precision for Corncrake under LIFE: see the above section where all costs are covered (average annual cost per hectare: €530)	recurring	0	0	LIFE/National

* indicate whether the measure is recurring or one-off

Expected results for targeted species and habitat types

It is expected that if appropriately designed and incentivised AES is offered in the MFF period, supplemented by national financing as necessary under the NPWS farm plan scheme, that there will be an improvement in the conservation status of the relevant habitats and species in this group.

In addition, it is expected that the LIFE Atlantic Crex project will deliver an improvement in the conservation status of Corncrake, with a 20% increase in population in the project sites. The project will seek to have sustainable support measures for Corncrake mainstreamed in national AES schemes in future funding periods.

Expected results: other benefits

It is anticipated that there will be a further move in this MFF period towards results-based scoring of the quality of the habitat that farmers manage, be that for habitats or for species. Ultimately it is hoped that this scoring will lead to an improved understanding by farm planners/advisors and farmers of what is required in terms of species and habitat management, resulting in a better outcome for biodiversity. While this approach is not limited to the grasslands group, it is anticipated that there will be results-based incentives in this group, with a focus on species as necessary.

The LIFE Atlantic Crex project has tourism and development spin-offs, as was shown in the Burren. In addition, modern technologies will be employed as part of the LIFE project, with input from leading agriculturalists and innovators. New nest protection techniques will also be developed, to enhance the potential for increased breeding success. Based on an improved understanding of the habitat requirements of the species through the project, precision environmental management for Corncrake will be delivered, which in turn allow space for conservation, farming and sustainable development. Such new technologies and techniques are likely to be useful for other species management.

E.2.5. Other agroecosystems (incl. croplands)

Current status of habitats and species, conservation measures taken until now and their impact so far, remaining pressures and threats

No Habitats Directive Annex I habitats or Annex II species are considered in this MAES category.

Birds

The following table lists the SPA trigger species in this MAES group and the numbers of SPAs that have been selected for each species. Note that habitats in other MAES categories may also be important for the species listed.

Species code	Species name		Season[1]	Number of SPAs	Annex I[2]	BoCCI 2013[3]	Other MAES category[4]
A037	Bewick's Swan	*Cygnus columbianus bewickii*	W	3	Annex I	Red	Freshwater habitats (rivers and lakes)
A038	Whooper Swan	*Cygnus cygnus*	W	21	Annex I	Amber	Freshwater habitats (rivers and lakes)
A043	Greylag Goose	*Anser anser*	W	8		Amber	Marine and coastal waters
A045	Barnacle Goose	*Branta leucopsis*	W	22	Annex I	Amber	Grasslands
A140	Golden Plover	*Pluvialis apricaria*	W	32	Annex I	Red	Bogs, mires, fens and other wetlands
A142	Lapwing	*Vanellus vanellus*	W	22		Red	Bogs, mires, fens and other wetlands
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*	W	22	Annex I	Amber	Marine and coastal waters

[1] W- wintering; B- breeding; P- passage
[2] Annex I- species listed on Annex I of the Birds Directive
[3] BoCCI- species status on "Birds of Conservation Concern in Ireland" list (Colhoun and Cummins, 2013)
[4] Bird species and SPAs selected for them are not always easily assigned to a single MAES habitat category. This column indicates the second most important habitat group for the species. SPAs may also cover other important habitats not listed here

Some of the most notable breeding bird species relevant to this habitat that have undergone severe long-term breeding range declines are:

- Grey Partridge (*Perdix perdix*) – Breeding: long- term range decline of 74%
- Yellowhammer (*Emberiza citrinella*) – Breeding: long- term range decline of 62%
- Twite (*Carduelis flavirostris*) – Breeding: long- term range decline of 96%
- Lapwing *(Vanellus vanellus*) – Breeding: long-term range decline of 56%

In addition, there has been a long-term non-breeding population decline of Greenland White-fronted Goose (*Anser albifrons flavirostris*).

In the GLAS agri-environmental scheme (AES), measures have been delivered for Twite (418 participants in 3,628ha) and for breeding waders (160 participants in 1,262ha). The breeding wader measure in GLAS did not explicitly target Lapwing.

Hedgerows, which are included in this habitat category, can be a valuable resource for the influxes of regularly occurring migrant passerines during the winter months as well as resident species such as Yellowhammer (*Emberiza citronella*). An additional benefit of the conservation of these species is their importance as food for birds of prey.

Grey Partridge

In the 19th century this species bred in every county in Ireland but a population decline was evident in the early stages of the 20th century, at the time considered to be caused by shooting pressure and changes in agricultural practices.

Due to the critically low size, poor productivity and restricted range of the Irish Grey Partridge population in the 1990s, an intensive conservation effort was initiated in Boora, Co Offaly. This conservation effort included:

- a brood rearing programme (the remaining Irish birds were initially supplemented with European stock)
- habitat management works; and
- an intensive predator control initiative

The primary organisations involved in the early stages of the Irish Grey Partridge recovery were NPWS, the Irish Grey Partridge Conservation Trust (IGPCT) and the National Association of Regional Game Councils (NARGC).

The Boora Project has been successful at increasing the population of the wild population and has been a source of donor stock for other conservation projects, including Fingal (Co. Dublin) and Inch (Co. Donegal). The Grey Partridge conservation measures at Boora has resulted in a number of ancillary conservation dividends with a strong population of Lapwing regularly breeding successfully on site as well as various raptors (including Hen Harrier) using the managed habitat over the winter months.

The NPWS, IGPCT and BirdWatch Ireland have worked with DAFM to include Grey Partridge agri-environmental Measures into its GLAS programme. The IGPCT and NPWS have also provided donor stock to at least three conservation projects all of which are still in the early stages of establishment.

A strategic approach at the national level is warranted to allow for the sharing of knowledge and promotion of common standards with regards to habitat management, survey methodology and analyses, predator control actions and value for money due to the avoidance of duplication of effort.

There are currently 170 participants in GLAS for Grey Partridge. In Co. Donegal, for example, 15km of Grey Partridge strips have been established on 10 farms, seven of which are on Inch Island and a 2018 spring survey of calling male birds indicated a resident population of approximately 20+ pairs holding territory in the wild on Inch Island.

Geese and Swans:

Wintering Annex I species, such as Whooper swan (*Cygnus cygnus*), Greenland white-fronted goose (*Anser albifrons flavirostris*) and Barnacle goose (*Branta leucopsis*) require ongoing specific conservation measures.

To date, the NPWS farm plan scheme has delivered significant measures for "Geese and Swans". The plans are largely confined to the Wexford Slobs and Lough Swilly/Inch (Donegal) for the first two species and Sligo for Barnacle Goose. There are currently 23 participants and the farm plans cover 1,321ha. Farmers are paid to manage their lands in a way that can provide forage for the birds from October to March/April, and to undertake not to disturb the birds when feeding on their land. The losses arising from these actions can be quantified accurately, and are significant in many cases. NPWS directly manage a portion of the North Wexford Slobs-Wexford Wildfowl Reserve, principally for Greenland White-fronted Geese.

In general, the Department's approach is to pay only for priority species under the Birds Directive, and to allow scaring of plentiful species (such as Brent Goose) in a manner which will allay some farmers' concerns without detriment to the population.

Most of the farms currently contracted in the scheme are highly modernised and intensive. They therefore fall outside the usual target farm type for agri-environment schemes and the losses sustained from wildfowl are often substantially in excess of the GLAS and GLAS+ payment rates.

However there are also measures for "Geese and Swans" delivered in GLAS, generally for farmers who have smaller plots of lands than those who enter the NPWS farm plan scheme. There are currently 1,458 participants in this measure in GLAS, on lands comprising 15,330ha.

Measures needed to maintain or restore favourable conservation status

The list of conservation measures required to address the threats and pressures to birds, as reported under Article 12 of the Birds Directive, in this MAES group was reviewed and distilled into a single list of measures.

CODE	CONSERVATION MEASURE NAME
CA02	Restore small landscape features on agricultural land
CA05	Adapt mowing, grazing and other equivalent agricultural activities
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production
CA15	Manage drainage and irrigation operations and infrastructures in agriculture
CF03	Reduce impact of outdoor sports, leisure and recreational activities
CH03	Reduce impact of other specific human actions
CI01	Early detection and rapid eradication of invasive alien species of Union concern
CI02	Management, control or eradication of established invasive alien species of Union concern
CI03	Management, control or eradication of other invasive alien species
CI05	Management of problematic native species
CN02	Implement climate change adaptation measures

Prioritization of measures to be implemented during the next MFF period

The provision of measures for birds in agri-environmental schemes such as field margins to provide feeding and breeding cover, delayed mowing of key breeding sites, and other similar measures (e.g. beetle banks) are required at relevant scales in the wider countryside.

AES measures are required for all the species in this group.

All Grey Partridge project areas will require support. The existing prescriptions for the species will need to be reviewed in advance of the next RDP. A funding stream over the MFF period 2021-2027 needs to be maintained, to include predator control as necessary.

Several SPAs listed for wintering waterbirds encompass this habitat group. The provision of suitable feeding resources (e.g. grass of an appropriate sward height) with low levels of disturbance are necessary for such SPAs to continue to hold nationally and internationally important numbers (relevant species include Greenland White-fronted Goose (*Anser albifrons flavirostris*), Whooper Swan (*Cygnus cygnus*), Barnacle Goose (*Branta leucopsis*), Brent Goose (*Branta bernicla hrota*) and Greylag Goose (*Anser anser*)).

Additionally several wetland SPAs that are listed for a variety of wintering waterbirds rely to varying extents on suitable grassland and cropland habitats in the hinterland of such SPAs being available to the constituent waterbirds for feeding and/or alternative roosting purposes.

Improved targeting of measures for Geese and Swans and Twite is required in the MFF period.

Intensive agricultural practices occurring over large scales can depress the numbers of passerines present during the non-breeding season. This is relevant in term of *ex-situ* implications for those lowland SPAs that hold or potentially hold significant Hen Harrier (*Circus cyaneus*) roost sites.

Siting general passerine focused measures (as outlined below) at a sufficient scale and intensity in the hinterland of such SPAs may well ensure continued use of such roost sites as well as potentially having knock-on benefits on breeding numbers and performance across the six upland SPAs (for Hen Harrier).

The maintenance of healthy hedgerows as a resource for resident and migrant passerines is required.

List of prioritized measures to be carried out, and estimated costs for these measures

- within Natura 2000 sites designated for the targeted habitats and species

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Agri-environmental scheme for Geese and Swans (Whooper swan, Greenland white-fronted goose & Barnacle goose) in intensive farming systems under the NPWS farm plan scheme (average annual cost per hectare: €300)	recurring	2,000ha	€600,000	National
Agri-environmental scheme for Geese and Swans (Whooper swan, Greenland white-fronted goose & Barnacle goose) under the RDP (average annual cost per hectare: €205)	recurring	12,000ha	€2,460,000	EAFRD
Non-productive investment for the restoration of habitat for birds (Whooper swan, Greenland white-fronted goose & Barnacle goose) in intensive farming systems under the NPWS farm plan scheme: reseeding (average annual cost per hectare: €200)	one-off	300ha	€8,571	National
Agri-environmental scheme for Grey Partridge under the RDP (average annual cost per metre: €2.10)	recurring	200 farmers /200km of strips	€420,000	EAFRD
Agri-environmental scheme for Twite) under the RDP (average annual cost per hectare: €375)	recurring	2,000ha	€750,000	EAFRD
Agri-environmental scheme for Lapwing*:* extensive grazing, appropriate arable management (average annual cost per hectare: €450)	recurring	300ha	€135,000	EAFRD/National

- additional measures beyond Natura 2000 (wider green infrastructure measures)

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Management of the Grey Partridge at Boora	recurring	200ha	€200,000	National
Non-productive investment for the restoration of habitat for Hen Harrier (wintering)*:* creation of grazing strips, rush management, predator control, retention of stubble etc. (Dealt with under E.2.2.)	one-off	0	0	EAFRD/National
Agri-environmental scheme for wintering Hen Harrier*:* extensive grazing, low fertiliser input. (Dealt with under E.2.2.)	recurring	0	0	EAFRD/National
Agri-environmental scheme for Lapwing*:* extensive grazing, appropriate management (average annual cost per hectare: €450)	recurring	300ha	€135,000	EAFRD/National
Agri-environmental scheme for Yellowhammer under the RDP (average annual cost per hectare: €205)	recurring	2,500ha	€512,500	EAFRD
Agri-environmental scheme for the management of hedgerows for birds under the RDP (average annual cost per metre: €2.20)	recurring	200km	€440,000	EAFRD
Agri-environmental scheme for Geese and Swans (Whooper swan, Greenland white-fronted goose & Barnacle goose) under the RDP (average annual cost per hectare: €205)	recurring	3,000ha	€615,000	EAFRD

* indicate whether the measure is recurring or one-off

Expected results for targeted species and habitat types

Targeted measures in national AES are required for wintering waterbirds, Grey Partridge, Twite and Lapwing both within Natura 2000 and in the wider countryside. If the measures are well designed and targeted, and supported by appropriate advisors, then it is likely that the population and range of the species in this group will be secure. In addition, measures are required for species in the wider countryside, such as Yellowhammer, and for hedgerows (as habitat for birds), that provide important food resources for resident and migrant passerines. Good management in the wider countryside will deliver an improvement in the population and range of species that are declining (e.g. Yellowhammer) and for species that depend on suitable forage and roosting for part of the year (e.g. Hen Harrier in the non-breeding phase).

Expected results: other benefits

Hedgerows can be a valuable food resource for the influxes of regularly occurring migrant passerines during the winter months as well as resident species such as Yellowhammer (*Emberiza citronella*). Gaps in our knowledge exist with regard to the numbers and distributions of such migrants including Fieldfare (*Turdus pilaris*), Redwing (*Turdus iliacus*), as well as resident species such as Yellowhammer (*Emberiza citrinella*) and Linnet (*Linaria cannabina*) during the winter months. Having sufficient feeding resources across Ireland for such birds during the breeding and over-wintering periods is an important wider green infrastructure in light of continued

agricultural intensification, pesticide and herbicide use that represent both pressures and threat to these bird species of Ireland's agroecosystems.

E.2.6. Woodlands and forests

Current status of habitats and species

Within this MAES category, Ireland supports four habitats listed in Annex I of the Habitats Directive. One plant species, four invertebrate species and two mammal species in this MAES group are listed in Annex II of that directive. Two species in the standard list (1303 and 6985) are considered to be true woodland species in Ireland. The other species are not considered further in this group.

The following table lists the habitats and species in this group and the numbers of SACs that have been selected for each. The total reported area of each habitat contained in the Natura 2000 network (as a qualifying feature) is also given.

