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IRELAND

6th National Report to the Convention on Biological Diversity

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Cover photo: *Colchicum autumnale* L. also known as meadow saffron, autumn crocus or naked ladies is an endangered, toxic, autumn blooming, perennial corm geophyte. In Ireland this species is found in base-rich riverside meadows and is largely restricted to the Nore Valley. Its use in the treatment of gout and rheumatism can be traced back at least 2,000 years.

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Executive Summary

Outline of this report

This assessment report reviews Ireland's progress on the five Strategic Goals and 20 Aichi Biodiversity Targets set by the Conference of Parties of the UN Convention on Biological Diversity (CBD) in Nagoya, Japan in 2010 for implementation by 2020. Section I provides an overview of each of the 7 Objectives and 18 Targets of Ireland's National Biodiversity Action Plan (NBAP). This section describes the context to these Objectives and Targets and the links with the Global Aichi Targets of the CBD. Section II describes the implementation measures undertaken to achieve the Targets of the NBAP and details any obstacles to their effectiveness. Section III discusses the performance of these measures against each Target of the NBAP. This is followed in Section IV by an assessment of the Irish contribution to achieving the Aichi Targets and links with the UN Sustainable Development Goals are provided. In Section V, progress with Targets under the Irish and Global Strategy for Plant Conservation are detailed.

There is some repetition between sections due to the need to discuss different aspects of measures. This means that where a measure or its effectiveness appear not to have been fully assessed in one section, it is very likely to have been addressed in the next. Section IV is presented as a series of questions for each Target as proposed in the CBD reporting guidelines and draws together the results of the assessment from the preceding sections.

Country Profile

Status of Species and Habitats in Ireland

Ireland lies on the western edge of the European continental shelf. Ireland's territorial waters extend to the outer edge of the continental margin covering an area of 880,000 km^2. The terrestrial area of Ireland covers an area of 84,421 km^2 comprised of low central plains surrounded by coastal mountains.

In common with other countries, biodiversity in Ireland is impacted by habitat loss, changes in land use, pollution and climate change. Most rural land in Ireland is under agricultural production (mainly pasture for cattle and dairy with some arable) or commercial forestry; improved farm productivity has been encouraged in the agricultural sector in particular. According to the most recent (Article 17) Report to the EC on the implementation of the EU Habitats Directive in 2013[1], 52% of listed species were identified as being in 'Favourable Conservation Status'.[1] 20% of species were assessed as being in "inadequate status" and 12% were assessed as being in "bad status". 10% of species showed a declining trend since the previous report compared with 6% which showed an improving trend.

Other studies indicate a decline of 14% in bee species [2]. Bumblebees are especially affected with 7 out of 20 species at risk of extinction. Amongst bird species, 19% had increased, but 18% of breeding species and 16% of wintering species were in decline [3]. Of the 10% of species on the Red List, 24% are regarded as "threatened" and 15% "critically endangered".

1 A new Article 17 report is due in 2019.

Functioning habitats are key to species survival; however 91% of listed habitats were assessed by the Article 17 report as being in "Unfavourable Conservation Status" with 31% in a declining condition and 16% in an improving condition. Draft results from the 2019 Habitats Directive report shows over 50% of habitats with a declining trend, based on more robust monitoring than previous reports. Of particular note are declines in peatlands and grasslands, and some of the marine habitats. Around 65% of Important Bird Areas (IBAs), as identified by Birdlife International, are regarded as having a very high level of threat [4].

The composition of species and habitats at risk indicates, in particular, the impact of changes in land use in Ireland. For example, the decline or loss of farmland bird species such as *corncrake*, *yellowhammer* and *corn bunting*, are indicative of changes in agricultural practice and a nationwide reduction in mixed farming with small scale cereal growing, moving instead to specialisation in livestock production. The decline in bees, butterflies and other insects has largely resulted from the effect of monoculture and the drive to ever higher levels of productivity characterised also by a loss or neglect of hedgerows, farmland edges and scrub. The decline of once familiar breeding bird species such as *curlew* and *lapwing*, and many flowering plants, are indicative of long term trends in drainage of ponds, wetlands and the conversion of remaining meadows into agriculturally productive grassland. Applications of fertiliser to maintain more intensive systems have, in turn, had a deleterious effect on aquatic biodiversity, contributing an estimated 53% of water pollution as the nutrients of nitrogen and phosphorous have spread into watercourses.[5] Together with pollution from urban sources and dispersed housing, this has presaged a gradual decline in water quality. Although this decline has stabilised, there is a continuing loss of the highest quality waters of most value to biodiversity, including for species such as *freshwater pearl mussel*.

Biodiversity has also suffered from the drainage and exploitation of peatlands, in particular of raised bog, and also blanket bog. Industrial-scale cutting of peatlands for electricity generation, household fuel and horticulture products has impacted severely on the larger raised bogs, but private cutting for domestic fuel has increasingly become the domain of contractors using machinery. Ninety-two percent of raised bog is thought to be degraded, while the area of active (peat-forming) raised bog may be just 4% [6]. As these peatlands were drained prior to being worked they are vulnerable to any further desiccation due to drier or warmer temperatures associated with climate change.

Forestry has also had an impact on biodiversity with 85% of commercial forest being comprised of a monoculture of fast-growing coniferous species of low biodiversity value. Much of this planting previously occurred on cut-away bogs or in the uplands, and while the conditions of planting have been tightened to avoid protected areas of biodiversity value, including areas of value to *hen harrier*, *curlew* or *red grouse*, there is still no working definition of 'high nature value' farming to guide where planting should or should not occur.

Ireland has an extensive marine resource, however, a prolonged period of over-fishing had a severe impact on the biodiversity of commercial fisheries, and recently only very limited catches of former staples such as *cod*, *haddock* and *herring* were permitted. The populations of 22% of commercial species remain below 'maximum sustainable yield'.[7] The use or location of nursery and feeding habitats is still little understood and many benthic habitats, including reefs, are thought to have been severely damaged by bottom dredging fishing gear. In aquaculture, although there have been past instances of poor siting and management, presenting problems of eutrophication and disturbance to fish, shellfish and wildlife populations[8, 9], a substantial appraisal system for licensing is now in

place. In addition, to this historical legacy, climate change may be inducing changes in the distribution or migration of some cetaceans and fish species and is a probable factor in the decline of charismatic species such as *puffin*.

Policy response

Fortunately, this legacy of damage and loss is gradually being addressed. The third National Biodiversity Action Plan 2017-2021 has been developed by the National Parks and Wildlife Service (NPWS) to protect and enhance Ireland's biodiversity by ensuring its conservation in the wider countryside and marine environment, by expanding and improving the management of protected areas and species, by strengthening the knowledge base, raising public awareness, and mainstreaming biodiversity actions with the cooperation of other Government Departments and Agencies. Through its strategic objectives and 119 targeted actions, the NBAP is likewise contributing to the implementation of the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets.

Within the core responsibilities of the NPWS, terrestrial Protected Areas now account for around 17% of Ireland's land area. Areas protected under the EU Nature Directives are being formally designated and provided with Site Specific Conservation Objectives, although proposed National Heritage Areas have much weaker restrictions of land use activities. Much attention has been directed at peatlands. Peat cutting has been prohibited on a network of designated peatlands and the owners of turbary (peat cutting) rights are eligible for compensation payments or alternative arrangements. The semi-state peat company, Bord na Móna, has signalled its intention to withdraw from commercial peat production by 2028 and has begun to experiment with peatland rehabilitation and restoration. These changes will also have a significant benefit for biodiversity and for maintaining the carbon store that these peatlands represent.

Agricultural policy is moving towards improved environmental management within the requirements of core farm transfer payments. Over 13% of Irish farmland is subject to agri-environmental schemes (AES) where farmers receive payments, essentially payments for ecosystem services, to protect features of environmental and biodiversity value. Payments are supplemented for farmers with holdings in Natura 2000 areas or who have signed up the NPWS Farm Plan Scheme which is directed at area of High Nature Value. In addition, there is a positive move towards Locally-Led and Results-based AES where farmers have more say in the design of projects and are paid by conservation results. This trend has been underpinned by various EU LIFE projects and a new round of European Innovation Projects (EIPs) to support specific habitats and species.

Forest policy is improving too with more restrictions on the nature and location of planting, including the requirement that 15% of planted area should comprise of native broadleaf species. In addition, various schemes are now available to support the planting of broadleaf woodland, including native species woodland, and the rehabilitation of existing native woodlands. Native species now account for 27% of the forest estate. However, commercial forestry depends primarily on commercial coniferous species and most demand for planting continues to be for less productive grazing land, some of which could be of unknown biodiversity value.

European fisheries are now managed according to an Ecosystem Approach which aims to restore ecological systems and populations of commercial species, including through recent controls on bycatch and discards. Bottom trawling on deep sea reef habitats designated under the EU Habitats Directive has been banned. A high proportion of species populations remain below Maximum Sustainable Yield

with the population status of many others being insufficiently understood. However, the overall biomass has risen to above critical thresholds at which stocks would not be able to recover. Greater controls have also been placed on aquaculture, including improved site location and requirements for environmental management.

Continuing issues

Although better conservation designations have been put in place and improved environmental management has been adopted, the mainstreaming of biodiversity has yet to amount to a fully integrated approach. It is unclear if the greater consideration being given to sustainability and biodiversity in sectoral policy is sufficient to turn around the continuing degradation of habitat and species populations, and the threats to key ecosystem services. In particular, agriculture, forestry and aquaculture are all aiming for significant target increases in output, or output value, under the Food Wise 2025 strategy. Although in principle, the strategy contains safeguards for biodiversity, water quality and carbon emissions, it is often unclear what how these will be applied at producer level.

Agricultural market forces and policy continue to push farmers towards more capital intensive systems or intensive use of land. Agri-environmental schemes have had limited success in recruiting farmers from higher value sectors, e.g. dairy. Productive forestry is predominantly based on high volume, modest quality timber output from exotic species rather than hard woods. Broadleaf woodlands, and in particular native species woodland, remains vulnerable to browsing by deer, invasive understory plant species, and now also a disease introduced through commercial forestry which threatens ash trees, the most prevalent native tree species in the wider Irish countryside. The small area, 100,000 hectares, of remaining native woodland is at particular risk from neglect and degradation.

Ironically, while biodiversity has been impacted in all these sectors, it has an essential role in providing the ecosystem services that sustain output and product quality. In particular, biodiversity is central to soil productivity, pollination, pest predation, water retention, clean water provision and the maintenance of commercial fisheries. In each of these areas there is an opportunity to realise market premia and transfer greater value added to those who manage their production using methods that protect natural capital. In this respect, there is also a role in policy and plan making for a greater level of representation and advice from NGOs and other stakeholders. However, this integration of biodiversity and sectoral activity will still rely on the core conservation activities of State Agencies and the need for the adequate funding and management for Protected Areas to be supplemented by a strategic approach to the protection of biodiversity that can address on-going pressures, including climate change.

In summary, progress that is partially effective is reported for many of the national targets, however this progress is at an insufficient rate. A transformational change is required to achieve the Vision in the National Biodiversity Action Plan 2017-2021 “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”.

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National Biodiversity Plan 2017-2021 overview of Objectives and Targets

1 OBJECTIVE

Mainstream biodiversity into decision-making across all sectors

Target 1.1. Shared responsibility for the conservation of biodiversity and the sustainable use of its components is fully recognised, and acted upon, by all sectors

Target 1.2. Strengthened legislation in support of tackling biodiversity loss in Ireland

2 OBJECTIVE

Strengthen the knowledge base for conservation, management and sustainable use of biodiversity

Target 2.1. Knowledge of biodiversity and ecosystem services has substantially advanced our ability to ensure conservation, effective management, and sustainable use by 2021

3 OBJECTIVE

Increase awareness and appreciation of biodiversity and ecosystems services

Target 3.1 Enhanced appreciation of the value of biodiversity and ecosystem services amongst policy makers, businesses, stakeholders, local communities, and the general public

4 OBJECTIVE

Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.1. Optimised opportunities under agriculture and rural development, forestry and other relevant policies to benefit biodiversity

Target 4.2. Principal pollutant pressures on terrestrial and freshwater biodiversity substantially reduced by 2020

Target 4.3. Optimised benefits for biodiversity in Flood Risk Management Planning and drainage schemes

Target 4.4. Harmful invasive alien species are controlled and there is reduced risk of introduction and/or spread of new species

Target 4.5. Improved enforcement of wildlife law

5 OBJECTIVE

Conserve and restore biodiversity and ecosystem services in the marine environment

Target 5.1. Progress made towards good ecological and environmental status of marine waters over the lifetime of this Plan

Target 5.2. Fish stock levels maintained or restored to levels that can produce maximum sustainable yield, where possible, no later than 2020

6 OBJECTIVE

Expand and improve management of protected areas and species

Target 6.1. Natura 2000 network designated and under effective conservation management by 2020

Target 6.2. Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020

Target 6.3. No protected species in worsening status by 2020; majority of species in, or moving towards, favourable status by 2021

7 OBJECTIVE

Strengthen international governance for biodiversity and ecosystem services

Target 7.1. Strengthened support for biodiversity and ecosystem services in external assistance

Target 7.2. Enhanced contribution to international governance for biodiversity and ecosystem services

Target 7.3. Enhanced cooperation with Northern Ireland on common issues

Target 7.4. Reduction in the impact of Irish trade on global biodiversity and ecosystem services

CBD Strategic Plan for Biodiversity and the Aichi Biodiversity Targets

Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

TARGET 1

By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

TARGET 2

By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

TARGET 3

By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

TARGET 4

By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use

TARGET 5

By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

TARGET 6

By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

TARGET 7

By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

TARGET 8

By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

TARGET 9

By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

TARGET 10

By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

TARGET 11

By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

TARGET 12

By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

TARGET 13

By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services

TARGET 14

By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

TARGET 15

By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

TARGET 16

By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building

TARGET 17

By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

TARGET 18

By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

TARGET 19

By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

TARGET 20

By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.

Sustainable Development Goals

GOAL 1
End poverty in all its forms everywhere

GOAL 2
End hunger, achieve food security and improved nutrition and promote sustainable agriculture

GOAL 3
Ensure healthy lives and promote well-being for all at all ages

GOAL 4
Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

GOAL 5
Achieve gender equality and empower all women and girls

GOAL 6
Ensure availability and sustainable management of water and sanitation for all

GOAL 7
Ensure access to affordable, reliable, sustainable and modern energy for all

GOAL 8
Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

GOAL 9
Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

GOAL 10
Reduce inequality within and among countries

GOAL 11
Make cities and human settlements inclusive, safe, resilient and sustainable

GOAL 12
Ensure sustainable consumption and production patterns

GOAL 13
Take urgent action to combat climate change and its impacts

GOAL 14
Conserve and sustainably use the oceans, seas and marine resources for sustainable development

GOAL 15
Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

GOAL 16
Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

GOAL 17
Strengthen the means of implementation and revitalize the global partnership for sustainable development

SECTION I

Alignment between National Biodiversity Objectives and Targets and the Aichi targets

Objective 1
Mainstream biodiversity into decision-making across all sectors

Target 1.1. Shared responsibility for the conservation of biodiversity and the sustainable use of its components is fully recognised, and acted upon, by all sectors

Target 1.1 recognises the importance of other sectors taking biodiversity considerations into account when developing policies and operational plans. Actions include best practice in Environmental Impact Assessment, enhancing relevant expertise across sectors, and legislation to ensure conservation and sustainable use.