Code	Name	Number of SACs	QI area (ha)
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	39	5,893
91D0	Bog woodland*	12	486
91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*	27	2,392
91J0	*Taxus baccata* woods of the British Isles*	5	877
1303	Lesser Horseshoe Bat (*Rhinolophus hipposideros*)	41	
6985	Killarney Fern (*Vandenboschia speciosa*)	18	

Summary statistics for the woodlands and forests group:

Number of SACs containing one or more Annex I qualifying habitat	67	9,648
Number of SACs containing one or more Annex II qualifying species	57	
Total number of SACs in the woodlands and forests group	**110**	

Annex I habitats

Of the four habitat types listed in Annex I of the Habitats Directive occurring in Ireland, all depend on active management. All the above habitats are listed as Qualifying Interests in Special Areas of Conservation (SACs) specifically selected for their conservation. Three habitats are listed as "priority habitats" in Annex I of the Habitats Directive (*priority).

Annex II species

The following species are considered to fall within this MAES group in an Irish context:

- Lesser Horseshoe Bat (*Rhinolophus hipposideros*) (1303)
- Killarney Fern (*Vandenboschia speciosa*) (6985)

Current status of Annex I habitats

The following table shows national conservation status of the four Annex I habitats listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf for more detail):

Code	Short/common name	2007	2013	2019
91A0	Old oak woodland	Bad	Bad↑	Bad↓
91D0	Bog woodland*	Inadequate	Favourable	Favourable
91E0	Alluvial woodland*	Bad	Bad↑	Bad↓
91J0	Yew woodland*	Bad	Bad↑	Bad=

The cover of native woodland in Ireland is relatively low, currently comprising about 1.8% of the land area. The area criterion has been assessed as unfavourable (U2) for the Annex I woodland habitats 91A0, *91E0 and *91J0.Furthermore, native woodlands in Ireland tend to be small in size and are highly fragmented. The Structure and functions criterion has been assessed as being unfavourable (U2) for two habitat types (91A0, *91J0), unfavourable (U1) for one habitat type (*91E0) and favourable for one habitat type (*91D0). This indicates that additional efforts will be required to optimize woodland management regimes in at least some of the areas covered by the 91A0, *91E0 and *91J0 habitats.

Invasive alien species was reported as a high importance pressure and the most frequently recorded pressure within 91A0 monitoring sites. The most frequently recorded invasive alien plant species were *Fagus sylvatica, Acer pseudoplatanus, Rhododendron ponticum* and *Abies* spp. Overgrazing was also a high importance pressure and was the second most frequently recorded pressure within 91A0. Overgrazing was primarily by deer, including native red deer and non-native sika and fallow deer. This pressure contributes to a serious deficiency of oak regeneration; no oak saplings were recorded within sample plots at 56% of 91A0 monitoring sites.

Invasive alien species were a high importance pressure and the most frequently recorded pressure within *91E0 monitoring sites. The most frequently recorded invasive alien plant species were *Acer pseudoplatanus, Fagus sylvatica, Aesculus hippocastanum, Impatiens glandulifera* and *Ribes* spp. (i.e. *R. nigrum* and *R. rubrum*). Ash Dieback Disease also presents a high importance threat to the *91E0 habitat.

Invasive alien species was identified as a high importance pressure and the most frequently recorded pressure within *91J0 monitoring sites. The most frequently recorded invasive alien plant species were *Acer pseudoplatanus, Fagus sylvatica, Prunus laurocerasus* and *Clematis vitalba*. Overgrazing was also a high importance pressure and was the second most frequently recorded pressure within *91J0. Overgrazing was primarily by deer, including native red deer and non-native sika deer.

Current status of Annex II species

The following table shows national conservation status of the two Annex II species listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol3_Species_Article17.pdf for more detail):

Code	Common Name	2007	2013	2019
6985	Killarney Fern	Favourable	Favourable	Favourable
1303	Lesser Horseshoe Bat	Favourable	Favourable	Inadequate↓

Birds

Woodcock (*Scolopax rusticola*) has undergone an estimated long term breeding range decline of circa 68%. Knowledge of the abundance of this species, which is on the Open Seasons Order, is poor. This species along with others including Long-eared Owl (*Asio otus*), Hen Harrier (*Circus cyaneus*) and Merlin (*Falco columbarius*) can site their nests in conifer forests. Some species site their nests on mature trees whilst others often nest on the ground only during the pre-thicket stage of the forest rotation. Therefore, these bird species and others are exposed to potentially disturbing activities related to forest management (e.g. clear felling and thinning).

Although these birds use stands of commercial conifers for aspects of their breeding activities, all species require access to a sufficiency of proximate more open areas (e.g. heath/bog, wet grassland) for foraging purposes. These are considered further in the relevant MAES categories.

Afforestation continues to be a landuse option on lower productivity grassland (including HNV grasslands), and without appropriate safeguards, this could constitute an eventual direct loss of foraging and nesting habitats for a range of bird species and an increase in the risk of predation events for a range of ground nesting bird species.

Conservation Measures delivered to date

Of the 63 91A0, 14 *91D0, 40 *91E0 and 6 *91J0 monitoring sites surveyed in 2017-2018 for the purposes of Article 17 reporting, conservation measures were recorded from 22 sites (34.9%), two sites (14.3%), four sites (10.0%) and three sites (50.0%) respectively.

Measures undertaken for Annex I woodland habitats include those carried out as part of a LIFE Nature Project "Restoring Priority Woodland Habitats in Ireland" (2006-2009), which targeted nine SACs and 550.8ha of *91D0, *91E0 and *91J0, as well as scrubby facies of 8240 *Limestone pavements, which is not included in this MAES category. Conservation measures implemented included conifer removal, control of invasive non-native species, fencing, and drain blocking, installation of hydrological monitoring equipment and vegetation management. Yew seedlings were propagated and planted over a total area of 55.7ha of suitable habitat, which will potentially deliver a substantial increase in the area of 91J0 in the longer term. After-LIFE monitoring has shown that yew is growing well at three of the five sites at which it was planted; it is present but less abundant at the other two. The water table was found to be high at the *91D0 and *91E0 sites, indicating that drain blocking was successful.

The People's Millennium Forests Project restored 16 native woodland sites across the island of Ireland by planting over 1.2 million trees from native seed. Within the Republic of Ireland, conservation measures were implemented for 91A0 at eight sites, four of which were located in SACs specifically designated for this habitat type, and for *91E0 at one undesignated site. A deer fence was erected at one *91J0 site within an SAC specifically designated for this habitat type. However, deer are currently present within this fence, resulting in excessive grazing levels and contributing to a lack of tree regeneration.

The KerryLIFE Project (2014-2019) is in the process of establishing approximately 30ha of new native woodland, converting at least 41 ha of conifer plantations to native woodland, and implementing conservation measures in approximately 30ha of existing native woodland. The project operates within two SACs and will mainly deliver pioneer birch woodland which, in the long-term, may develop into the 91A0 habitat type.

A LIFE Nature Project "Restoring Raised Bog in Ireland" (2004-2008) implemented conservation measures for *91D0 at two SACs specifically designated for this habitat type. As part of the National Raised Bog SAC Management Plan 2017–2022, site-specific restoration plans have been drafted and are being implemented on a phased basis at 53 SACs specifically designated for raised bog. These SACs contain approximately 30.9ha of *91D0 (i.e. 14.5% of the national resource) and site-specific conservation objectives have been set for *91D0. An ongoing LIFE project, "The Living Bog" (2016–2020), has implemented conservation measures for *91D0 (drain blocking) at one SAC specifically designated for this habitat type.

The Irish Deer Management Forum was launched in 2015. It aimed to use a cross-sectoral approach to deliver deer management structures that suited spatial requirements, conformed to best practice and complied with existing legislation and policy. It produced the document "Deer Management in Ireland: A Framework for Action", which aimed to set out a framework to manage deer responsibly and minimise their impact on

agriculture, woodlands and other habitats. However, implementation has been limited and the forum is currently inactive.

NPWS implement conservation measures in Annex I woodland habitats in national parks and nature reserves. For example, Connemara National Park (NP) undertakes control of the invasive alien species *Rhododendron ponticum*, trail maintenance to prevent damage to sensitive habitats and control of trespassing stock. Killarney NP conducts *Rhododendron ponticum* control, trail maintenance and management of sika and red deer. Glenveagh National Park carries out *Rhododendron ponticum* and *Gaultheria mucronata* control, trail maintenance and management of red deer. Wicklow Mountains NP undertakes invasive species control, trail maintenance, tree planting, fencing and management of sika, fallow and red deer.

Coillte also implements conservation measures within Annex I woodland habitats in its Biodiversity Areas. These measures include invasive species control, conifer removal, and deer management using fences and culling.

The Native Woodland Scheme was launched in 2001 and is operated by the Forest Service of the Department of Agriculture, Food and the Marine. It provides funding and technical guidance for the conservation (i.e. maintenance) and establishment (i.e. restoration) of native woodlands. The Native Woodland Conservation Scheme provides for the conservation of existing native woodlands, the management of naturally regenerated emergent woodland and the conversion of non-native plantations to native woodland. The Native Woodland Establishment Scheme provides for the establishment of new native woodlands.

Progress has been made to establish what measures are required for Lesser horseshoe bat and how an agri-environmental scheme could deliver for the species .

Measures needed to maintain or restore favourable conservation status

The list of conservation measures required to address the threats and pressures to each habitat and species, as reported by the Article 17 process, was reviewed and distilled into a single list of measures for this MAES group. Any additional measures identified for bird species were added. The full list is given below. See also Appendix 1, where necessary measures are listed for each habitat and species. It includes measures that are relevant and may be delivered at different scales (from site-level to national).

CODE	CONSERVATION MEASURE NAME
CA02	Restore small landscape features on agricultural land
CA05	Adapt mowing, grazing and other equivalent agricultural activities
CA06	Stop mowing, grazing and other equivalent agricultural activities
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities
CA12	Reduce/eliminate air pollution from agricultural activities
CA15	Manage drainage and irrigation operations and infrastructures in agriculture
CB01	Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation
CB02	Maintain existing traditional forest management and exploitation practices
CB04	Adapt/manage reforestation and forest regeneration
CB05	Adapt/change forest management and exploitation practices
CB06	Stop forest management and exploitation practices
CB08	Restoration of Annex I forest habitats
CB10	Reduce diffuse pollution to surface or ground waters from forestry activities
CB14	Manage drainage and irrigation operations and infrastructures
CC01	Adapt/manage extraction of non-energy resources
CC02	Adapt/manage exploitation of energy resources
CC04	Reduce impact of hydropower operation and infrastructure
CC07	Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure

CC08	Manage/reduce/eliminate point pollution to surface or ground waters from resource exploitation and energy production
CC09	Manage/reduce/eliminate diffuse pollution to surface or ground waters from resource exploitation and energy production
CE01	Reduce impact of transport operation and infrastructure
CE05	Manage/reduce/eliminate noise, light and other forms of pollution from transport
CE06	Habitat restoration of areas impacted by transport
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities
CF03	Reduce impact of outdoor sports, leisure and recreational activities
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities
CF05	Reduce/eliminate diffuse pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities
CF09	Reduce/eliminate noise, light, heat or other forms pollution from industrial, commercial, residential and recreational areas and activities
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development
CF11	Manage water abstraction for public supply and for industrial and commercial use
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants
CH03	Reduce impact of other specific human actions
CI01	Early detection and rapid eradication of invasive alien species of Union concern
CI02	Management, control or eradication of established invasive alien species of Union concern
CI03	Management, control or eradication of other invasive alien species
CI05	Management of problematic native species
CI07	Controlling and eradicating plant and animal diseases, pathogens and pests
CJ03	Restore habitats impacted by multi-purpose hydrological changes
CN02	Implement climate change adaptation measures

Prioritization of measures to be implemented during the next MFF period

Active management measures are required to lead to progressive improvement of ecological condition of the following areas covered by Annex I woodland types which are not in good condition (the figures in the text and tables below are based on the Article 17 report and on current Native Woodland Scheme grant and premium rates)

- Old oak woodland (91A0): of which 996ha in Natura 2000 sites and 818ha outside Natura 2000 (total area: 1,814 ha)
- Alluvial woodland (*91E0): of which 172ha in Natura 2000 sites and 126ha outside Natura 2000 (total area: 298 ha)

Yew woodland (*91J0): of which 54ha in Natura 2000 sites and 0ha outside Natura 2000 (total area: 54ha)The area of the 91A0, *91E0 and *91J0 habitats remain below the favourable reference area. Sufficient measures to address this this have not yet been implemented for the 91A0 and *91E0 habitats, which require a seven- and eight-fold increase in area respectively to reach their favourable reference areas. For various reasons (the large disparity between current areas and favourable reference areas, lack of access to the most suitable land for targeted restoration measures, insufficient involvement of private landowners and managers in restoration measures, competition with other land uses, etc.), only part of the areas required to restore favourable conservation status will be available for implementation of measures during the next MFF 2021-2027. Based on a rough estimate, targets have been set at 25% of the current habitat area during the MFF 2021-2027.

- Old oak woodland (91A0): 1,500ha
- Alluvial woodland (*91E0): 500ha

Further restoration measures will have to be implemented at a later stage.

To promote the conservation and expansion of existing native woodlands, establishment of new native woodlands, conversion of conifer plantations to native woodlands, reduce fragmentation, and improve the connectivity of woodland habitats, continuation of the Native Woodland Scheme (Conservation and

Establishment Elements) or similar is needed post-2020. This scheme provides funding and technical guidance for many of the necessary conservation measures for 91A0, *91E0 and *91J0.

To prevent loss of range or area (e.g. through inappropriate development or felling) or deterioration in structure and functions (e.g. through inappropriate management), ongoing regulatory measures must be implemented for all habitats and species within this MAES category.

Coillte is planning to undertake conservation measures in 30ha of Alluvial Woodland at Hazelwood in Lough Gill SAC (001976) during this period. The principal operations are felling Norway spruce, western hemlock, thinning Scots pine and removing invasive exotics (rhododendron, laurel and dogwood) and naturalised non-native tree species (beech, horse chestnut and sycamore).

As no high importance pressures or threats were identified for Killarney fern (*Vandenboschia speciosa*), no conservation measures have been prioritised for this species. However, woodland conservation measures, particularly control of invasive species, must take account of Killarney fern, especially at known sites.

Conservation measures for lesser horseshoe bat *(Rhinolophus hipposideros)* will target roosting sites, in addition to woodland feeding sites. There is a need to address the gap in the species distribution in the mid-west and an AES scheme for the species in the six counties where it is located will be required.

Measures are required to ensure that forestry related activities do not constitute a direct and significant disturbance to nesting Hen Harrier (*Circus cyaneus*) and Merlin (*Falco columbarius*).