Many Government Departments and Agencies have responsibilities that can have an effect on biodiversity or which benefit from functioning ecosystems. Ecosystem services underpin the sustainability of key sectors such as agriculture, forestry and the marine, and support human health and well-being through water quality, protection from extreme weather events such as storms and flooding, and by providing a resource for recreation, amenity and quality of life. Section II identifies where there is a shared responsibility for biodiversity.

Target 1.1 links with Aichi Biodiversity Target 2, including through actions to develop a Natural Capital Register and Natural Capital Accounts and to ensure that these are integrated into policy and decision-making. One action under Target 1.1 links directly to Aichi Biodiversity Target 3, namely measures

to minimise the impact of incentives and subsidies on biodiversity loss. An action to monitor the implementation of the Plan through a Biodiversity Working Group (BWG) and Biodiversity Forum of external stakeholders links with Aichi Biodiversity Target 17. NBAP Target 1.1 links with Aichi Biodiversity Target 20 by developing a National Biodiversity Finance Plan to determine how money is currently spent and how this spending could be made more effective.

Objective 1
Mainstream biodiversity into decision-making across all sectors

Target 1.2. Strengthened legislation in support of tackling biodiversity loss in Ireland

Improved legislation is important to ensure the conservation of biodiversity. Actions under this Target will identify gaps and update legislation for rare flora, Invasive Alien Species and for National Parks.

Although improved legislation will contribute to many of the Aichi Biodiversity Targets, the ratification of the Nagoya Protocol and the requirement to enact any necessary regulations links directly to Aichi Biodiversity Target 16.

Objective 2
Strengthen the knowledge base for conservation, management and sustainable use of biodiversity

Target 2.1. Knowledge of biodiversity and ecosystem services has substantially advanced our ability to ensure conservation, effective management, and sustainable use by 2021

Up-to-date scientific knowledge is essential to make an informed assessment on the status of biodiversity, for insight into the causes of biodiversity loss and for developing the policies and means to halt or reverse losses. This Target also recognises the importance of the implementation of common data standards and quality assurance procedures. Actions under this target will ensure compliance with the EU Habitat, Birds and INSPIRE Directives.

The Target aims for advances in relation to biodiversity data and mapping data, and the importance of applied research for understanding ecological relationships, impacts on biodiversity and the ecosystem services contribution of biodiversity. A programme of applied research by Ireland's university and higher education institutions is supported by Government Agencies.

Although strengthened knowledge underpins many of the Aichi Biodiversity Targets, the national target is closely linked with Aichi Biodiversity Target 19.

Objective 3
Increase awareness and appreciation of biodiversity and ecosystems services

Target 3.1 Enhanced appreciation of the value of biodiversity and ecosystem services amongst policy makers, businesses, stakeholders, local communities, and the general public

Increased awareness and understanding of biodiversity issues is important for enhancing proactive behaviour and engaging all relevant bodies in actions outlined in this Plan. Stakeholder participation will be key in reaching the targets and therefore the aim will be to enhance training, communication, cooperation and concerted action between all relevant sectors, (government, landowners, business, farming, forestry, scientific and conservation communities, etc.) in support of biodiversity conservation.

Awareness of biodiversity in Ireland is at comparable levels to other EU Member States. In the 2015 Eurobarometer survey, 26% of people in Ireland understand the term "biodiversity" compared with 30% for the EU28. Just under one third of people in Ireland feel "well informed" or "very well informed" of "loss of biodiversity". However, this still means that a majority of people do not feel well-informed.

This Target directly links with Aichi Biodiversity Target 1, although it does also support the mainstreaming efforts of Aichi Biodiversity Targets 2 & 4.

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.1. Optimised opportunities under agriculture and rural development, and forest policy to benefit biodiversity

This Target focuses on the role of agriculture, rural development and forestry policies in restoring, preserving and enhancing biodiversity. Actions under this target will ensure compliance with the EU Habitat, Birds and Nitrates Directives.

Changes in agricultural practice have been linked to declines in biodiversity, particularly of traditional farmland bird species and pollinator species. As in many countries, Ireland faces pressures of intensification of agricultural production and the loss of semi-natural habitats. Ireland remains one of the least forested countries in Europe and, while the forested area has increased, 68% of forests are plantation forests and at least half of this is largely a single species monoculture of low biodiversity value. Ireland does possess Europe's largest area of raised bog as well as a significant area of blanket bog. However, almost all of these peatlands have been affected by cutting for peat fuel and at least 92% of raised bog, and 75% of blanket bog, are classified as degraded, with less than 4% of Raised bog thought to be actively peat-forming [6].

Actions under this target address sustainable agriculture and forestry linking with Aichi Biodiversity Target 4 and protection of peatland ecosystem services and habitat linking with Targets 14 and 15. Measures taken will contribute towards reduced loss and degradation of habitats as required under Target 5. National genetic conservation strategies relate to Target 13. Agri-environment schemes and

the All-Ireland Pollinator Plan require participation by local communities reflecting the requirements of Target 18.

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.2. Principal pollutant pressures on terrestrial and freshwater biodiversity substantially reduced by 2020

This National Target requires action to significantly reduce the impact of pollution on biodiversity. Actions under this target will ensure compliance with the EU Habitat, Birds and Water Framework Directives.

Around 30% of fresh waterbodies In Ireland are at risk of not achieving Water Framework Directive status objectives, including 35% of high ecological status rivers and lakes. There has also been a reduction in the number of rivers of bad status, but at the other end of the scale, a continuing gradual reduction in the number of high quality sites. This decline in high water status waters has impacted severely on species which require such conditions, including the freshwater pearl mussel, and has largely eliminated the uniqueness of some habitats whose former ecology depended on high water quality.

Target 4.2 directly links with Aichi Biodiversity Target 8.

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.3. Optimised benefits for biodiversity in Flood Risk Management Planning and drainage schemes

Actions under this Target seek to encourage the use of catchment wide, non-structural flood relief management measures to minimise the impact of arterial drainage on biodiversity, particularly wetlands. Compliance with Environmental Impact Assessment related regulation is required.

In earlier decades there was major investment in arterial drainage in Ireland linked to policies of agricultural and land use improvement. This had a significant negative impact on biodiversity and on natural environments that could retain or absorb water in times of heavy rainfall. A catchment and flood risk approach has subsequently been taken, but there is a legacy to overcome of hard engineering approaches to flood management before some of these natural habitats can be restored and their functions regained.

This target links with Aichi Biodiversity Target 14, in particular the safeguarding of ecosystem services relating to water.

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.4. Harmful invasive alien species are controlled and there is reduced risk of introduction and/or spread of new species

A number of actions under this Target aim to ensure that harmful invasive alien species are controlled and there is reduced risk of spread of new species. The implementation and adoption of international commitments, such as the EU Invasive Alien Species Regulation (2015) and the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention), will help control harmful invasive alien species and reduce the risk of spread of new species.

Many Invasive Alien Species, both plants and animals, are now well-established in Ireland and some 37%[2] present a significant threat to species and to habitats and several, including rhododendron or zebra mussel (*Dreissena polymorpha*), have proven to be extremely difficult to eradicate. The pressures presented by land use activities and trends towards increased trade and human movement, and now potentially climate change, mean that the risk of new IAS arriving is high.

This target links with directly with Aichi Biodiversity Target 9.

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.5. Improved enforcement of wildlife law

Improved enforcement of biodiversity related legislation is very important to reduce the threats to biodiversity.

If the actions under this Target are implemented effectively they will contribute to several of the Aichi Biodiversity Targets. There is an action to publish a CITES enforcement plan, therefore contributing to Aichi Biodiversity Target 12.

2 Namely, 127 out of 377 assessed

Objective 5. Conserve and restore biodiversity and ecosystem services in the marine environment

Target 5.1. Progress made towards good ecological and environmental status of marine waters over the lifetime of this Plan

Actions under this Target aim to address pressures from human activities on Ireland's coastal and marine biodiversity and ecosystem services arise from a growing range of sources including nutrient and chemical discharge from human activities (for example from industry, agriculture, municipal wastewater) and through direct physical disturbance and habitat degradation from pollution, litter, man-made noise and light. Actions proposed are high level and cross cut sectors dealing with spatial planning and compliance under the EU Habitats, Birds, Water Framework and Marine Strategy Framework Directives.

Measures taken to achieve Good Ecological Status (GES) and equivalent status assessments under the Directives above will contribute to the reduction of habitat degradation (Aichi Biodiversity Target 5), the improved conservation status of species (Aichi Biodiversity Target 12), a reduction of pressures brought about by pollution, IAS and climate change (Aichi Biodiversity Targets 8, 9, 10 respectively).

Objective 5. Conserve and restore biodiversity and ecosystem services in the marine environment

Target 5.2. Fish stock levels maintained or restored to levels that can produce maximum sustainable yield, where possible, no later than 2020

This Target recognises the importance of setting a Maximum Sustainable Yield for commercial fish species. Actions include stock recovery plans and enforcement of illegal fishing. These actions will ensure compliance with the EU Marine Strategy Framework Directive. This Target directly links with Aichi Biodiversity Target 6.

Objective 6. Expand and improve management of protected areas and species

Target 6.1. Natura 2000 network designated and under effective conservation management by 2020

Protected Areas and species are there cornerstone of conservation initiative globally. They provide essential refuges which provide refuges for the movement and migration of species. Ireland has a network of protected sites, including Special Areas of Conservation (SACs) and Species Protection Areas (SPAs) under the EU Birds and Habitats Directives. Alongside these internationally designated sites, there are a series of national designations including Natural Heritage Areas (NHAs), National Parks and National Nature Reserves. The National Wildlife Act 1987 (Amended 2001) is the principle mechanism for the legislative protection of species that have significant conservation value. Species of conservation concern have been established through the published national species Red Lists, EU Habitats and Birds Directives, and identification of birds of conservation concern.

Actions under this Target focus on conservation objectives for Protected Areas and the implementation of measures required to achieve these. These actions will ensure compliance with the EU Habitats and Birds Directive.

This Target directly links with Aichi Biodiversity Target 11. Measures to restore peatlands will also contribute towards Aichi Biodiversity Target 15.

Objective 6. Expand and improve management of protected areas and species

Target 6.2. Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020

This Target details the ambition to expand Marine Protected Areas and to ensure that Protected Areas are managed as a network to recognising the importance of connectivity. Ireland's habitats score poorly in terms of their fragmentation by roads, built development or agricultural intensification. This leaves remnant habitats vulnerable to further spatial or other degradation and impacts on the potential for migration of species in response to climate change.

This Target links with Aichi Biodiversity Target 11. Measures improve resilience of the Protected Area network will also contribute towards Aichi Biodiversity Target 15.

Objective 6. Expand and improve management of protected areas and species

Target 6.3. No protected species in worsening status by 2020; majority of species in, or moving towards, favourable status by 2021

Actions under this Target focus on restoration programmes/species action plans for threatened species. Many species, have experienced significant declines in response to land use change and loss of habitat. As well as protection within designated sites, there are initiatives directed at farming, species focused EU LIFE programmes and collaborative work with Irish and other European NGOS.

This Target links with directly with Aichi Biodiversity Target 12.

Objective 7. Strengthen international governance for biodiversity and ecosystem services

Target 7.1. Strengthened support for biodiversity and ecosystem services in external assistance

The action under this Target aims to ensure that Biodiversity will be made a component of Ireland's Development Cooperation Programme.

As Biodiversity falls under the Climate fund umbrella in the Development Cooperation Programme funds are expected to contribute towards achieving Aichi Biodiversity Target 14.

Objective 7. Strengthen international governance for biodiversity and ecosystem services

Target 7.2. Enhanced contribution to international governance for biodiversity and ecosystem services

This Target ensures the ongoing participation of Ireland in Biodiversity related international agreements.

Ireland will continue to contribute data to the Global Biodiversity Information Facility thereby contributing to Aichi Biodiversity Target 19.

The National Biodiversity Data Centre is the national node of the Global Biodiversity Information Facility in Ireland and to date has published 61 datasets representing 1,248,000 species. In addition, the National Biodiversity Data Centre hosted the 25th meeting of the Governing Board of the Global Biodiversity Information Facility (GBIF) in October 2018.

Objective 7. Strengthen international governance for biodiversity and ecosystem services

Target 7.3. Enhanced cooperation with Northern Ireland on common issues

Actions under this Target relate to cooperating on the development and implementation of species action plans and on all island surveys.

Concerted efforts to implement species action plans and improved knowledge arising from surveys will contribute towards the achievement of Aichi Targets 12 and 19 respectively.

Objective 7. Strengthen international governance for biodiversity and ecosystem services

Target 7.4. Reduction in the impact of Irish trade on global biodiversity and ecosystem services

Actions under this Target aim to reduce the impacts of trade on biodiversity.

If the impacts of trade on biodiversity are reduced this will contribute towards the achievement of Aichi Biodiversity Targets 5 and 12.

SECTION II

Implementation measures taken, assessment of their effectiveness, associated obstacles and scientific and technical needs to achieve national targets.

This section examines the implementation measures taken to meet Ireland's National Biodiversity Action Plan (NBAP) targets as set out in Section I. It sets out in more detail the context for these targets and the obstacles that respective actions need to overcome. The effectiveness of these measures in achieving progress for biodiversity under each target is further described in Section III. To avoid excess repetition with Section III, this section deals with the design of the measures, their appropriateness or fitness for purpose, potential to overcome obstacles, and the scientific or technical needs required for them to achieve the targets.

The CBD reporting guidelines require that measures are described by just four levels, namely "measures taken have been effective", "measures taken have been partially effective", "measures taken have been ineffective" and "unknown". It requests reference to methodology used to arrive at these assessments and sources or websites used.

Objective 1. Mainstream biodiversity into decision-making across all sectors

Target 1.1. Shared responsibility for the conservation of biodiversity and the sustainable use of its components is fully recognised, and acted upon, by all sectors

Government Departments, Agencies and Local Authorities

2.1.1 **The National Parks and Wildlife Service (NPWS)** falls under the aegis of the **Department of Culture Heritage and the Gaeltacht** (DCHG) and has responsibility for nature conservation in Ireland. Representatives from the NPWS serve as National focal points for the CBD. The NPWS manages Ireland's National Parks and Nature Reserves which are important areas for biodiversity in Ireland. It also has responsibility for the enforcement of conservation legislation and the designation and protection of Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Natural Heritage Areas (NHAs). Other activities include research, monitoring, agri-environmental advice, licensing and peatland conservation policy, including the management of compensation to private households with turbary (peat-cutting) rights. The NPWS coordinates delivery of the National Biodiversity Action Plan (NBAP) and the National Peatlands Strategy. DCHG has responsibility for the National Landscape Strategy 2015-2025 and is also the lead department for reviewing the effect of sectoral actions on climate change relevant to biodiversity.

2.1.2 The **National Biodiversity Data Centre (NBDC)** is contracted for the collection, collation, management, analysis and dissemination of data on Ireland's biological diversity. The NBDC was established in 2007 and is funded by the Heritage Council and the DCHG. The Centre manages 4.2 million biological records representing over 16,000 species. It also maintains indicators of the state of biodiversity and raises awareness of biodiversity including through support by relevant accessible information for the public and citizen science. The NBDC also coordinates the All-Ireland Pollinator Plan.

2.1.3 A **National Biodiversity Expenditure Review (NBER)** was undertaken in 2016-17 funded by the NPWS and the Irish Research Council (IRC). The review was based on the methodology of the UNDP Biodiversity Finance Initiative (BIOFIN) and is intended to inform future biodiversity planning and expenditure by identifying where expenditure to date has been most efficient and effective. In response, a National Biodiversity Finance Plan will detail how the actions and targets of the NBAP will be delivered in future years. These areas will be examined further in 2019 based on a Financial Needs Assessment and Resource Mobilisation Strategy supported by NPWS and the IRC. The research will examine the current and future financial needs for biodiversity and potential financing mechanisms. Biodiversity financing is also a theme that was explored by stakeholders at the National Biodiversity Conference in February 2019.