List of prioritized measures to be carried out, and estimated costs for these measures

- within Natura 2000 sites designated for the targeted habitats and species

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Native woodland conservation measures for 91A0 Old sessile oak woods (tree planting, non-native tree removal, invasive alien species control, fencing) (average annual cost per hectare: €629)	one-off	996 ha	€89,498	ERDF/LIFE/National
Native woodland conservation measures for 91A0 Old sessile oak woods (vegetation management, removal of non-native tree/invasive alien species regeneration, fence maintenance, control of grazing levels) (average annual cost per hectare: €171)	recurring	996 ha	€170,316	ERDF/LIFE/National
Native woodland establishment measures for 91A0 Old sessile oak woods (ground preparation, tree planting, fencing) (average annual cost per hectare: €688)	one-off	750 ha	€73,714	ERDF/LIFE/National
Native woodland establishment measures for 91A0 Old sessile oak woods (supplementary planting, vegetation management, removal of non-native tree/invasive alien species regeneration, fence maintenance, control of grazing levels) (average annual cost per hectare: €201)	recurring	750 ha	€150,750	ERDF/LIFE/National
Native woodland conservation measures for *91E0 Alluvial woodland (tree planting, non-native tree removal, invasive alien species control, drain blocking) (average annual cost per hectare: €543)	one-off	172 ha	€13,342	ERDF/LIFE/National
Native woodland conservation measures for *91E0 Alluvial woodland (vegetation management, removal of non-native tree/invasive alien species regeneration) (average annual cost per hectare: €171)	recurring	172 ha	29,412	ERDF/LIFE/National
Native woodland establishment measures for *91E0 Alluvial woodland (ground preparation, tree planting) (average annual cost per hectare: €566)	one-off	250 ha	€20,214	ERDF/LIFE/National
Native woodland establishment measures for *91E0 Alluvial woodland (supplementary planting, vegetation management, removal of non-native tree/invasive alien species regeneration) (average annual cost per hectare: €189)	recurring	250 ha	€47,250	ERDF/LIFE/National
Native woodland conservation measures for *91J0 Yew woodland (tree planting, non-native tree removal, invasive alien species control, fencing) (average annual cost per hectare: €629)	one-off	54 ha	€4,852	ERDF/LIFE/National
Native woodland conservation measures for *91J0 Yew woodland (vegetation management, removal of non-native tree/invasive alien species regeneration, fence maintenance, control grazing levels) (average annual cost per hectare: €171)	recurring	54 ha	€9,234	ERDF/LIFE/National
Conservation measures for *91E0 Alluvial woodland at Hazelwood	one-off	30 ha	€71,429	National
Non-productive investments for Lesser Horseshoe Bat roosting sites (not including Limerick)	one-off	5 counties	€40,000	National/LIFE
Agri-environment scheme for Lesser Horseshoe Bat woodland/feeding sites (average annual cost per hectare: €*)	recurring	6 counties	€81,000	EAFRD/LIFE/ National

- additional measures beyond Natura 2000 (wider green infrastructure measures)

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Native woodland conservation measures for 91A0 Old sessile oak woods (tree planting, non-native tree removal, invasive alien species control, fencing) (average annual cost per hectare: €629)	one-off	818 ha	€73,503	ERDF/LIFE/National
Native woodland conservation measures for 91A0 Old sessile oak woods (vegetation management, removal of non-native tree/invasive alien species regeneration, fence maintenance, control of grazing levels) (average annual cost per hectare: €171)	recurring	818 ha	€139,878	ERDF/LIFE/National
Native Woodland Conservation Scheme premium for private landowners for 91A0 Old sessile oak woods (average annual cost per hectare: €350)	recurring	818 ha	€286,300	National
Native woodland establishment measures for 91A0 Old sessile oak woods (ground preparation, tree planting, fencing) (average annual cost per hectare: €688)	one-off	750 ha	€73,714	ERDF/LIFE/National
Native woodland establishment measures for 91A0 Old sessile oak woods (supplementary planting, vegetation management, removal of non-native tree/invasive alien species regeneration, fence maintenance, control of grazing levels) (average annual cost per hectare: €201)	recurring	750 ha	€150,750	ERDF/LIFE/National
Native Woodland Establishment Scheme premium for private landowners for 91A0 Old sessile oak woods (average annual cost per hectare: €673)	recurring	750 ha	€504,750	National
Native woodland conservation measures for *91E0 Alluvial woodland (tree planting, non-native tree removal, invasive alien species control, drain blocking) (average annual cost per hectare: €543)	one-off	126 ha	€9,774	ERDF/LIFE/National
Native woodland conservation measures for *91E0 Alluvial woodland (vegetation management, removal of non-native tree/invasive alien species regeneration) (average annual cost per hectare: €171)	recurring	126 ha	€21,546	ERDF/LIFE/National
Native Woodland Conservation Scheme premium for private landowners for *91E0 Alluvial woodland (average annual cost per hectare: €350)	recurring	126 ha	€44,100	National
Native woodland establishment measures for *91E0 Alluvial woodland (ground preparation, tree planting) (average annual cost per hectare: €566)	one-off	250 ha	€20,214	ERDF/LIFE/National
Native woodland establishment measures for *91E0 Alluvial woodland (supplementary planting, vegetation management, removal of non-native tree/invasive alien species regeneration) (average annual cost per hectare: €189)	recurring	250 ha	€47,250	ERDF/LIFE/National
Native Woodland Establishment Scheme premium for private landowners for *91E0 Alluvial woodland (average annual cost per hectare: €665)	recurring	250 ha	€166,250	National
Focussed efforts to bridge the biogeographical gap in Co. Limerick for Lesser Horseshoe Bat	recurring	Co Limerick (50 farmers)	€70,000	EAFRD/LIFE/ National

* indicate whether the measure is recurring or one-off

Expected results for targeted species and habitat types

The implementation of the above conservation (i.e. maintenance) measures targeting 91A0, *91E0 and *91J0 during the next MFF period is expected, in the long term, to bring about an improving trend in the structure and functions of these habitats. The implementation of the above establishment (i.e. restoration) measures for 91A0 and *91E0 during the next MFF period is expected, in the long term, to bring about an improving trend in the area of these habitats.

The measures planned by Coillte at Hazelwood in Lough Gill SAC will restore a large discrete alluvial woodland block and create a buffer for woodlands restored under previous projects, especially regarding the threat of invasive species re-infestation (primarily rhododendron).

Expected results: other benefits

The above priority measures for woodland maintenance and restoration are expected to contribute to the following socio-economic benefits:

In the context of the Water Framework Directive, the role of native woodlands and particularly Alluvial woodlands (*91E0) in the protection and enhancement of water quality is increasingly recognised in national policy e.g. DAFMs “Forests & Water: Achieving Objectives under Ireland’s River Basin Management Plan 2018-2021” policy document.

Native woodlands have a significant function in mitigating the impacts of climate change through flood control and atmospheric carbon sequestration and storage. When sustainably managed under appropriate silvicultural

systems which are compatible with conservation objectives, some native woodlands can provide opportunities for quality timber production.

The establishment, maintenance and monitoring of native woodlands provides direct employment in the forestry and ecological sectors.

As well as providing a habitat for a wide array of generalist and true woodland species, native woodlands have wider benefits for biodiversity. They provide ecological corridors, improving habitat connectivity. Appropriately managed native woodlands can stabilise soils and prevent soil erosion.

Their role in soil stabilisation and water quality protection can benefit aquatic species such as freshwater pearl mussel, otter and salmonids.

The scenic wooded landscapes of Killarney National Park and the Wicklow Mountains National Park are among Ireland's most popular tourist destinations. Native woodlands provide social, recreational, educational and ecotourism opportunities, such as walking trails, guided walks, forest schools and outdoor classrooms.

E.2.7. Rocky habitats, dunes & sparsely vegetated lands

Current status of habitats and species, conservation measures taken until now and their impact so far, remaining pressures and threats

The following table lists the Annex I habitats in this group and the numbers of SACs that have been selected for each. The total reported area of each habitat contained in the Natura 2000 network (as a qualifying feature), is also given. There are no Annex I species assigned to this this group.

Code	Name	Number of SACs	QI area (ha)
1210	Annual vegetation of drift lines	28	91
1220	Perennial vegetation of stony banks	36	1,548
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	33	4,724
2110	Embryonic shifting dunes	38	170
2120	Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")	47	419
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	14	1,444
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	3	474
8210	Calcareous rocky slopes with chasmophytic vegetation	14	800
8220	Siliceous rocky slopes with chasmophytic vegetation	18	1,841
8240	Limestone pavements*	24	24,735
8310	Caves not open to the public	9	205

Summary statistics for rocky habitats, dunes and sparsely vegetated lands:

Number of SACs containing one or more Annex I qualifying habitat	127	36,451
Number of SACs containing one or more Annex II qualifying species	0	
Total number of SACs in rocky habitats, dunes and sparsely vegetated lands group	**127**	

Annex I habitats

This MAES category contains a variety of habitats all of which are considered in Ireland to be part of larger systems. Annual vegetation of driftlines (1210), perennial vegetation of stony banks (1220), embryonic shifting dunes (2110) and shifting dunes along the shoreline (2120) generally occur as relatively small areas and are part of larger coastal/sand dune systems. Thus, relevant measures are either included in the marine and coastal waters group (E.2.1.) or the grasslands group (E.2.4.) (which contains fixed dunes and machair). Vegetated sea cliffs tend to transition to either heath or grasslands, so relevant measures for this habitat can also be found in heathlands and shrubs (E.2.2). The upland scree and rock-dominated habitats (8110, 8120, 8210, 8220) also tend to occur in mosaic with habitats included in the heaths category. The vast majority of Ireland's limestone pavements habitat occurs in Counties Clare and Galway in the west of Ireland, where it is part of a farmed landscape comprising an intimate habitat mix including Annex I species-rich grassland habitats and Alpine and boreal heaths. Measures for this priority habitat are included with the grasslands group. Finally, In Ireland, caves not open to the public, are only selected as an Annex I habitat on account of the Annex II species Lesser Horseshoe Bat (*Rhinolophus hipposideros*). Measures for this species are included in the woodlands and forests group (E2.6.).

Current status of Annex I habitats

The following table shows national conservation status of the nine Annex I habitats listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf for more detail):

Code	Short name	2007	2013	2019
1210	Drift lines	Inadequate	Inadequate↓	Inadequate↓
1220	Shingle	Inadequate	Inadequate=	Inadequate=
1230	Sea cliffs	Inadequate	Inadequate=	Inadequate=
2110	Embryonic shifting dunes	Inadequate	Inadequate=	Inadequate=
2120	Marram dunes (white dunes)	Bad	Inadequate=	Inadequate=
8110	Siliceous scree	Inadequate	Inadequate↑	Inadequate=
8120	Eutric scree	Inadequate	Inadequate=	Inadequate=
8210	Calcareous rocky slopes	Inadequate	Inadequate=	Inadequate=
8220	Siliceous rocky slopes	Inadequate	Inadequate=	Inadequate=
8240	Limestone pavement*	Inadequate	Inadequate=	Inadequate=
8310	Caves	Favourable	Favourable	Favourable

With the exception of caves, which is reported to be in favourable status, the remaining habitats in this group are assessed as inadequate. For the coastal/dune sedimentary habitats, issues such as interference with sediment dynamics, pressure from recreational and other human activities and the presence of negative indicator species were reported. Unsuitable grazing regimes and invasive alien species are some of the issues reported for the rock-dominated habitats.

Birds

The following table lists the SPA trigger species in this MAES group and the numbers of SPAs that have been selected for each species. Note that habitats in other MAES categories may also be important for the species listed.

Species code	Species name		Season[1]	Number of SPAs	Annex I[2]	BoCCI 2013[3]
A103	Peregrine	*Falco peregrinus*	B	10	Annex I	Green

[1] W- wintering; B- breeding; P- passage
[2] Annex I- species listed on Annex I of the Birds Directive
[3] BoCCI- species status on "Birds of Conservation Concern in Ireland" list (Colhoun and Cummins, 2013)

Note that many breeding seabirds and waterbirds listed in section 2.1, make use of cliffs, rocky islets and habitats such as shingle for breeding, so are also relevant to this MAES group.

Conservation measures delivered to date

As mentioned above, measures relevant to habitats in this group are reported in other sections. Measures relevant to driftlines (1210), shingle (1220) and the dune habitats (2110 and 2120) are either included in the marine and coastal waters group (E.2.1.) or the grasslands group (E.2.4.). The latter category also includes agri-environmental measures relevant to limestone pavement (8240) and cliff-top (1230) grasslands. The heathlands and shrubs (E.2.2) group also contains measures relevant to cliffs as well as the scree/rock habitats (8110, 8120, 8210, 8220).

Measures needed to maintain or restore favourable conservation status

The list of conservation measures required to address the threats and pressures to each habitat, as reported by the Article 17 process, was reviewed and distilled into a single list of measures for this MAES group. The full list is given below. See also Appendix 1, where necessary measures are listed for each habitat and species. It includes measures that are relevant and may be delivered at different scales (from site-level to national).

CODE	CONSERVATION MEASURE NAME
CA01	Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land
CA02	Restore small landscape features on agricultural land
CA03	Maintain existing extensive agricultural practices and agricultural landscape features
CA04	Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures
CA05	Adapt mowing, grazing and other equivalent agricultural activities
CA06	Stop mowing, grazing and other equivalent agricultural activities
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities
CA12	Reduce/eliminate air pollution from agricultural activities
CA15	Manage drainage and irrigation operations and infrastructures in agriculture
CC01	Adapt/manage extraction of non-energy resources
CE01	Reduce impact of transport operation and infrastructure
CE05	Manage/reduce/eliminate noise, light and other forms of pollution from transport
CE06	Habitat restoration of areas impacted by transport
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities
CF03	Reduce impact of outdoor sports, leisure and recreational activities
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities
CF09	Reduce/eliminate noise, light, heat or other forms pollution from industrial, commercial, residential and recreational areas and activities
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants
CH03	Reduce impact of other specific human actions
CI01	Early detection and rapid eradication of invasive alien species of Union concern
CI02	Management, control or eradication of established invasive alien species of Union concern
CI03	Management, control or eradication of other invasive alien species
CI05	Management of problematic native species
CJ03	Restore habitats impacted by multi-purpose hydrological changes
CL01	Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes
CN02	Implement climate change adaptation measures

Prioritization of measures to be implemented during the next MFF period

Prioritised measures are included in other categories as described above. Prioritised measures for lagoon management and restoration (in E.2.1.) will also benefit the shingle habitat (1220) and dune habitats (2110 and 2120). Agri-environmental measures for heaths (under E.2.2.) will benefit rocky slopes and screes (8110, 8120, 8210, and 8220). Agri-environmental measures for species-rich grasslands (as part of E.2.4.) will encompass areas of limestone pavement (8240).

List of prioritized measures to be carried out, and estimated costs for these measures

- within Natura 2000 sites designated for the targeted habitats and species

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Covered elsewhere				

- additional measures beyond Natura 2000 (wider green infrastructure measures)

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Covered elsewhere				

* indicate whether the measure is recurring or one-off

Expected results for targeted species and habitat types

With the exception of caves, these habitats tend to occur in mosaic with, or transition into, other habitats in bigger systems, thus, measures implemented to improve these systems (such as agri-environmental measures in heath-dominated uplands) will improve the resilience and conservation status of all the associated habitats.

Expected results: other benefits

Improving the conservation status of coastal systems that include habitats such as perennial vegetation of stony banks and shifting dunes will increase the resilience of coastlines to storms and flooding events. Halting and preventing damage to upland areas that contain scree slopes will help to prevent landslips caused by anthropomorphic pressures.

E.2.8. Freshwater habitats (rivers and lakes)

Current status of habitats and species, conservation measures taken until now and their impact so far, remaining pressures and threats

The following table lists the habitats and species in this group and the numbers of SACs that have been selected for each. The total reported area of each habitat contained in the Natura 2000 network (as a qualifying feature), is also given.

Code	Name	Number of SACs	QI area (ha)
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	28	15,556
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	23	21,955
3140	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.	18	28,012
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	9	19,424
3160	Natural dystrophic lakes and ponds	10	2,614
3180	Turloughs*	45	4,059
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	21	4,436
3270	Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation	7	106
1029	*Margaritifera margaritifera*	19	
1092	*Austropotamobius pallipes*	15	
1095	*Petromyzon marinus*	12	
1096	*Lampetra planeri*	10	
1099	*Lampetra fluviatilis*	10	
1103	*Alosa fallax*	4	
1106	*Salmo salar*	26	
1355	*Lutra lutra*	45	
1833	*Najas flexilis*	24	
5046	*Alosa killarnensis*	1	

Summary statistics for freshwater habitats (rivers and lakes) group:

Number of SACs containing one or more Annex I qualifying habitat	121	96,162
Number of SACs containing one or more Annex II qualifying species	77	
Total number of SACs in freshwater habitats (rivers and lakes) group	**142**	

Annex I habitats

There are five Annex I lake habitats in Ireland. Some of the larger more complex Irish lakes support more than one Annex I habitat type. 88 SACs are listed for one or more lake habitat-types. Turloughs are depressions in limestone areas that temporarily flood with groundwater in most years; typically being dry in summer and flooded in winter. They are often grazed by livestock when dry. Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation is a rare habitat in Ireland and is often associated with turloughs that retain water for relatively long periods. Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation is the only Annex I habitat entirely associated with flowing water in Ireland.

Annex II species

A single Annex II plant species, Slender Naiad (*Najas flexilis*) is included in this habitat group, while there are two Annex II invertebrate species - Freshwater Pearl Mussel (*Margaritifera margaritifera*) and White-clawed crayfish (*Austropotamobius pallipes*). Annex II fish species comprise Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Twaite Shad (*Alosa fallax*), Killarney Shad (*Alosa*

killarnensis) and Atlantic Salmon (*Salmo salar*). Allis Shad (*Alosa alosa*) is considered to be a vagrant. Otter is the only Annex II mammal species associated with this habitat group in Ireland.

Current status of Annex I habitats

The following table shows national conservation status of the eight Annex I habitats listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf for more detail):

Code	Short name	2007	2013	2019
3110	Oligotrophic soft water lakes	Bad	Bad↓	Bad=
3130	Soft water lakes with base rich influences	Bad	Inadequate=	Inadequate↓
3140	Hard water lakes	Bad	Bad↓	Bad↓
3150	Natural eutrophic lakes	Bad	Inadequate=	Inadequate=
3160	Dystrophic lakes	Bad	Inadequate↓	Inadequate=
3180	Turloughs*	Inadequate	Inadequate=	Inadequate=
3260	Floating river vegetation	Bad	Inadequate↓	Inadequate↓
3270	Chenopodium rubri	Favourable	Favourable	Favourable

Water quality issues arising from sources including agriculture, forestry, wastewater discharge, peat extraction and urban run-off; and hydromorphological/physical modifications of water bodies are the main pressures and threats identified for the permanent lake habitats. These have led to national conservation assessments of either inadequate or bad for these habitats.

Agricultural activities leading to pollution, overgrazing and drainage have been identified as the main issues for Turloughs, resulting in an inadequate conservation status assessment.

Based on evidence that there is an on-going decline in high status rivers sites, the conservation status of floating river vegetation has again been assessed as inadequate.

Chenopodium rubri vegetation is in favourable status.

Current status of Annex II species

The following table shows national conservation status of the ten Annex II species listed in this MAES group according to Article 17 reporting (see https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol3_Species_Article17.pdf for more detail):

Code	Species name	2007	2013	2019
1029	Freshwater Pearl Mussel (*Margaritifera margaritifera*)	Bad	Bad↓	Bad↓
1092	White-clawed Crayfish *(Austropotamobius pallipes)*	Inadequate	Inadequate=	Bad↓
1095	Sea Lamprey (*Petromyzon marinus*)	Inadequate	Bad=	Bad=
1096	Brook Lamprey (*Lampetra planeri*)	Favourable	Favourable	Favourable
1099	River Lamprey (*Lampetra fluviatilis*)	Favourable	Favourable	Unknown
5046	Killarney Shad (*Alosa killarnensis*)	Favourable	Favourable	Favourable
1103	Twaite Shad (*Alosa fallax*)	Bad	Bad=	Bad=
1106	Atlantic Salmon (*Salmo salar*)	Bad	Inadequate=	Inadequate=
1833	Slender Naiad (*Najas flexilis*)	Inadequate	Inadequate=	Inadequate↓
1355	Otter (*Lutra lutra*)	Inadequate	Favourable	Favourable

Freshwater pearl mussel is critically endangered in Ireland and across Europe. The species' bad conservation status arises from a combination of hydrological and morphological changes, sedimentation and enrichment. The pressures impacting on the species come from a combination and wide variety of sources (e.g. pollution from urban wastewater, development activities, farming and forestry), often quite removed from the habitat of the species. The species also suffers direct impacts from in-stream works such as channelisation, bridge

repairs/construction and recreational fishery structures. Flow changes, caused by activities such as land drainage, have been highlighted as an important pressure.

The most severe current threat to White-clawed Crayfish is the presence of the Crayfish Plague organism *Aphanomyces astaci*, which has caused outbreaks of the disease in six catchments. It was confirmed in Ireland in 2015 by DNA testing, and this was the first known case since the 1980s. The spread of this is unpredictable and how many populations and how much of the range will be impacted is unknown. This has resulted in a national conservation status assessment of bad.

The main pressures and threats listed for fish species, assessed as either inadequate or bad in freshwater, are poor water quality due to agriculture, wastewater discharge and forestry in catchments; hydromorphological changes to habitat and processes; barriers preventing natural upstream migration; and invasive alien species. For salmon, survival during the marine phase of its lifecycle (i.e. marine survival) has been identified as the key determinant of trends in population size in natal rivers. Killarney Shad, which is confined to a single lake in Co. Kerry, is assessed as favourable. River Lamprey (*Lampetra fluviatilis*) has been assessed as unknown due to the inability to distinguish between *L. fluviatilis* and *L. planeri* larvae and the challenges associated with sampling for adult river lamprey, which means that an evaluation of its actual range and population size could not be undertaken.

The pressures and threats listed above for lake habitats also apply to Slender Naiad, which is associated with the Annex I habitat Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea (3130).

The conservation status of Otter has been assessed as favourable for the last two reporting periods.

Birds

The following table lists the SPA trigger species in this MAES group and the numbers of SPAs that have been selected for each species. Note that habitats in other MAES categories may also be important for the species listed.

Species code	Species name		Season[1]	Number of SPAs	Annex I[2]	BoCCI 2013[3]	Other MAES category[4]
A004	Little Grebe	*Tachybaptus ruficollis*	W	6		Amber	Marine and coastal waters
A051	Gadwall	*Anas strepera*	W	4		Amber	Bogs, mires, fens and other wetlands
A052	Teal	*Anas crecca*	W	20		Amber	Bogs, mires, fens and other wetlands
A053	Mallard	*Anas platyrhynchos*	W	8		Green	Bogs, mires, fens and other wetlands
A054	Pintail	*Anas acuta*	W	11		Red	Bogs, mires, fens and other wetlands
A056	Shoveler	*Anas clypeata*	W	16		Red	Bogs, mires, fens and other wetlands
A059	Pochard	*Aythya ferina*	W	6		Red	
A061	Tufted Duck	*Aythya fuligula*	W	11		Red	
A065	Common Scoter	*Melanitta nigra*	B	3		Red	
A067	Goldeneye	*Bucephala clangula*	W	6		Red	Marine and coastal waters
A125	Coot	*Fulica atra*	W	11		Amber	Bogs, mires, fens and other wetlands
A179	Black-headed Gull	*Chroicocephalus ridibundus*	B	5		Red	Bogs, mires, fens and other wetlands
A229	Kingfisher	*Alcedo atthis*	B	2	Annex I	Amber	
	Wetlands[5]			21			

[1] W- wintering; B- breeding; P- passage

[2] Annex I- species listed on Annex I of the Birds Directive

[3] BoCCI- species status on "Birds of Conservation Concern in Ireland" list (Colhoun and Cummins, 2013)

[4] Bird species and SPAs selected for them are not always easily assigned to a single MAES habitat category. This column indicates the second most important habitat group for the species. SPAs may also cover other important habitats not listed here

[5] This row indicates the number of SPAs in this MAES category where the presence of wetlands has contributed to their selection as SPAs

Ireland's rivers and lakes hold rare and vulnerable breeding waterbird species, such as Red-breasted Merganser (*Mergus merganser*) whose population is less than 10 breeding pairs and Common Scoter (*Melanitta nigra*) whose population is estimated to be less than 40 pairs and has undergone a short term decline of circa 50%.

These freshwater systems are also important for more common and widespread species, some of which have undergone significant long-term breeding range declines:

- Common Sandpiper (*Actitis hypoleucos*) – breeding: long-term range decline of 40%
- Coot (*Fulica atra*) – breeding: long-term range decline of 38%
- Moorhen (*Gallinula chloropus*) – breeding: long-term range decline of 20%
- Red-breasted Merganser (*Mergus serrator*) – breeding: long-term range decline of 55%
- Tufted Duck (*Aythya fuligula*) – breeding: long-term range decline of 22%
- Little Grebe (*Tachybaptus ruficollis*) – breeding: long-term range decline of 52%

Outside of bird atlas initiatives, knowledge of the changes in abundances and distribution of the vast majority of breeding waterbird species is not sufficient.

Kingfisher (*Alcedo atthis*), an SPA trigger species has not been surveyed at their SPAs or beyond since their designation circa 10 years ago.

Several lakes have been designated as SPAs on account of their importance for wintering ducks. Recent short - term data derived from I-WeBS indicate that several wintering waterbird species have undergone significant declines over the last 12 years including:

- Common Pochard (*Aythya farina*) – wintering: short-term range decline of 91%
- Tufted Duck (*Aythya fuligula*) – wintering: short-term range decline of 47%
- Common Goldeneye (*Bucephala clangula*) – wintering: short-term range decline of 50%
- Coot (*Fulica atra*) – wintering: short-term range decline of 35%
- Greater Scaup (*Aythya marila*) – wintering: short-term range decline of 90%

The majority of Ireland's bird species that are listed on its Open Seasons Order are waterbirds, which are associated with various wetland habitats – this is dealt with in more detail elsewhere.

Conservation measures delivered to date

Measures to address water quality issues are set out in Ireland's 2nd Cycle River Basin Management Plan (RBMP) 2018-2021, which was launched in 2018.

(https://www.housing.gov.ie/sites/default/files/publications/files/rbmp_report_english_web_version_final_0.pdf)

The Programme of Measures set out in the Plan for the period to 2021 is guided by clear priorities. The following evidence-based priorities have been adopted for this river basin planning cycle, and all have relevance to the Natura 2000 network:

- Compliance with EU Directives such as the Urban Waste Water Treatment Directive;
- Prevention of deterioration in water status;
- Meeting the objectives for designated protected areas such as bathing waters and shellfish growing waters;
- Protection of high-status waters (there is significant overlap between these catchments and Natura 2000 sites) which have high biodiversity value, and;

- Implementation of targeted actions and pilot schemes in priority areas aimed at (1) targeting improvement in status in water bodies close to meeting their objective and (2) addressing more complex issues that will build knowledge for the next cycle.

Significant progress has been made with domestic waste water treatment systems through the inspection regime (under the Domestic Waste-Water Treatment Regulations) and associated grant scheme. There is also on-going substantial investment by Irish Water in urban waste water treatment and collection systems.

Works have been undertaken to improve fish passage in a number of rivers in SACs (e.g. Fergus (SAC 002165), Slaney (SAC 000781), Barrow, Nore (SAC 002162)).

In an effort to prevent the spread of Crayfish Plague from other countries, the importation to Ireland of the five crayfish species on the EU list of invasive alien species of Union concern has been prohibited by SI 354/2018, the European Union (Invasive Alien Species) (Freshwater Crayfish) Regulations 2018. Recommended biosecurity measures ("check, clean, dry") to minimise risk of spread between catchments have been widely publicised (http://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/).

KerryLIFE (http://kerrylife.ie/) has developed and is demonstrating effective conservation measures in farmed and forested catchments with the aim of restoring freshwater pearl mussel *Margaritifera margaritifera* habitat to favourable conservation condition in two SAC catchments (Blackwater River (Kerry) (002173) and Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365)). Agricultural measures put in place include drainage management measures; establishment of riparian buffers and/or set back areas; grazing and livestock management measures; nutrient management planning; and alternative drinking water facilities for livestock. Forestry measures include restructuring of commercial conifer plantation to long-term retention woodland; establishment of native broadleaf woodland; removal of invasive species; and sensitive harvesting trials. Measures designed to reduce the potential for sediment and nutrient losses associated with harvesting were also demonstrated. The project finishes in 2020.

The aforementioned Pearl Mussel Project involves farmers, species and habitat experts, and agricultural advisors working together to deliver improved habitat quality via a results-based agri-environment scheme in the top eight priority catchments for the species. These are located in seven SACs (Lough Corrib SAC (000297), Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365), Glanmore Bog SAC (001879), Mweelrea/Sheeffry/Erriff Complex SAC (001932), The Twelve Bens/Garraun Complex SAC (002031), Cloghernagore Bog and Glenveagh National Park SAC (002047) and Blackwater River (Kerry) SAC (002173)). The Pearl Mussel Project is taking forward and further developing successful agriculture-related elements of the KerryLIFE project. Habitat measures in catchments will, in some cases overlap with Annex I habitats, particularly in the heathlands and bogs habitat groups.

Two other EIP projects, "Duhallow Farming for Blue Dot Catchments" and "Innovation, Technology and Knowledge Transfer for Farmer Led Enhancement of Water Quality, Instream Habitat and Riparian Management in the Mulkear Catchment" are focused on improving the ecological status in two SAC river catchments (River Allow in Backwater River Cork/Waterford SAC (002174) and Mulkear River in Lower River Shannon SAC (002164).

The Forest Service published a Draft Plan for Forests and Freshwater Pearl Mussel in Ireland in 2018 (https://www.agriculture.gov.ie/forestservice/publicconsultation/planforforestsfreshwaterpearlmusselinirelan d/), which sets out the approach to managing commercial forestry within Freshwater Pearl Mussel catchments. The objective of the Plan is to eliminate, reduce or mitigate diffuse and point sources of sediment and nutrients and the disruption of natural hydrological regimes, arising from forests and regulated forestry activities within the Plan's area, to ensure that these do not threaten the achievement of the conservation objectives for freshwater pearl mussel set for each of the SACs involved. Envisaged is the gradual restructuring of the forest resource within these areas, with the introduction of water setbacks complete with hydrological restoration, native woodland and areas managed under continuous cover forestry, and the use of native woodland establishment as part of on-farm mitigation.