2.1.4 The DCHG is also the parent Department for the **Heritage Council**. The Heritage Council promotes engagement with Ireland's natural and cultural heritage. It channels funds to support a network of Heritage Officers in local authorities across the country and has funded various research reports and projects relevant to biodiversity, including on High Nature Value Farmland and Landscape Character Assessment. The Heritage Council funds the NBDC and the NGOs Woodlands of Ireland, the Burren Beo Trust and the Irish Uplands Forum.

2.1.5 Many Government Departments and Agencies, as well as Local Authorities, have responsibilities that can impact Biodiversity. The section below describes the responsibilities of these Departments and Agencies and lists the measures where there is a shared responsibility for biodiversity. This information is important to understand responsibilities for measures or policies that are described under subsequent headings.

2.1.6 The **Department of Housing, Planning and Local Government (DHPLG)** has responsibilities for the terrestrial and marine environment, and spatial planning. DHPLG are the competent authority for the MSFD which includes Marine Protection Areas and the Marine Spatial Plan. The DHPLG also oversees the National Planning Framework which includes national policy objectives for Green Infrastructure, sustainable use and biodiversity.

2.1.7 T**he Department of Agriculture, Food and the Marine (DAFM)** is responsible for agriculture policy, national and EU schemes in support of agriculture, food, fisheries, aquaculture, forestry, and the regulation of those sectors, including animal and plant health and animal welfare. The Department manages agricultural income supports, the Nitrates Action Plan (2018-2021), commonage grazing, organic farming, and linking land use policy to sustainability. Specifically, for biodiversity, the Department employs ecologists and manages agri-environmental schemes (AES) including the Green Low Carbon Agri-Environmental Scheme (GLAS). New AES initiatives are being explored which are results- or locally- led. The Department is also supporting new projects which are integrating land use with environmental and biodiversity objectives under the European Innovation Programme (EIP). In addition, the Department has links with Origin Green (www.origingreen.ie), the food industry's voluntary programme of sustainable production, which is supported by Bord Bia, the state agency for food marketing. **Teagasc**, the Agricultural and Food Development Authority, provides a farm advisory and training service and undertakes research to support the agricultural sector, including in environmentally sensitive farming practice.

2.1.8 The **Forest Servic**e is part of the DAFM and manages the Forestry Programme 2014-2020. FS_DAFM has an overall broadleaf planting target of 30% and a range of measures supporting biodiversity such as the Native Woodland Scheme (NWS). It implements measures to protect against the introduction and spread of potentially harmful pests and diseases, such as the disease Ash Dieback (Chalara) which, since 2012, has been threatening native ash an important species for the Irish landscape and for biodiversity. **Coillte** is the national forestry company. Coillte forests are open for public access while 15% of its estate is managed for biodiversity. It is responsible for many native woodlands and for the maintenance of the Peoples' Millennium Forest.

2.1.9 The responsibilities of DAFM include the marine sector, including sea fisheries, aquaculture and the marine agencies. Of the last of these, the **Marine Institute (MI)** is the agency responsible for marine research and development, with activities that include marine spatial mapping and environmental assessment. The sea fishing and aquaculture sectors are supported by **Bord Iascaigh Mhara (BIM)** through grants, advice and training. Sea fish catch quotas are enforced by the **Sea Fisheries Protection Authority (SFPA)**.

2.1.10 The **Department of Communications, Climate Action and Environment (DCCAE)** has responsibilities relevant to biodiversity that include sustainability, climate change mitigation and adaptation, and management of the EU LIFE Programme. The Department has lead responsibility for the 2030 **Sustainable Development Agenda** and the 17 SDGs. Climate change could have profound implications for biodiversity as is recognised in the **National Adaptation Framework (NAF)** which acknowledges serious impacts for biodiversity, but also identifies adaptation measures which, if adopted, could have some positive biodiversity effects, including non-structural approaches to flood, storm and coastal management. The DCCAE has responsibilities for the growth of the **bioeconomy** which in turn requires

a functioning natural environment for the delivery of renewable resources and ecosystem services. **Local Agenda 21** Environmental Partnership is overseen by DCCAE and supports sustainability and environmental awareness including local projects such as biodiversity action plans. DCCAE also manages the **Environment Fund** which is raised from the levies on landfill waste and single-use plastic bags. The Fund has been used to support the IEN and initiatives such as grant programmes.

2.1.11 The DCCAE is the parent Department for the **Environmental Protection Agency (EPA)**. Licensing, monitoring and enforcement by the EPA provides a safeguard against pollution, waste and radiation. The EPA is also responsible for environmental research, monitoring the state of the natural environment, for communicating the effect of climate change and for guidance on environmental and strategic impact assessment. These activities are primarily designed to protect human health and well-being, but the agency's monitoring work is essential to ensure the protection of water, land/soil and atmospheric resources upon which biodiversity is dependent and which it also regulates through ecosystem services. The agency also has a key role in producing the State of Environment report (e.g. Ireland's Environment 2016) informing the NBAP and overseeing EIA and SEA and the publication of relevant criteria and guidance.

2.1.12 The DCCAE is also the parent Department for **Inland Fisheries Ireland (IFI)** whose principal objective is the protection of inland fisheries and sea angling. While it is focused on the protection of the angling resource and specific fish species, its activities also support threatened species such as eel, lamprey and charr. A significant proportion of the agency's activity is directed at angling (and sea angling), but there is a cross-over with biodiversity as this angling resource includes vulnerable fish species and relies on good water quality and a healthy aquatic ecosystem. Biodiversity more widely is supported through applied research relevant to aquatic ecosystems, the rehabilitation of rivers under the **Environmental Rivers Enhancement Programme** (EREP), and the control of invasive species (for example, curly-leaved waterweed or *Lagarosiphon*) and restoration of the connectivity of rivers for migrating fish through the removal of weirs and other barriers. IFI is also responsible for fish stock assessments which are reviewed annually. Conservation Limits for Atlantic Salmon have been in effect since 2007 and appropriate catch limits set for 143 rivers.

2.1.13 The Marine Environment Division of the **Department of Transport, Tourism and Sport (DTTS)** aims to secure appropriate environmental protection measures, including rapid response to pollution incidents. **Fáilte Ireland** is the state agency responsible for the promotion of tourism and tourist infrastructure, a major industry in Ireland. Ireland has a modest ecotourism sector largely focused on whale and dolphin watching, but which also includes spas and retreats, and walking in areas of landscape and ecological interest. While Fáilte Ireland does not have specific responsibilities for biodiversity, its promotion programmes, for example the Wild Atlantic Way, rely heavily on the quality of the natural environment and landscape and contain distinct measure to minimise impact on this natural resource. Ireland's **National Parks**, which are managed by NPWS, are honeypot destinations for tourists. A Tourism Interpretative Master Plan has been drawn up to manage the coexistence of tourism and nature in Ireland's National Parks.

2.1.14 The **Department of Rural and Community Development (DRCD)** is responsible for the administration of the **EU LEADER programme** which is supported under the EU Agricultural Fund for Rural Development and has the rural environment (water resources, local biodiversity and renewable energy) as one of its three priorities which has supported various small projects such as nature walks and habitat restoration.

2.1.15 The **Office of Public Works (OPW)** responsibilities include river, flood and coastal management and the protection of cultural heritage, including some World Heritage Sites such as Skellig Michael island. The former have tended to involve structural engineering works to date, but there is increasing interest in non-structural works. A catchment-based flood risk assessment approach has been adopted since 2007 with which there are evident synergies with other aspects of water management more generally. The Interdepartmental **Flood Policy Co-ordination Group** is intended to address multiple objectives in relation to flood management including the needs of biodiversity. The OPW, along with Inland Fisheries Ireland (below), is involved in the **Environmental Rivers Enhancement Programme (EREP)** to enhance the ecology of rivers that were previously drained. **The National Botanic Gardens (NBG)** in Dublin are also managed by OPW. As well as Victorian conservatories the gardens hold over 17,000 plant species from all over the world, it has a permanent research facility with a laboratories and also hold the Irish National Herbarium (International Herbarium Code DBN) with over 600,000 dried and economic botany specimens.