Measures needed to maintain or restore favourable conservation status

The list of conservation measures required to address the threats and pressures to each habitat and species, as reported by the Article 17 process, was reviewed and distilled into a single list of measures for this MAES group. Any additional measures identified for bird species were added. The full list is given below. See also Appendix 1, where necessary measures are listed for each habitat and species. It includes measures that are relevant and may be delivered at different scales (from site-level to national).

CODE	CONSERVATION MEASURE NAME
CA01	Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land
CA02	Restore small landscape features on agricultural land
CA03	Maintain existing extensive agricultural practices and agricultural landscape features
CA04	Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures
CA05	Adapt mowing, grazing and other equivalent agricultural activities
CA06	Stop mowing, grazing and other equivalent agricultural activities
CA08	Adapt soil management practices in agriculture
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities
CA12	Reduce/eliminate air pollution from agricultural activities
CA15	Manage drainage and irrigation operations and infrastructures in agriculture
CB01	Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation
CB04	Adapt/manage reforestation and forest regeneration
CB05	Adapt/change forest management and exploitation practices
CB06	Stop forest management and exploitation practices
CB08	Restoration of Annex I forest habitats
CB09	Manage the use of chemicals for fertilisation, liming and pest control in forestry
CB10	Reduce diffuse pollution to surface or ground waters from forestry activities
CB14	Manage drainage and irrigation operations and infrastructures
CC01	Adapt/manage extraction of non-energy resources
CC02	Adapt/manage exploitation of energy resources
CC03	Adapt/manage renewable energy installation, facilities and operation
CC04	Reduce impact of hydropower operation and infrastructure
CC07	Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure
CC08	Manage/reduce/eliminate point pollution to surface or ground waters from resource exploitation and energy production
CC09	Manage/reduce/eliminate diffuse pollution to surface or ground waters from resource exploitation and energy production
CC13	Manage water abstraction for resource extraction and energy production
CE01	Reduce impact of transport operation and infrastructure
CE06	Habitat restoration of areas impacted by transport
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities
CF03	Reduce impact of outdoor sports, leisure and recreational activities
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities
CF05	Reduce/eliminate diffuse pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development
CF11	Manage water abstraction for public supply and for industrial and commercial use
CG01	Management of professional/commercial fishing (including shellfish and seaweed harvesting)
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants
CG04	Control/eradication of illegal killing, fishing and harvesting
CG05	Reduce bycatch and incidental killing of non-target species
CG06	Reduce impact of lead poisoning

CG12	Reduce/eliminate diffuse pollution to surface waters from freshwater aquaculture
CH03	Reduce impact of other specific human actions
CI01	Early detection and rapid eradication of invasive alien species of Union concern
CI02	Management, control or eradication of established invasive alien species of Union concern
CI03	Management, control or eradication of other invasive alien species
CI05	Management of problematic native species
CJ03	Restore habitats impacted by multi-purpose hydrological changes
CL03	Restore habitats following geological and natural catastrophes
CN02	Implement climate change adaptation measures

Prioritization of measures to be implemented during the next MFF period

Ensuring the long-term future of the freshwater pearl mussel will require significant, integrated catchment management measures in order to halt direct impacts, to restore natural hydrological regimes and to reduce losses of sediment and nutrients from indirect sources. Such measures will take considerable effort to deliver in full and cannot be delivered in a single MFF period. However, progress will continue to be made during this period.

Continuity of results-based agri-environment programmes for freshwater pearl mussel will be required, with the Pearl Mussel Project running until 2023 and a new programme following on. Measures to reduce effects of forestry, turf-cutting and to restore more natural systems in the top eight catchments will also need to be established. Catchment-specific solutions will need to be delivered in some cases.

Other projects listed above, such as river-focused EIPs and work being undertaken by LAWPRO, which are delivering measures both within and beyond Natura 2000 will continue during this period.

Measures to improve water quality will continue to be delivered through the river basin planning cycles. Ireland's third River Basin Management Plan (2022 – 2027) will be published in December 2021. It is essential that the next river basin planning cycle and any other Water Framework Directive driven project takes the ecological requirements of water-dependent Annex I habitats, Annex II species and bird species fully into account to ensure effective and appropriate measures for their maintenance or restoration are identified and implemented.

The Waters of Life project, which will run until 2026, will act as a river basin-scale demonstration project, testing the effectiveness of the plan's best practice measures across a range of landscapes in five catchments. The project will encourage local communities and landowners to get involved in developing management actions for farmland and forested land. It will also build synergies between measures addressing water quality and biodiversity. The catchments, which have yet to be selected may overlap with Natura 2000.

To complement measures being undertaken under the Water Framework Directive, specific targeted programmes will be developed for a number prioritised catchments and habitats. Projects that develop measures for hard water lakes to deal with pressures arising from agriculture, other point and diffuse pollution; water abstractions and turf-cutting are planned. Measures for certain sites selected for Slender Naiad, where specific issues have been identified, are prioritised.

Measures for turloughs will need to be integrated with those for species-rich grasslands, meadows and limestone pavement (in E.2.4).

Efforts will continue to halt the spread of Crayfish Plague, including the prevention of the introduction of non-indigenous crayfish species (NICS) to Ireland.

Measures to remove barriers/construct fish passes to improve access for fish species will continue. Due regard will need to be given to any potential negative consequences or risks that may arise, including for other protected species (such as freshwater pearl mussel) and in the potential spread of invasive species.

Direct and targeted intervention is needed at key freshwater sites in order to ensure that listed species continue to be a feature of the SPA Network (i.e. Common Scoter (*Melanitta nigra*). For sustainable conservation

management, a multi-species approach to the conservation of our wetland birds is required. This includes measures for the conservation of breeding and non-breeding waterbirds associated with freshwater lakes.

List of prioritized measures to be carried out, and estimated costs for these measures

- within Natura 2000 sites designated for the targeted habitats and species

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Agri-environmental scheme for freshwater pearl mussel catchments: extensive grazing, no fertiliser input, no pesticides, nutrient management	recurring	8 priority catchments	€2,000,000	EAFRD/National
Non-productive investment for the improvement of farmed habitats in freshwater pearl mussel catchments: drain blocking, fencing, water troughs, nose pumps; exclusion areas to prevent livestock incursion	one-off	8 priority catchments	€50,000	EAFRD/National
Forest management measures: continuous cover, selective felling, conversion to native species	recurring	8 priority catchments	€2,000,000	National
Ex-situ breeding facilities for freshwater pearl mussel: development	one-off		€14,300	National
Ex-situ breeding programme for freshwater pearl mussel	recurring		€100,000	National
Removal of barriers to fish (priority rivers to be identified by IFI)	one-off		€50,000	National/LIFE
Crayfish plague biosecurity measures	recurring		€5,000	National
Species re-establishment measures for freshwater crayfish	one-off		€15,000	National
Agri-environmental scheme for farmed land on islands and lakeshores at key sites selected for waterbird assemblages including 4 SPAs selected for *Melanitta nigra;* extensive grazing (average annual cost per hectare: €400)	recurring	150 ha	€60,000	EAFRD/National
Non-productive investment for the improvement of land on islands and lakeshores at key sites selected for waterbird assemblages including 4 SPAs selected for *Melanitta nigra:* fencing; scrub clearance (average annual cost per hectare: €350)	one-off	25 ha	€1,250	EAFRD/National
Predator control at key sites selected for waterbird assemblages including 4 SPAs selected for *Melanitta nigra*	recurring		€10,000	National/LIFE
Agri-environmental scheme for prioritised hard water lake catchments: extensive grazing; low/no fertiliser input, nutrient management	recurring	Prioritised catchments	€750,000	EAFRD/National/ LIFE
Non-productive investment for the restoration of prioritised hard water lake catchments: including fencing, water troughs, nose pumps; exclusion areas to prevent livestock incursion (average annual cost per hectare: €400)	one-off		€35,000	EAFRD/National/ LIFE
Agri-environmental scheme for prioritised turloughs: extensive grazing; low/no fertiliser input, nutrient management (average annual cost per hectare: €450)	recurring		€100,000	EAFRD/National/ LIFE
Non-productive investment for the restoration of prioritised turloughs: incl. fencing, water troughs, nose pumps; exclusion areas to prevent livestock incursion (average annual cost per hectare: €400)	one-off		€20,000	EAFRD/National/ LIFE
Measures to halt damage due to turf-cutting affecting catchments of Natura 2000 sites (covered under E.2.3.)	one-off		0	National/ LIFE/ERDF
Measures to prevent/halt water pollution/other water-related impacts in catchments affecting Natura 2000 sites	recurring		€10,000,000	EAFRD/National/ LIFE/ERDF

- additional measures beyond Natura 2000 (wider green infrastructure measures)

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Measures to prevent/halt water pollution/other water-related impacts in catchments affecting Natura 2000 sites	recurring	Included above	0	EAFRD/National/ LIFE/ERDF
Catchment management measures under the Waters of LIFE IP (all measures)	one-off	5 catchments	€1,285,714	LIFE/National

* indicate whether the measure is recurring or one-off

Expected results for targeted species and habitat types

Measures to improve water quality via Water Framework Directive mechanisms and schemes targeting prioritised species and habitats will start to improve the status of these features, but it will take time for these improvements to manifest themselves. Implementation of appropriate agri-environmental measures at a catchment-level will deliver improvements to water quality, and quantity, as will forestry measures.

Expected results: other benefits

Catchment-level improvements to water quality and restoration of hydrological processes will have multiple benefits for all the habitats within those catchments. This will also improve human water supplies and make these catchments more resilient to the effects of extreme weather events such as flooding and droughts.

E.2.9. Others (caves, etc.)

Current status of habitats and species, conservation measures taken until now and their impact so far, remaining pressures and threats

Not used

Measures needed to maintain or restore favourable conservation status

Not used

Prioritization of measures to be implemented during the next MFF period

Not used

List of prioritized measures to be carried out, and estimated costs for these measures

- within Natura 2000 sites designated for the targeted habitats and species

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Not used				

- additional measures beyond Natura 2000 (wider green infrastructure measures)

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Not used				

* indicate whether the measure is recurring or one-off

Expected results for targeted species and habitat types

Not used

Expected results: other benefits

Not used

E.2.10. References for site-related maintenance and restoration measures within and beyond Natura 2000

Section E.1.6 contains references that are also relevant here.

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E.3. Additional species-specific measures not related to specific ecosystems or habitats

E.3. Additional species-specific measures not related to specific ecosystems or habitats

Curlew (*Numenius arquata*) is described under a separate heading as it is a widely occurring species that is present in a variety of MAES groups and it is not restricted to Natura 2000 sites. Recent surveys (2015-2017) have confirmed that 71% of breeding pairs were on peatlands and heather moorland, while the remaining 29% were mainly found on rushy pasture and wet grassland.

E.3.1. Species-specific measures and programmes not covered elsewhere

Current status of the species

As mentioned previously, Curlew is listed as having unfavourable conservation status as a breeding and wintering species for Ireland and is on the BoCCI red list for both breeding and wintering populations. The breeding Curlew population is regarded as being at high risk of extinction in Ireland.

The first national survey of breeding Curlew, between 2015 and 2017 recorded 138 pairs and thus a 96% decline since Bird Atlas of 1988-1991.

The wintering population of Curlew is estimated to be c. 24,000 individuals; this is derived from a 5-year mean peak across all sites monitored by IWeBS during the period 2011-2016. This represents a short-term (12 year) decline of 21% and a long-term (29 year) decline of 69%. While this is likely to be an underrepresentation of the full population as many wintering birds may occur on uncounted sites, such as those inland, the count method has been consistent and thus the trends show real change.

Summary population and range information for breeding Curlew from Article 12 reporting

Population size	Population trend (NPWS 2019) (short term)	Population trend (NPWS 2019) (long term)	Long-term Range (NPWS 2013)	Long-term Range Balmer *et al* (2013)
138 Pairs	-86%	-98%	-89%	-78%

The cause of decline in the breeding Curlew population is considered to be a combination of factors, ultimately linked to habitat change. This includes both agricultural intensification and farm abandonment driving changes in sward type and structure, vegetation cover and associated factors, large-scale commercial peat extraction and afforestation. Potentially increasing in significance is the development of renewable energy infrastructure further posing a threat or potentially having impacted at some sites already. Predation is widely cited as a major cause of Curlew decline and this is likely linked to the composition and configuration of habitats on a landscape scale. These threats and pressures are accounted for in the International Single Species Action Plan for the Conservation of the Eurasian Curlew.

Conservation Measures delivered to date

Over half of the breeding Curlew recorded in the 2015-2017 national survey occurred within designated sites although breeding Curlew is not a Qualifying Interest of any designated site.

There were a number of new or extant projects, agri-environment schemes and measures which attempted to support the suite of breeding waders including Curlew during the previous PAF period. These included works focussed on key breeding wader “hotspots” such as the Shannon Callows, machair areas of the north and west coasts and some individual peatland sites in the midlands, as well as providing an AE mechanism targeted at Curlew conservation in the wider countryside via the GLAS scheme

European Innovation Partnership

In spring 2018, the Irish Breeding Curlew EIP was granted just over €1m of funding from DAFM for a four-year project to address factors contributing to the decline of breeding Curlew in Ireland The project, which will run until December 2021, is run by BirdWatch Ireland in partnership with the Irish Natura and Hill Farmers Association (INHFA), the Irish Grey Partridge Conservation Trust and Teagasc. It is operating at known breeding sites around Lough Corrib, Co Galway and the South Leitrim bogs area and is trialling pioneering measures to improve breeding outcomes on both farmland and bogs.

Curlew Task Force

This was initiated in 2017 and comprised over 30 representatives from various sectors and backgrounds which represent a cross-section of stakeholders associated with breeding Curlew in Ireland.

Curlew Conservation Programme

In 2017, NPWS designed a Curlew Conservation Programme, which operates in six key areas, covering about 50% of the national population. It has two main pillars, with an emphasis on 'local' to ensure flexibility to adapt to local situations and requirements:

(1) Action on the ground by landowners, local communities and a Local Curlew Team consisting of a Curlew Advisory Officer, a Curlew Champion and a Nest Protection Officer. This is known as the Curlew Conservation Partnership.

(2) A research programme at UCD, investigating the effectiveness of the measures undertaken, with a view to informing future roll-out and application of measures.

Halting Environmental Loss Project (HELP)

The Halting Environmental Loss Project (HELP) was completed at the end of 2014. This four-year project, funded by INTERREG IVA under the European Regional Development Fund (ERDF), was led by RSPB Northern Ireland, with BirdWatch Ireland and RSPB Scotland as junior partners. The main aim in the border region (the eligible project area in the Republic of Ireland), was the conservation of breeding waders through surveys, habitat management and engagement with farmers.