2.1.16 The **Central Statistics Office (CSO)** collects demographic, social and economic data to support Government policy. It is also working to integrate **natural capital values** into accounting and reporting systems as required by Eurostat. This work can be extended into the development of a System of Environmental and Economic Accounting (SEEA) as sought by the EU Biodiversity Strategy. There are six modules in the Eurostat Environmental Accounts Regulation as well as voluntary Eurostat modules. The CSO's release of the voluntary module 'Environmental Subsidies and Transfers' can potentially be extended to include those harmful to biodiversity (Aichi Target 3). The Material Flow Accounts are of relevance to Target 4 and the new annual Fish Landings release commenced this year is relevant to Target 6. In addition, the CSO started a new survey in October 2018 that will provide better quality data for the Eurostat Environmental Protection module which collects expenditure by industry and services enterprises on the protection of biodiversity.

2.1.17 **Bord na Móna (BnM)**, the state peatland company, manages 80,000ha of peatland and so is a major landowner with a considerable influence on biodiversity. Historically, its principal activity has been peat extraction for producing electricity, sale of moss peat for horticulture, and production of household briquette fuel. BnM is gradually divesting from peat production towards the renewable energies of wind, solar and wood biomass, as well as the rehabilitation of peat workings for biodiversity and amenity.

2.1.18 BnM is looking to rehabilitate its worked bogs as these fall out of production over the next 5-10 years and has various established rehabilitation and bog restoration projects. It has launched a Sustainability 2030 Plan for the future use of peatlands and is in the process of implementing its second Biodiversity Action Plan 2016-2021. An Ecology Team was set up in 2009 to ensure the appropriate approach to rehabilitation in terms of biodiversity and other ecosystem goods and services benefits.

2.1.19 **Local Authorities** fall under the responsibility of the DHPLG. Local authorities can have a direct influence on biodiversity through planning and environmental assessment. They also have a key input to biodiversity indirectly through their responsibility for local amenity including park management and green infrastructure, for example sustainable urban drainage. Specific biodiversity actions are modest, but most local authorities include Heritage Officers (supported though the Heritage Council) and four include Biodiversity Officers who can have an important influence on local planning. **Local Agenda 21** and the **EU LEADER Programme** are both important sources of funding for Local Authority support for environmental and biodiversity projects. In 2018, a grant scheme of €400,000 was made

available by DCHG to County Heritage/Biodiversity officers to implement biodiversity actions at a local level, including workshops for school children, actions on invasive species, pollination, surveys of swifts (Apus apus) and the supply of nesting boxes for this species.

Institutions and other fora supporting shared responsibility for biodiversity

2.1.20 To further the implementation of the Actions for Biodiversity contained in the NBAP, and to mainstream biodiversity within national policy, an interdepartmental **Biodiversity Working Group (BWG)** was established in 2012 drawn from 18 Government Departments and Agencies. Members have responsibilities for sectors where activities can have a direct impact on biodiversity or where there are opportunities for changes in the management of environmental resources that can support biodiversity policy formation. These sectors include strategic and land use planning, management of agriculture and forestry, management of marine and freshwater fisheries, the management and monitoring of water and environmental quality, and the provision of transport and energy infrastructure. In addition, there are Government Departments or Agencies with responsibility for sectors where there are opportunities for synergies between biodiversity protection and community development, education or health. Policy is also informed by an independent **Biodiversity Forum** which is currently comprised of 16 members drawn from environmental NGOs, academic institutions, professional and sectoral representative organisations, community bodies, and business and finance.

2.1.21 The Irish Forum on **Natural Capital (IFNC)** was launched in 2015 and aims to pull together wider experience on biodiversity from a diversity of organisations, stakeholders and the wider public. The IFNC has a steering group drawn from the public and private sectors, NGOs, consultancy and academia. Administration is supported by a grant from the NPWS and EPA. The IFNC developed out of a National Conference held at Ireland's National Botanic Gardens in 2014 which had been organised by the voluntary Natural Capital Committee. It provides for an exchange of expertise and experience through public presentations, webinars and blogs on topics such as the Natural Capital Protocol, natural capital accounting and payments for ecosystem services. The IFNC has also provided workshops to local authority planners and ecologists, and briefings for the business community. It held a conference (Making Nature Count) in 2016 to which 25 speakers were invited, including international experts, and attended by 150 delegates.

2.1.22 The **Environmental Pillar** promotes policies to advance sustainable development and is comprised of environmental NGOs (eNGOs), including those acting to protect or conserve biodiversity, as well as others working on relevant issues such as climate change. The **Irish Environmental Network (IEN)** contributes directly to the Environmental Pillar and represents eNGOs and local groups comprised of over 35,000 volunteers. Local groups may also be represented in the Public Participation Networks (PPNs) which were established in 2014 by the Local Government Act and are intended to allow community groups to input to local and national government policy on various issues including the environment.

Rationale for assessment of effectiveness

2.1.23 A structure is in place to promote the integration of biodiversity considerations in Government policies. Overall, each Department and Agency listed is advancing a shared awareness for biodiversity encapsulated in many of the measures described in this report. However, more proactive efforts at integration are needed including an acknowledgement of the contribution of biodiversity to ecosystem services. At present, the emphasis placed on biodiversity is mixed and, for some Departments and Agencies can still be viewed as a secondary consideration in relation to the requirements of the National Planning Framework or in response to EU or national legislation relating to the environment or sustainability. At present, there is only a modest acceptance by some Departments' of their dependence on natural capital.

Measures taken have been partially effective

Objective 1. Mainstream biodiversity into decision-making across all sectors

Target 1.2. Strengthened legislation in support of tackling biodiversity loss in Ireland

2.1.24 The **Wildlife Act 1976** and the **Wildlife (Amendment) Act 2000** are the principal national legislation relevant to biodiversity. Biodiversity protection is also underpinned by the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC). The two nature directives are transposed into Irish Law by the European Communities Birds ad Natural Habitats Regulations (2011). Other EU Directives, including the Environmental Liability Directive (2004/35/EC), Water Framework Directive (2000/60/EC) and the Environmental Impact Assessment Directive (2014/52/EU), also have much relevance to biodiversity. Some specific legislation has been passed dealing with biodiversity or other aspects of natural heritage and amenity under the Local Government (Planning and Development) Acts. Inter-relationships between biodiversity and the activities of other Government Departments has also been formalised in some cases through the enactment of legislation.

2.1.25 The **Climate Action and Low Carbon Development Act 2015** (Section 6) specifies a requirement for the preparation of sectoral adaptation plans. A Biodiversity Sectoral Climate Change Adaptation Plan has been prepared by the NPWS and a workshop attended by representatives from the Biodiversity Working Group, the Biodiversity Forum and the national Adaptation Steering Group. Regional Climate Change Offices and staff from NPWS. The plan addresses i) climate impacts and their consequences for biodiversity; ii) adaptation actions, and iii) cross-sectoral linkages. The draft plan was released for public consultation in in February 2019.[3]

2.1.26 **Strategic Environmental Assessment** (2001/42/EC) is required for major programmes and plans by the EU SEA Directive. The scope and sophistication of SEAs has been improving since the establishment of the National SEA Forum and assessments of SEA practice by the EPA. SEAs must include assessment of impacts on biodiversity. **Environmental Impact Assessment** is routinely applied to major projects as required by the EIA Directive 85/337/EEC, but has been codified by 2011/92/EU and subsequently amended by Directive 2014/52/EU. Guidance and updates on SEA and EIA are provided by the EPA with larger projects reviewed by the planning authority An Bord Pleanála. Appropriate Assessment (AA) is required by the Habitats Directive (92/43/EEC) where Natura sites are at risk from development.

3 Ireland's Biodiversity Sectoral Climate Change Adaptation Plan (2019) DCHG

2.1.27 The **Forestry Act** passed into law on 26 October 2014, replacing the previous 1946 Forestry Act. The Act integrates the requirements of the EU EIA Directive, the Birds Directive and Habitats Directive, and gives the Minister greater flexibility in terms of attaching environmental conditions to license approval for afforestation, forest roading works, tree felling and aerial fertilisation. The Forestry Act is support by the Forestry Regulations 2017 (S.I. 191 of 2017).

Rationale for assessment of effectiveness

2.2.28 For the most part, legislation has complemented or strengthened existing policy and has been supportive of biodiversity protection.

Measures taken have been partially effective

Objective 2. Strengthen the knowledge base for conservation, management and sustainable use of biodiversity

Target 2.1. Knowledge of biodiversity and ecosystem services has substantially advanced our ability to ensure conservation, effective management, and sustainable use by 2021.

2.2.1 **Target 2.1** aims to build on the former NBAP by further addressing the need for survey and research to strengthen biodiversity conservation. A significant amount of assessment, monitoring and research continues to be done in areas such as forestry, agriculture and marine ecosystems, including to meet the obligations of the EU Directives. For example, a national Article 17 report to the EU on the **Status, Trends and Distribution of Habitats and Species** addressed by the EU Habitats Directive was submitted in 2013 [1]. This was followed by an equivalent report in relation to the EU Birds Directive in 2014 [2]. The reports were underpinned by detailed survey and monitoring work and by assessments of bees, butterflies, rare plants, bats, otters, frogs, bats, otters, seals, cetaceans, frogs and Natterjack toad (*Epidalea calamita*), amongst other species. Recent habitat assessments have included turloughs, raised bog, woodland, lake, marine, salt marsh, grasslands and dune heath. Seven Red Lists were published between 2011 and 2016. An updated list of Birds of Conservation Concern has been published [3]. The NPWS publishes scientific reports as well as methodological guidance in the "Irish Wildlife Manual" series on its website. [4]

2.2.2 A number of **NGOs** continue to contribute towards regular c**itizen science-driven monitoring**. Of particular note are the efforts of the Irish Whale and Dolphin Group work on cetacean movements and strandings, the Vincent Wildlife Trust, Bat Conservation Ireland and the garden survey, countryside bird survey and wetland bird counts managed by Birdwatch Ireland (BWI). In addition, the NBDC co-ordinate long-term bee monitoring in support of the All-Ireland Pollinator Plan, butterfly monitoring in support of the European Environment Agency (EEA) Grassland Butterfly Indicator and EEA Phenological Climate Change Indicator, and monitoring of the Marsh Fritillary butterfly (*Euphydryas aurinia*) in support of Article 17 reporting for the Habitats Directive.

2.2.3 A **National Vegetation Database (NVD)** has been developed by BEC Consultants, hosted by NBDC and funded by NPWS. The database brings together data collected by academics, environmental consultants and state bodies and will be central to a future Irish vegetation classification system

4 www.npws.ie/publications

introduced in Section I. The fifth phase of work on the Irish Vegetation Classification project is ongoing. The sixth and final phase will consolidate the classification system and publish the Irish Vegetation Classification in 2020.

2.2.4 **Environmental mapping** and **data** on rare, threatened and protected species and habitats has been made freely available on-line. A total of 144 datasets have been launched using the common standards of the EU INSPIRE Directive and made available, where appropriate, through the Government's open data portal (data.gov.ie). Existing species and habitats indicators are being advanced based on a state, pressure and response framework (https://indicators-biodiversityireland.ie/). Biodiversity Maps https://maps.biodiversityireland.ie/ is licensed by the non-profit organisation Creative Commons and published to the GBIF Global Portal www.gbif.org. Best practice guidelines for habitat surveys and mapping were produced in 2011 [4].

2.2.5 At present, Ireland has no standardised national terrestrial habitat mapping. Although there is a widespread range of habitat data available, these are collected by different organisations for differing purposes. A report on the potential value of a national land cover database was therefore commissioned by DCHG and the Heritage Council [5]. On foot of its recommendations, the **National Land Cover Data Initiative** was initiated to pull together land cover data collected by various agencies and projects. Changes in land cover can provide an indication of modifications to natural or protected habitat. Until recently, land cover data was only available through the European CORINE database at relatively low resolution, but this data is now being combined with finer level national land use/ land cover (LULC) datasets available from other sources such as Ordnance Survey Ireland (OSi), DAFM or specific habitat surveys. The EPA funded TaLam project has examined how digital mapping and satellite imagery can be combined. This spatial data will be very important for monitoring and protected area and species reporting under Article 17 of the Habitats Directive.

2.2.6 **Integrated Mapping** for Sustainable Development of Ireland's Marine Resource (INFOMAR) is a joint venture between the Geological Survey of Ireland (GSI) and the Marine Institute (MI). This project is continuing to map the physical, chemical and biological features of the seabed. The NPWS has also assisted with the SeaRover survey of deep-sea reefs. These activities will help to identify areas of ecological importance, reducing the risk of damage from fishing activity or ill-sited extractive or marine energy development. International consultants have recently been appointed to contribute mapping, ecological and economic elements to this initiative.

2.2.7 **Ecosystem service mapping and valuation** are listed among the NBAP actions. The EU 2020 Biodiversity Strategy requires Member States to map and assess the location and state of ecosystems and their services with a view to informing policy in relation to land use, water, climate and the marine. An initial baseline Habitats Assets Register and Ecosystem Service Information Database has been developed in relation to the **Mapping and Assessment of Ecosystems and their Services (MAES)** initiative of the EU Biodiversity Strategy [6,7]. The value or importance of these services has been only partially estimated. As noted under Target 1.1, it is proposed that a Natural Capital Asset Register and national natural capital accounts be developed by 2020 and will be integrated with national accounts for the purposes of economic policy and decision-making.

2.2.8 A number of research and consultancy projects have been undertaken in the area of **ecosystem service valuation** in recent years, for example, in relation to freshwater ecosystems, forests and native woodlands, peatlands, marine protected areas (MPAs) and coral ecosystems. Ireland is also an active

participant in **IPBES**, the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services, and has contributed directly to its activities and the report on the *Diverse Conceptualization of Multiple Values of Nature and its Benefits, including Biodiversity and Ecosystem Functions and Services.*

Applied research

2.2.9 The **National Platform for Biodiversity Research** publishes recommendations for research on agriculture, soils, freshwater, the marine, peatland and invasive species. Research strategies are supported by the EPA whose STRIVE programme has been providing research grants for applied scientific research covering biodiversity and natural capital related projects since 2010, especially where these relate to one of the EPA's principal responsibilities or managing water quality under the Water Framework Directive. Other support for biodiversity-related projects is available from the Irish Research Council (IRC), the DAFM for sustainable agriculture and forestry (COFORD) research and the Marine Institute. EU support for transnational research is available under the EU Horizon 2020 programme and the European Regional Development INTERREG Fund. In addition, the NBDC undertakes ongoing research and survey work in a wider range of biodiversity areas.