Co-operation Across Borders for Biodiversity (CABB)

The Co-operation Across Borders for Biodiversity Project (CABB) is an INTERREG-funded cross-border initiative between six partners. One of the aims is to help conserve populations of breeding waders, including Curlew, through monitoring, direct management of habitats, capital works (including permanent and temporary predator-proof fences) advisory work with farmers and advocacy. Exchange of knowledge and best practice across the three regions is also an important element.

Collaborative Action for the Natura Network (CANN)

Another INTERREG project, the CANN project, is focusing on seven protected wetland habitats (including blanket bogs and heaths) and seven species, including and breeding wader species. In Ireland conservation efforts will be delivered in in 5 SACs and where possible Curlew is being integrated into plans at these sites.

RBAPS – Shannon Callows

The Results-Based agri-environment pilot scheme included a pilot area in the Shannon Callows where a wader measure was trialled. The approach was regarded as an effective approach albeit with limited results delivery during the project period.

Ballydangan Bog

Established in 2009, the Ballydangan Bog Red Grouse Project aims to prevent the decline and, in the long-term, increase the numbers of red grouse and other birds of conservation concern on Ballydangan Bog, Co. Roscommon. The originally focussed on Red Grouse conservation but now maintains potentially the best site for

breeding Curlew in Ireland supporting up to 7 pairs. The project received an award at the National Biodiversity Conference of February 2019 in the "People Together for Biodiversity Award, Large Project" category.

Kildare Bogs

A number of local projects exist covering bogs in the Irish midlands and County Kildare which contribute to efforts for Curlew conservation these include education monitoring and management at Lodge Bog by the Irish Peatland Conservation Council and there are efforts on predator control on four other midlands bogs by Wild Kildare.

Other Initiatives

DAFM is implementing an interim safeguarding measure for Curlew within their forestry applications process. Finalising these safeguarding measures will be dependent upon State-led decision making and should take cognisance of the recommendations of the Curlew Task Force.

While no specific land management work is noted for the wintering population, hunting of Curlew in winter was ceased in 2012

Measures needed to maintain or restore favourable conservation status

The measures identified for breeding and wintering Curlew to restore favourable conservation status are provided below:

- Enhance conservation provision for all remaining Curlew pairs and build potential for expansion of the population to secure it for future (more habitat, better productivity etc.)
- Utilise agri-environment provision more effectively; cooperative working, better guidance, redesigned measures, capital works (NPIs) and advisory supports
- Tackle identified wider countryside threats to species by ensuring development planning, forestry and other land use takes proper account of the species
- Utilise state lands as effectively as possible for the species; national parks and nature reserves in particular but also where semi-state bodies can contribute
- Pilot approaches to rehabilitating ground currently under forest stands or managed as commercially exploited peatlands
- Ensure existing designated sites that have Curlew are suitably supported
- Raise public awareness to ensure support for actions to conserve the species are widely supported
- Establish a framework through Species Action Planning and ensure it is implemented
- Ensure ongoing research and monitoring to inform action is carried out

Prioritization of measures to be implemented during the next MFF period

The following measures identified for breeding Curlew are prioritised in the 2021-2027 period:

- Enhance conservation provision for all remaining Curlew pairs and build potential for expansion of the population to secure it for future (more habitat, better productivity etc.)
- Utilise agri-environment provision more effectively; cooperative working, better guidance, redesigned measures
- Tackle identified wider countryside threats to species by ensuring development planning, forestry and other land use takes proper account of the species
- Utilise state lands as effectively as possible for the species; national parks and nature reserves in particular but also where semi-state bodies can contribute
- Pilot approaches to rehabilitating ground lost in past such as inappropriate forestry or commercial peatlands
- Ensure existing designated sites that have Curlew are suitably supported

Uptake of GLAS Curlew measures appears high but the effectiveness of measures in terms of delivery is unknown. A national scheme funded under EAFRD is recommended.

Larger contiguous management units would enable better delivery across larger scale for Curlew which is generally a widely dispersed breeding species. A pilot scheme would demonstrate economy of scale for predator and habitat management purposes and reduce habitat fragmentation and edge effects. Enhanced management payments could be provided for clusters of farmers working across the landscape.

About 50% of the Irish Curlew population occurs within the Natura 2000 network. Designated sites where breeding waders are present could be significantly enhanced using an RBAPS model in combination with lessons from CCP and NPWS farm plan scheme. Roll out of this approach to key designated sites holding breeding Curlew over seven years would form an effective means of delivering steadily improving conditions for breeding Curlew. The four-point plan referred to above should be implemented at the very least within the Natura 2000 network, though additional measures are needed for the other 50% outside the network.

The Curlew Task Force (CTF) recommendations identify a wide range of policy changes and management proposals to protect Curlew. One example is the need to examine and develop opportunities to re-structure some existing forest plantations, where appropriate, to reduce the impacts of forest cover and edge habitat. To achieve this effectively, the introduction of open spaces at reforestation, together with strategic forest removal and habitat rehabilitation will be required. Doing so will enable the potential for restoration of range. Other examples include full recognition of Curlew in the planning process etc.

The CTF recommendations recognise the need for predator control as a support to habitat management in order to maximise recovery potential. The CTF has also identified the value of maintaining awareness of Curlew within the general public both at national level and local level.

List of prioritized measures to be carried out, and estimated costs for these measures

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
Expansion and adaption of Curlew Conservation Programme (CCP) and utilise other measures implemented via other mechanisms, such as the Curlew EIP and Interreg	recurring	100% of pop.	€505,000	National/ERDF
Curlew headstarting (i.e. improving breeding productivity via captive rearing of eggs to fledgling stage, when released)	recurring	N/A	€120,000	National/LIFE/ ERDF
Enhance GLAS measures (average annual cost per hectare: €366)	recurring	3,415ha	€1,250,000	EAFRD
Pilot landscape scale co-operation across key Curlew areas (average annual cost per hectare: €40, on top of €366ha)	recurring	300ha	€5,430	EAFRD
Deliver site specific Curlew conservation scheme for important designated sites - derived from previous RBAPS programme (average annual cost per hectare: €366)	recurring	307ha	€122,800	National/EAFRD
Deliver site specific Curlew conservation via capital works in important designated sites – 20% of above cost	one-off	50-75ha	€24,560	National/EAFRD
Forestry: clear fell rehabilitation to open ground/ peatland - pilot	recurring	5 project sites	€47,000	National/LIFE
Peatland restoration project scoping	one-off	3 Restoration plans	€2,200	National
Curlew management enhancement at key peatland nature reserves and National Parks (average annual cost per hectare: €100)	recurring	3 sites (900ha)	€14,300	National
Integrate predator control into RDP schemes	recurring	N/A	€500,000	EAFRD
World Curlew Day and other awareness raising events & promotional material	recurring	N/A	€3,000	National
WINTER				
Curlew winter population conservation review	one-off	N/A	€1,430	National

* indicate whether the measure is recurring or one-off

Expected results for targeted species

Even with such action, it is likely that Curlew will continue to be lost from territories year-on-year while the formative years of applied conservation effort are put in place. Capacity in terms of knowledge needs to be built nationally and management programmes must learn from experiences in parts of the UK and beyond to avoid repeating mistakes and implement targeted, evidence-based management. Towards this end, the UK and Ireland Curlew Action Group provides a very useful network.

Through the above initiatives, it is expected that the population in the core breeding areas may remain stable in the short-term but significant national efforts will be required if the breeding population is to increase more widely in Ireland.

Expected results: other benefits

There may be opportunities to engage on wider issues such as climate change and flood alleviation through sustainable upland management that could use the Curlew as a flagship species. These are likely to need to be large-scale projects (e.g. LIFE projects, EIPs.) but may be able to gain national support if re-wetting upland Curlew sites could be used to help stop flooding downstream in catchments, or if maintaining upland carbon-rich soils could be used to offset carbon emissions elsewhere.

Measures undertaken for Curlew should not be undertaken in isolation. While often mutually beneficial, works for Curlew, including scrape creation, scrub clearance, tree removal, water level management, fencing and so on all have the potential to interfere with the ecological functioning of other habitats or species. Time spent in designing and targeting should avoid conflicts at the time of implementation/post-action.

E.3.2. Prevention, mitigation or compensation of damage caused by protected species

Current status in terms of prevention, mitigation and compensation for damages

N/A

Measures needed

N/A

Prioritization of measures to be implemented during the next MFF period

N/A

List of prioritized measures to be carried out, and estimated costs for these measures

Name and short description of the measures	Type of measure*	Target (Unit & quantity)	Estimated cost in Euros (annualised)	Possible EU co-funding source
N/A				

* indicate whether the measure is recurring or one-off

Expected results for targeted species

N/A

Expected results: other benefits

N/A

E.3.3. References for additional species-specific measures not related to specific ecosystems or habitats

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F. Further added values of the prioritized measures

The PAF aims at halting and reversing biodiversity loss by prioritising necessary conservation measures within the Natura 2000 network and also by addressing improved connectivity of nature corridors in "green infrastructure" in the wider countryside.

This will contribute to the implementation of Union policy and legislation in the area of nature and biodiversity, not only under Directives 92/43/EEC and 2009/147/EC but also under the European Union Biodiversity Strategy to 2030 and the EU Green Deal.

The PAF will assist in improving the knowledge base for the elaboration, implementation, assessment, monitoring and evaluation of Union nature and biodiversity policy and legislation, and for the assessment and monitoring of the factors, pressures and responses that impact on nature and biodiversity within Ireland.

The PAF provides the prioritisation for implementing Ireland's commitments under the Nature Directives (Birds and Habitats Directives) and in turn augments the EU contribution to the Aichi targets and the likely post-2020 targets of the UN Convention on Biological Diversity. The Programme for Government, published in June 2020, contains a range of actions to promote and protect biodiversity in Ireland, and implementation of the PAF will be a significant contribution to that work.

As a Party to the UN Convention on Biological Diversity (CBD), Ireland has made a commitment to prepare Action Plans towards the achievement of the Convention's targets: namely to secure the conservation of biological diversity; sustainable use of its components; and the equitable sharing of the benefits arising out of the utilisation of genetic resources. Ireland's 3rd National Biodiversity Action Plan (NBAP) 2017-2021, arising from these commitments, sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland's Vision for Biodiversity that "biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally".

The NBAP contains 119 actions under a framework of seven strategic objectives. These encompass mainstreaming biodiversity into decision making across all sectors; strengthening the knowledge base for the conservation; increasing awareness and appreciation of biodiversity and ecosystem services; conserving and restoring biodiversity and ecosystem services in the wider countryside; conserving and restoring ecosystem services in the marine environment; expanding and improving management of protected areas and species; and strengthening international governance for biodiversity and ecosystem services. The PAF is intended to provide a focus for the delivery of NBAP actions as it relates to access to EU funding that would support this delivery.

The importance of pollinators, and reducing and resolving the threats they face, feature strongly across a range of policy documents, such as the EU Farm to Fork Strategy, the EU Biodiversity Strategy, and Ireland's current Programme for Government. Specific actions within this Programme aim to support biodiversity data collection and the publishing of a new All-Ireland Pollinator Plan. The current plan (2015-2020) is strongly supported across the private and public sector. Many of the conservation measures for habitats and species contained in the PAF will also improve the prospects for pollinators.

Many of Ireland's economic sectors depend on high quality air, soils, water, and diverse habitats. However, Ireland can only be sustainable if our natural assets are protected from degradation. Improved management of nature and biodiversity can assist in contributing to our heritage, health, well-being, enjoyment and national identity.

Continued awareness of biodiversity and its importance to our lives is crucial and there needs to be on-going efforts to raise awareness and encourage positive engagement with Ireland's habitats and species. The PAF promotes the importance of the wide range of ecosystems, habitats and species to society as a whole, and this economic value can be further elaborated through the concepts of natural accounting and an increased

recognition of the value of ecosystem services. It is accepted that the protection of biodiversity provides a buffer from the impacts of climate change. Improved management of natural ecosystems can increase the natural adaptive capacity of biodiversity, while also contributing to climate change mitigation.

Biodiversity, ecosystem services and the economic, social, cultural and societal benefits they provide are vital to Ireland's continued economic recovery and healthy and sustainable future. Ireland's plan for infrastructure and capital investment 2016-2021 acknowledges the role of our natural heritage for economic growth, highlighting investments in the rehabilitation of peatlands. In addition to investment in physical infrastructure, investing directly in biodiversity through protection and rehabilitation of habitats is fundamental for sustaining and improving the benefits we get from nature. This PAF prioritises the key measures for sustaining and improving the condition of biodiversity, and consequently its ecosystem services, on our land and in our seas and freshwaters.

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Appendix 1:

Conservation measures listed for each habitat and species for each MAES group under E.2.1. to E.2.8.

Bogs, mires, fens and other wetlands

CM_CODE	CM_NAME	Birds	Bogs, mires, fens and other wetland birds	CM_2190 Humid dune slacks	CM_7110 Active raised bogs*	CM_7120 Degraded raised bogs still capable of natural regeneration	CM_7130 Blanket bogs (* if active bog)	CM_7140 Transition mires and quaking bogs	CM_7150 Depressions on peat substrates of the Rhynchosporion	CM_7210 Calcareous fens with Cladium mariscus and species of the Caricion davallianae*	CM_7220 Petrifying springs with tufa formation (Cratoneurion)*	CM_7230 Alkaline fens	CM_1013 *Vertigo geyeri*	CM_1014 *Vertigo angustior*	CM_1016 *Vertigo moulinsiana*	CM_1528 *Saxifraga hirculus*	CM_6216 *Hamatocaulis vernicosus*
CA01	Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land	Birds	2190				7130	7140	7150	7210		7230					6216
CA02	Restore small landscape features on agricultural land							7140		7210		7230	1013	1014	1016	1528	
CA03	Maintain existing extensive agricultural practices and agricultural landscape features		2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CA04	Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures		2190	7110	7120		7140	7150	7210	7220	7230	1013	1014	1016	1528		
CA05	Adapt mowing, grazing and other equivalent agricultural activities		2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CA06	Stop mowing, grazing and other equivalent agricultural activities		2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016			
CA07	Recreate Annex I agricultural habitats	Birds															
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production		2190					7140		7210		7230		1014			6216
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities		2190					7140		7210	7220	7230	1013	1014	1016		6216
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities		2190					7140		7210	7220	7230	1013	1014	1016		6216
CA12	Reduce/eliminate air pollution from agricultural activities		2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016			6216
CA15	Manage drainage and irrigation operations and infrastructures in agriculture	Birds	2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528		6216
CB01	Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation	Birds		7110	7120	7130		7150		7220		1013	1014				
CB04	Adapt/manage reforestation and forest regeneration																
CB05	Adapt/change forest management and exploitation practices			7110	7120	7130		7150									
CB06	Stop forest management and exploitation practices			7110	7120	7130		7150									
CB08	Restoration of Annex I forest habitats			7110	7120			7150									
CB10	Reduce diffuse pollution to surface or ground waters from forestry activities					7130	7140	7150	7210	7220	7230				1528	6216	
CB14	Manage drainage and irrigation operations and infrastructures			7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CC01	Adapt/manage extraction of non-energy resources		2190	7110	7120	7130	7140	7150	7210		7230				1528		
CC02	Adapt/manage exploitation of energy resources			7110	7120	7130	7140	7150	7210		7230				1528		
CC03	Adapt/manage renewable energy installation, facilities and operation	Birds				7130	7140	7150			7230				1528		
CC04	Reduce impact of hydropower operation and infrastructure					7130		7150									
CC07	Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure			7110	7120	7130	7140	7150	7210		7230				1528		
CC08	Manage/reduce/eliminate point pollution to surface or ground waters from resource exploitation and energy production			7110	7120	7130	7140	7150	7210		7230				1528		
CC09	Manage/reduce/eliminate diffuse pollution to surface or ground waters from resource exploitation and energy production						7140		7210		7230				1528		
CC10	Manage/reduce/eliminate air pollution from resource exploitation and energy production						7140		7210		7230						
CC13	Manage water abstraction for resource extraction and energy production					7130	7140	7150	7210		7230				1528		
CE01	Reduce impact of transport operation and infrastructure		2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528		
CE02	Manage/reduce/eliminate pollution to surface or ground water from transport						7140		7210		7230						
CE06	Habitat restoration of areas impacted by transport					7130		7150					1014	1016			
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities		2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528		
CF03	Reduce impact of outdoor sports, leisure and recreational activities	Birds	2190	7110	7120	7130	7140	7150		7220	7230	1013	1014	1016	1528	6216	
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities		2190				7140		7210		7230						
CF05	Reduce/eliminate diffuse pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities		2190				7140		7210		7230						
CF06	Reduce/eliminate air pollution from industrial, commercial, residential and recreational areas and activities						7140		7210		7230						
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development		2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CF11	Manage water abstraction for public supply and for industrial and commercial use		2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants	Birds															
CG06	Reduce impact of lead poisoning	Birds															
CG10	Manage water abstraction and modifications of hydrological conditions for freshwater aquaculture																
CG14	Other measures to reduce impacts of freshwater aquaculture infrastructures and operation					7130		7150									
CH03	Reduce impact of other specific human actions	Birds	2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CI01	Early detection and rapid eradication of invasive alien species of Union concern	Birds	2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CI02	Management, control or eradication of established invasive alien species of Union concern	Birds	2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CI03	Management, control or eradication of other invasive alien species	Birds	2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CI05	Management of problematic native species	Birds	2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CJ03	Restore habitats impacted by multi-purpose hydrological changes		2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CL01	Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes		2190			7130		7150									
CL03	Restore habitats following geological and natural catastrophes					7130		7150									
CN02	Implement climate change adaptation measures	Birds	2190	7110	7120	7130	7140	7150	7210	7220	7230	1013	1014	1016	1528	6216	
CS01	Reinforce populations of species from the directives	Birds															

Freshwater habitats (rivers and lakes)

CM_CODE	CM_NAME	Birds	CM_3110	CM_3130	CM_3140	CM_3150	CM_3160	CM_3180	CM_3260	CM_3270	CM_1029	CM_1092	CM_1095	CM_1096	CM_1099	CM_1103	CM_1106	CM_1355	CM_1833	CM_5046
CA01	Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land		3110	3130	3140	3150	3160	3180	3260	3270	1029								1833	
CA02	Restore small landscape features on agricultural land							3180			1029									
CA03	Maintain existing extensive agricultural practices and agricultural landscape features		3110	3130	3140	3150		3180	3260	3270	1029								1833	
CA04	Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures							3180												
CA05	Adapt mowing, grazing and other equivalent agricultural activities		3110	3130	3140	3150	3160	3180	3260	3270	1029								1833	
CA06	Stop mowing, grazing and other equivalent agricultural activities		3110	3130	3140	3150	3160	3180	3260	3270	1029								1833	
CA08	Adapt soil management practices in agriculture		3110	3130	3140	3150		3180	3260	3270	1029								1833	
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production	Birds	3110	3130	3140	3150		3180	3260		1029	1092	1095	1096	1099	1103	1106		1833	
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities	Birds	3110	3130	3140	3150		3180	3260	3270	1029	1092	1095	1096	1099	1103	1106		1833	
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities	Birds	3110	3130	3140	3150	3160	3180	3260	3270	1029	1092	1095	1096	1099	1103	1106		1833	5046
CA12	Reduce/eliminate air pollution from agricultural activities		3110	3130	3140	3150		3180	3260								1106		1833	
CA15	Manage drainage and irrigation operations and infrastructures in agriculture		3110	3130	3140	3150	3160	3180	3260	3270	1029	1092	1095	1096	1099	1103	1106		1833	
CB01	Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation		3110	3130	3140	3150	3160		3260										1833	
CB04	Adapt/manage reforestation and forest regeneration		3110	3130	3140	3150	3160		3260		1029								1833	
CB05	Adapt/change forest management and exploitation practices						3160				1029						1106			
CB06	Stop forest management and exploitation practices						3160				1029									
CB08	Restoration of Annex I forest habitats										1029									
CB09	Manage the use of chemicals for fertilisation, liming and pest control in forestry		3110	3130	3140	3150	3160		3260		1029								1833	
CB10	Reduce diffuse pollution to surface or ground waters from forestry activities	Birds	3110	3130	3140	3150	3160	3180	3260	3270	1029	1092					1106		1833	
CB14	Manage drainage and irrigation operations and infrastructures		3110	3130	3140	3150	3160	3180	3260	3270	1029								1833	
CC01	Adapt/manage extraction of non-energy resources		3110	3130	3140	3150	3160	3180	3260	3270	1029								1833	
CC02	Adapt/manage exploitation of energy resources		3110	3130	3140	3150	3160		3260		1029								1833	
CC03	Adapt/manage renewable energy installation, facilities and operation						3160													
CC04	Reduce impact of hydropower operation and infrastructure		3110	3130	3140	3150	3160		3260	3270	1029		1095	1096	1099	1103	1106		1833	
CC07	Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure		3110	3130	3140	3150	3160		3260	3270	1029		1095	1096	1099	1103	1106		1833	
CC08	Manage/reduce/eliminate point pollution to surface or ground waters from resource exploitation and energy production		3110	3130	3140	3150	3160	3180	3260	3270	1029						1106		1833	
CC09	Manage/reduce/eliminate diffuse pollution to surface or ground waters from resource exploitation and energy production		3110	3130	3140	3150	3160	3180	3260	3270	1029						1106		1833	
CC13	Manage water abstraction for resource extraction and energy production		3110	3130	3140	3150	3160		3260	3270	1029								1833	
CE01	Reduce impact of transport operation and infrastructure		3110	3130	3140	3150	3160	3180	3260	3270	1029								1833	
CE06	Habitat restoration of areas impacted by transport		3110	3130	3140	3150	3160	3180	3260	3270	1029				1099	1103		1355	1833	
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities		3110	3130	3140	3150	3160	3180	3260	3270	1029								1833	
CF03	Reduce impact of outdoor sports, leisure and recreational activities	Birds	3110	3130	3140	3150	3160	3180	3260	3270	1029								1833	
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities		3110	3130	3140	3150	3160	3180	3260		1029	1092	1095	1096	1099		1106		1833	5046
CF05	Reduce/eliminate diffuse pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities		3110	3130	3140	3150	3160	3180	3260		1029	1092	1095	1096	1099		1106		1833	5046
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development		3110	3130	3140	3150	3160	3180	3260	3270	1029		1095		1099		1106		1833	
CF11	Manage water abstraction for public supply and for industrial and commercial use		3110	3130	3140	3150	3160	3180	3260	3270	1029						1106		1833	
CG01	Management of professional/commercial fishing (including shellfish and seaweed harvesting)												1095			1103	1106			
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants	Birds											1095		1099	1103	1106	1355		
CG04	Control/eradication of illegal killing, fishing and harvesting																1106			
CG05	Reduce bycatch and incidental killing of non-target species															1103		1355		
CG06	Reduce impact of lead poisoning	Birds																		
CG12	Reduce/eliminate diffuse pollution to surface waters from freshwater aquaculture		3110	3130	3140	3150		3180									1106	1355		
CH03	Reduce impact of other specific human actions	Birds	3110	3130	3140	3150	3160	3180	3260	3270	1029	1092	1095	1096	1099	1103	1106	1355	1833	5046
CI01	Early detection and rapid eradication of invasive alien species of Union concern	Birds	3110	3130	3140	3150	3160	3180	3260	3270	1029	1092	1095	1096	1099	1103	1106	1355	1833	5046
CI02	Management, control or eradication of established invasive alien species of Union concern	Birds	3110	3130	3140	3150	3160	3180	3260	3270	1029	1092	1095	1096	1099	1103	1106	1355	1833	5046
CI03	Management, control or eradication of other invasive alien species	Birds	3110	3130	3140	3150	3160	3180	3260	3270	1029	1092	1095	1096	1099	1103	1106	1355	1833	5046
CI05	Management of problematic native species	Birds	3110	3130	3140	3150	3160	3180	3260	3270	1029	1092	1095	1096	1099	1103	1106	1355	1833	5046
CJ03	Restore habitats impacted by multi-purpose hydrological changes		3110	3130	3140	3150	3160	3180	3260	3270	1029						1106		1833	
CL03	Restore habitats following geological and natural catastrophes						3160				1029									
CN02	Implement climate change adaptation measures	Birds	3110	3130	3140	3150	3160	3180	3260	3270	1029	1092	1095	1096	1099	1103	1106	1355	1833	5046

Freshwater habitats birds

Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)

Oligotrophic to mesotrophic standing waters with vegetation of Littorelletea uniflorae and/or Isoeto-Nanojuncetea

Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.

Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation

Natural dystrophic lakes and ponds

Turloughs*

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation

Margaritifera margaritifera

Austropotamobius pallipes

Petromyzon marinus

Lampetra planeri

Lampetra fluviatilis

Alosa fallax

Salmo salar

Lutra lutra

Noturus flavipinnis

Alosa killarnensis

Grasslands

CM_CODE	CM_NAME	Birds	CM_1330	CM_1410	CM_21A0	CM_2130	CM_6130	CM_6210	CM_6410	CM_6230	CM_6430	CM_6510	CM_1065	CM_1395
		Grassland birds	Atlantic salt meadows	Mediterranean salt meadows	Machairs (* in Ireland)	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Calaminarian grasslands of the Violetalia calaminariae	Semi-natural dry grasslands and scrubland facies on calcareous substrates *	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils	Species-rich *Nardus* grasslands, on siliceous substrates	Hydrophilous tall herb fringe communities	Lowland hay meadows	*Euphydryas aurinia*	*Petalophyllum ralfsii*
CA01	Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land		1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	1395
CA02	Restore small landscape features on agricultural land	Birds												
CA03	Maintain existing extensive agricultural practices and agricultural landscape features	Birds	1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	1395
CA04	Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures	Birds	1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	1395
CA05	Adapt mowing, grazing and other equivalent agricultural activities	Birds	1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	1395
CA06	Stop mowing, grazing and other equivalent agricultural activities		1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	
CA07	Recreate Annex I agricultural habitats				21A0	2130		6210	6410			6510		
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production	Birds			21A0	2130		6210	6410	6230		6510	1065	1395
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities				21A0	2130		6210	6410		6430			1395
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities				21A0	2130		6210	6410		6430			1395
CA12	Reduce/eliminate air pollution from agricultural activities				21A0	2130		6210	6410	6230				1395
CA15	Manage drainage and irrigation operations and infrastructures in agriculture		1330	1410	21A0	2130			6410		6430			1395
CB01	Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation	Birds							6410	6230			1065	
CB14	Manage drainage and irrigation operations and infrastructures								6410	6230				
CC01	Adapt/manage extraction of non-energy resources				21A0	2130	6130	6210					1065	1395
CC02	Adapt/manage exploitation of energy resources								6410				1065	
CC07	Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure												1065	
CC08	Manage/reduce/eliminate point pollution to surface or ground waters from resource exploitation and energy production				21A0	2130		6210						
CC09	Manage/reduce/eliminate diffuse pollution to surface or ground waters from resource exploitation and energy production				21A0	2130								
CE01	Reduce impact of transport operation and infrastructure				21A0	2130								1395
CE06	Habitat restoration of areas impacted by transport				21A0	2130								
CF01	Manage conversion of land for construction and development of infrastructure						6130							
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities		1330	1410	21A0	2130	6130							1395
CF03	Reduce impact of outdoor sports, leisure and recreational activities	Birds	1330	1410	21A0	2130	6130	6210	6410	6230				1395
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities		1330	1410	21A0	2130	6130				6430			1395
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development		1330	1410	21A0	2130								1395
CF11	Manage water abstraction for public supply and for industrial and commercial use				21A0									1395
CH03	Reduce impact of other specific human actions	Birds	1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	1395
CI01	Early detection and rapid eradication of invasive alien species of Union concern	Birds	1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	1395
CI02	Management, control or eradication of established invasive alien species of Union concern	Birds	1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	1395
CI03	Management, control or eradication of other invasive alien species	Birds	1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	1395
CI05	Management of problematic native species	Birds	1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	1395
CJ03	Restore habitats impacted by multi-purpose hydrological changes		1330	1410	21A0	2130					6430			1395
CL01	Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes		1330	1410			6130							
CN02	Implement climate change adaptation measures	Birds	1330	1410	21A0	2130	6130	6210	6410	6230	6430	6510	1065	1395

Heathlands and shrubs

CM_CODE	CM_NAME	Heathland birds	Mediterranean and thermo-Atlantic halophilous scrubs	Decalcified fixed dunes	Atlantic decalcified fixed dunes	Dunes with *Salix repens* ssp. *argentea*	Northern Atlantic wet heaths	European dry heaths	Alpine and Boreal heaths	*Juniperus communis* formations	*Geomalacus maculosus*
		Birds	CM_1420	CM_2140	CM_2150	CM_2170	CM_4010	CM_4030	CM_4060	CM_5130	CM_1024
CA01	Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land			2140	2150	2170	4010	4030		5130	1024
CA02	Restore small landscape features on agricultural land									5130	
CA03	Maintain existing extensive agricultural practices and agricultural landscape features	Birds		2140	2150	2170	4010	4030	4060	5130	1024
CA04	Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures	Birds		2140	2150	2170	4010	4030	4060	5130	
CA05	Adapt mowing, grazing and other equivalent agricultural activities	Birds		2140	2150	2170	4010	4030	4060	5130	1024
CA06	Stop mowing, grazing and other equivalent agricultural activities			2140	2150	2170	4010	4030	4060	5130	1024
CA07	Recreate Annex I agricultural habitats	Birds		2140	2150	2170	4010	4030	4060	5130	
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production						4010	4030	4060	5130	
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities						4010	4030	4060	5130	
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities						4010	4030	4060	5130	
CA12	Reduce/eliminate air pollution from agricultural activities			2140	2150		4010	4030	4060	5130	
CA15	Manage drainage and irrigation operations and infrastructures in agriculture	Birds					4010				
CB01	Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation	Birds					4010	4030	4060		1024
CB04	Adapt/manage reforestation and forest regeneration										1024
CB05	Adapt/change forest management and exploitation practices						4010	4030	4060		1024
CB06	Stop forest management and exploitation practices						4010	4030	4060		1024
CB08	Restoration of Annex I forest habitats										1024
CB10	Reduce diffuse pollution to surface or ground waters from forestry activities						4010	4030	4060		
CC01	Adapt/manage extraction of non-energy resources			2140	2150	2170	4010	4030	4060	5130	
CC02	Adapt/manage exploitation of energy resources						4010	4030			
CC03	Adapt/manage renewable energy installation, facilities and operation	Birds					4010	4030	4060	5130	
CC07	Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure						4010	4030	4060	5130	
CC08	Manage/reduce/eliminate point pollution to surface or ground waters from resource exploitation and energy production						4010	4030	4060	5130	
CC09	Manage/reduce/eliminate diffuse pollution to surface or ground waters from resource exploitation and energy production						4010	4030	4060	5130	
CE01	Reduce impact of transport operation and infrastructure						4010	4030	4060	5130	1024
CE06	Habitat restoration of areas impacted by transport			2140	2150	2170	4010	4030	4060	5130	
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities			2140	2150	2170	4010	4030	4060	5130	1024
CF03	Reduce impact of outdoor sports, leisure and recreational activities		1420	2140	2150	2170	4010	4030	4060	5130	1024
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development		1420	2140	2150	2170	4010	4030	4060		
CF11	Manage water abstraction for public supply and for industrial and commercial use						4010	4030	4060		
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants	Birds									
CH03	Reduce impact of other specific human actions	Birds	1420	2140	2150	2170	4010	4030	4060	5130	1024
CI01	Early detection and rapid eradication of invasive alien species of Union concern	Birds	1420	2140	2150	2170	4010	4030	4060	5130	1024
CI02	Management, control or eradication of established invasive alien species of Union concern	Birds	1420	2140	2150	2170	4010	4030	4060	5130	1024
CI03	Management, control or eradication of other invasive alien species	Birds	1420	2140	2150	2170	4010	4030	4060	5130	1024
CI05	Management of problematic native species	Birds	1420	2140	2150	2170	4010	4030	4060	5130	1024
CJ03	Restore habitats impacted by multi-purpose hydrological changes		1420				4010	4030	4060		
CL01	Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes		1420								
CL03	Restore habitats following geological and natural catastrophes						4010	4030	4060		
CN02	Implement climate change adaptation measures	Birds	1420	2140	2150	2170	4010	4030	4060	5130	1024
CS01	Reinforce populations of species from the directives	Birds									

Marine and coastal waters

CM_CODE	CM_NAME	Marine and coastal birds	Sandbanks	Estuaries	Mudflats and sandflats	Coastal lagoons*	Large shallow inlets and bays	Reefs	Submarine structures made by leaking gases	*Salicornia* and other annuals colonizing mud and sand	Submerged or partially submerged sea caves	*Tursiops truncatus*	*Phocoena phocoena*	*Halichoerus grypus*	*Phoca vitulina*
		Birds	CM_1110	CM_1130	CM_1140	CM_1150	CM_1160	CM_1170	CM_1180	CM_1310	CM_8330	CM_1349	CM_1351	CM_1364	CM_1365
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production					1150									
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities			1130	1140	1150	1160	1170		1310					
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities			1130	1140	1150	1160	1170		1310					
CA13	Reduce/eliminate marine pollution from agricultural activities	Birds		1130	1140		1160	1170		1310	8330				
CA15	Manage drainage and irrigation operations and infrastructures in agriculture					1150									
CC01	Adapt/manage extraction of non-energy resources		1110			1150									
CC02	Adapt/manage exploitation of energy resources							1170				1349	1351	1364	1365
CC03	Adapt/manage renewable energy installation, facilities and operation	Birds	1110									1349	1351	1364	1365
CC12	Reduce/eliminate noise, light, thermal and other forms of pollution related to resource exploitation and energy production	Birds										1349	1351	1364	1365
CE01	Reduce impact of transport operation and infrastructure			1130	1140	1150		1170							
CE06	Habitat restoration of areas impacted by transport			1130	1140	1150	1160	1170		1310					
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities			1130	1140	1150	1160	1170		1310					
CF03	Reduce impact of outdoor sports, leisure and recreational activities	Birds		1130	1140	1150	1160	1170		1310					
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities			1130	1140	1150	1160	1170		1310					
CF05	Reduce/eliminate diffuse pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities			1130	1140	1150	1160	1170		1310					
CF07	Reduce/eliminate marine pollution from industrial, commercial, residential and recreational areas and activities	Birds		1130	1140		1160	1170		1310	8330				
CF08	Reduce/eliminate marine contamination with litter	Birds	1110	1130	1140		1160	1170		1310	8330	1349	1351	1364	1365
CF09	Reduce/eliminate noise, light, heat or other forms pollution from industrial, commercial, residential and recreational areas and activities	Birds										1349	1351	1364	1365
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development			1130	1140	1150	1160	1170		1310					
CF11	Manage water abstraction for public supply and for industrial and commercial use					1150									
CG01	Management of professional/commercial fishing (including shellfish and seaweed harvesting)	Birds	1110	1130	1140		1160	1170		1310		1349	1351	1364	1365
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants	Birds	1110	1130	1140		1160	1170		1310		1349	1351	1364	1365
CG05	Reduce bycatch and incidental killing of non-target species	Birds										1349	1351	1364	1365
CG06	Reduce impact of lead poisoning	Birds													
CG07	Manage changes in coastal conditions for marine aquaculture			1130	1140		1160	1170		1310					
CG08	Reduce/eliminate marine pollution from marine aquaculture	Birds		1130	1140	1150	1160	1170		1310					
CH03	Reduce impact of other specific human actions	Birds	1110	1130	1140	1150	1160	1170		1310	8330	1349	1351	1364	1365
CI01	Early detection and rapid eradication of invasive alien species of Union concern	Birds	1110	1130	1140	1150	1160	1170		1310	8330				
CI02	Management, control or eradication of established invasive alien species of Union concern	Birds	1110	1130	1140	1150	1160	1170		1310	8330				
CI03	Management, control or eradication of other invasive alien species	Birds	1110	1130	1140	1150	1160	1170		1310	8330				
CI05	Management of problematic native species	Birds	1110	1130	1140	1150	1160	1170		1310	8330				
CL01	Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes					1150									
CN02	Implement climate change adaptation measures	Birds	1110	1130	1140	1150	1160	1170		1310	8330	1349	1351	1364	1365

Rocky habitats, dunes & sparsely vegetated lands

CM_CODE	CM_NAME	Annual vegetation of drift lines CM_1210	Perennial vegetation of stony banks CM_1220	Vegetated sea cliffs of the Atlantic and Baltic Coasts CM_1230	Embryonic shifting dunes CM_2110	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes") CM_2120	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) CM_8110	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii) CM_8120	Calcareous rocky slopes with chasmophytic vegetation CM_8210	Siliceous rocky slopes with chasmophytic vegetation CM_8220	Limestone pavements* CM_8240	Caves not open to the public CM_8310
CA01	Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land										8240	
CA02	Restore small landscape features on agricultural land										8240	8310
CA03	Maintain existing extensive agricultural practices and agricultural landscape features		1220	1230		2120	8110	8120	8210	8220	8240	
CA04	Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures		1220	1230		2120	8110	8120	8210	8220	8240	
CA05	Adapt mowing, grazing and other equivalent agricultural activities		1220	1230		2120	8110	8120	8210	8220	8240	
CA06	Stop mowing, grazing and other equivalent agricultural activities		1220	1230	2110	2120	8110	8120	8210	8220	8240	
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production										8240	
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities										8240	8310
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities										8240	8310
CA12	Reduce/eliminate air pollution from agricultural activities				2110	2120			8210		8240	
CA15	Manage drainage and irrigation operations and infrastructures in agriculture										8240	
CC01	Adapt/manage extraction of non-energy resources	1210	1220	1230	2110	2120	8110	8120	8210	8220	8240	
CE01	Reduce impact of transport operation and infrastructure											8310
CE05	Manage/reduce/eliminate noise, light and other forms of pollution from transport											8310
CE06	Habitat restoration of areas impacted by transport		1220		2110	2120					8240	8310
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities	1210	1220	1230	2110	2120	8110	8120	8210	8220	8240	8310
CF03	Reduce impact of outdoor sports, leisure and recreational activities	1210	1220	1230	2110	2120	8110	8120	8210	8220	8240	8310
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities				2110	2120					8240	8310
CF09	Reduce/eliminate noise, light, heat or other forms pollution from industrial, commercial, residential and recreational areas and activities											8310
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development	1210	1220	1230	2110	2120					8240	8310
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants										8240	
CH03	Reduce impact of other specific human actions	1210	1220	1230	2110	2120	8110	8120	8210	8220	8240	8310
CI01	Early detection and rapid eradication of invasive alien species of Union concern	1210	1220	1230	2110	2120	8110	8120	8210	8220	8240	8310
CI02	Management, control or eradication of established invasive alien species of Union concern	1210	1220	1230	2110	2120	8110	8120	8210	8220	8240	8310
CI03	Management, control or eradication of other invasive alien species	1210	1220	1230	2110	2120	8110	8120	8210	8220	8240	8310
CI05	Management of problematic native species	1210	1220	1230	2110	2120	8110	8120	8210	8220	8240	8310
CJ03	Restore habitats impacted by multi-purpose hydrological changes	1210	1220	1230	2110	2120					8240	8310
CL01	Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes	1210	1220		2110	2120						
CN02	Implement climate change adaptation measures	1210	1220	1230	2110	2120	8110	8120	8210	8220	8240	8310

Woodlands and forests

CM_CODE	CM_NAME	Woodland birds	Old sessile oak woods with *Ilex* and *Blechnum*	Bog woodland*	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior**	*Taxus baccata* woods of the British Isles*	*Rhinolophus hipposideros*	*Trichomanes speciosum*
CM_CODE	CM_NAME	Birds	CM_91A0	CM_91D0	CM_91E0	CM_91J0	CM_1303	CM_6985
CA02	Restore small landscape features on agricultural land						1303	
CA05	Adapt mowing, grazing and other equivalent agricultural activities		91A0	91D0	91E0	91J0		
CA06	Stop mowing, grazing and other equivalent agricultural activities		91A0	91D0	91E0	91J0		6985
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production		91A0		91E0	91J0	1303	
CA10	Reduce/eliminate point pollution to surface or ground waters from agricultural activities		91A0	91D0	91E0	91J0		6985
CA11	Reduce diffuse pollution to surface or ground waters from agricultural activities			91D0	91E0			6985
CA12	Reduce/eliminate air pollution from agricultural activities		91A0	91D0	91E0	91J0		
CA15	Manage drainage and irrigation operations and infrastructures in agriculture			91D0	91E0			
CB01	Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation	Birds	91A0	91D0	91E0	91J0	1303	6985
CB02	Maintain existing traditional forest management and exploitation practices		91A0	91D0	91E0	91J0		
CB04	Adapt/manage reforestation and forest regeneration		91A0	91D0	91E0	91J0	1303	
CB05	Adapt/change forest management and exploitation practices	Birds	91A0	91D0	91E0	91J0	1303	6985
CB06	Stop forest management and exploitation practices		91A0	91D0	91E0	91J0	1303	6985
CB08	Restoration of Annex I forest habitats		91A0	91D0	91E0	91J0	1303	6985
CB10	Reduce diffuse pollution to surface or ground waters from forestry activities			91D0	91E0			6985
CB14	Manage drainage and irrigation operations and infrastructures			91D0	91E0			6985
CC01	Adapt/manage extraction of non-energy resources		91A0	91D0	91E0	91J0		
CC02	Adapt/manage exploitation of energy resources		91A0	91D0	91E0	91J0		
CC04	Reduce impact of hydropower operation and infrastructure				91E0			
CC07	Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure				91E0			
CC08	Manage/reduce/eliminate point pollution to surface or ground waters from resource exploitation and energy production			91D0	91E0			
CC09	Manage/reduce/eliminate diffuse pollution to surface or ground waters from resource exploitation and energy production			91D0	91E0			
CE01	Reduce impact of transport operation and infrastructure		91A0	91D0	91E0		1303	6985
CE05	Manage/reduce/eliminate noise, light and other forms of pollution from transport						1303	
CE06	Habitat restoration of areas impacted by transport		91A0	91D0	91E0		1303	6985
CF02	Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities		91A0	91D0	91E0	91J0	1303	6985
CF03	Reduce impact of outdoor sports, leisure and recreational activities		91A0	91D0	91E0	91J0		6985
CF04	Reduce/eliminate point source pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities			91D0	91E0			
CF05	Reduce/eliminate diffuse pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities			91D0	91E0			
CF09	Reduce/eliminate noise, light, heat or other forms pollution from industrial, commercial, residential and recreational areas and activities						1303	
CF10	Manage changes in hydrological and coastal systems and regimes for construction and development			91D0	91E0			
CF11	Manage water abstraction for public supply and for industrial and commercial use			91D0	91E0			
CG02	Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants	Birds						6985
CH03	Reduce impact of other specific human actions	Birds	91A0	91D0	91E0	91J0	1303	6985
CI01	Early detection and rapid eradication of invasive alien species of Union concern	Birds	91A0	91D0	91E0	91J0	1303	6985
CI02	Management, control or eradication of established invasive alien species of Union concern	Birds	91A0	91D0	91E0	91J0	1303	6985
CI03	Management, control or eradication of other invasive alien species	Birds	91A0	91D0	91E0	91J0	1303	6985
CI05	Management of problematic native species	Birds	91A0	91D0	91E0	91J0	1303	6985
CI07	Controlling and eradicating plant and animal diseases, pathogens and pests		91A0		91E0	91J0		
CJ03	Restore habitats impacted by multi-purpose hydrological changes			91D0	91E0			
CN02	Implement climate change adaptation measures	Birds	91A0	91D0	91E0	91J0	1303	6985

Other agroecosystems (incl. croplands)

CM_CODE	CM_NAME	Other agroecosystems (incl. croplands) bird group
CM_CODE	CM_NAME	Birds
CA02	Restore small landscape features on agricultural land	Birds
CA05	Adapt mowing, grazing and other equivalent agricultural activities	Birds
CA09	Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production	Birds
CA15	Manage drainage and irrigation operations and infrastructures in agriculture	Birds
CF03	Reduce impact of outdoor sports, leisure and recreational activities	Birds
CH03	Reduce impact of other specific human actions	Birds
CI01	Early detection and rapid eradication of invasive alien species of Union concern	Birds
CI02	Management, control or eradication of established invasive alien species of Union concern	Birds
CI03	Management, control or eradication of other invasive alien species	Birds
CI05	Management of problematic native species	Birds
CN02	Implement climate change adaptation measures	Birds