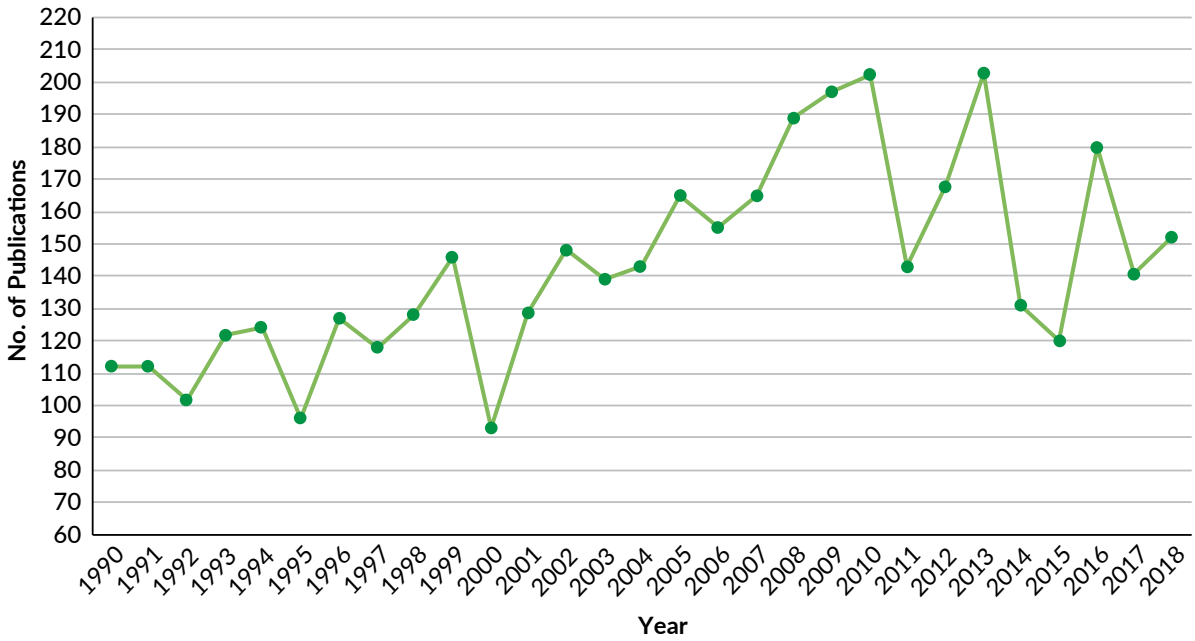


Figure 2.1: National Biodiversity Indicator H3iii. Number of peer-reviewed publications by Irish scientists in biodiversity-related disciplines 1990-2018.

2.2.10 The **Marine Institute** manages the Marine Research Programme which supports studies relevant to the marine environment and the Marine Strategy Framework Directive (MSFD). The Marine Research Programme operates a Ship Time Programme for its research vessels. This programme includes survey time for various studies looking at the impacts of fishing and human activities on marine biodiversity and ecosystems. Funding is also available under the European Maritime and Fisheries Fund (EMFF) to support inter-agency cooperation, data collection and research on the state of the marine environment.

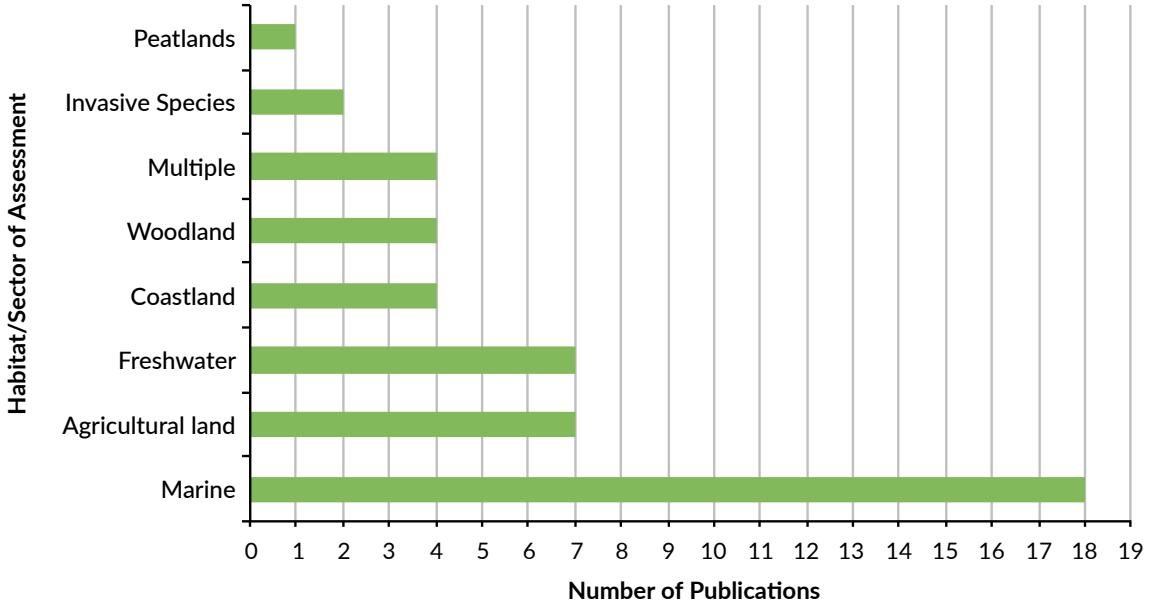


Figure 2.2: National Biodiversity Indicator H4ii.2. Number of publications by sector 2005-18.

2.2.11 Various research projects have been completed or are underway to improve the knowledge base for conservation.[5] These include, but are not limited to:

Freshwater habitats, flora and fauna

- The ESManage project (ongoing to 2019) to investigate the value of freshwater ecosystem services and to determine how these can be enhanced based on expert-based Bayesian Belief Systems and catchment modelling (UCD. EPA Funded);
- The ReConnect project (ongoing to 2019) examining the impact of river barrier removal, e.g. weirs, on aquatic biology, sediment movement and hydrology (UCD. EPA funded).
- The HYDROFOR Project (2014) examined the impact of coniferous forestry on water quality (UCD/UCC/NUIG. EPA/DAFM funded).

5 Lead institutions: UCD = National University of Ireland Dublin, TCD = Trinity College Dublin, SEMRU = Socio-Economic Marine Research Unit at NUIG (National University of Ireland Galway), UCC = University College Cork, IT Sligo = Institute of Technology Sligo.

Biodiversity finance

- Biodiversity Finance (2018). Calculated the amounts spent directly and indirectly on biodiversity in Ireland (UCD. IRC/DCHG funded).

Peatlands

- NEROS (2018) examined the implications of peatland re-wetting for biodiversity and carbon sequestration (UCD. EPA funded).
- The BOGLAND study (2011) prepared a strategy for the sustainable management of Ireland's peatlands, including studies of their carbon flux balance, hydrology and ecosystem services benefits (UCD/TCD. EPA Funded).

Coastal and marine

- SeaRover Programme: a 3 year programme funded under the EMFF marine Biodiversity Scheme. This is a joint programme supported by DAFM and DCHG and administered by the Marine Institute. Its objectives are to map the offshore geogenic and biogenic reef habitat along Ireland's continental shelf in areas that are subjected to intensive fishing and other areas of no fishing activity. Using the ROV, Holland I, two thirds of this area has been surveyed to date using HD cameras. The remaining area will be surveyed in summer 2019.
- ObSERVE Programme (2nd phase recently announced). Summer and winter Aerial (UCC) and acoustic (GMIT) surveys of cetacean and seabird diversity, distribution, abundance and migration habits. DCCAE/DCHG funded
- SAMFHIRES (ongoing) Saltmarsh function and human impacts on Ecological status (TCD. EPA funded).
- Spatially explicit ecological risk assessments framework for conservation planning of coastal waters (SEERAC) (NUIG. DAFM funded).
- Valuing Ireland's Blue Ecosystem Services (2016-18) explored the methods available to value the benefits of these ecosystem services (SEMRU. NUIG), EPA funded)
- Valuing Ireland's coastal, marine and freshwater ecosystem services and benefit transfer (2012) (SEMRU. EPA funded).
- Marine Ecosystem Restoration (MERCES) (SEMRU. H2020 funded)
- Measuring the Non-market Benefits of Marine Ecosystem Service Provision (SEMRU, MI (Beaufort Fund);
- Deepwater Ecosystem Assessment Spatial Management (ATLAS) (SEMRU. H2020)
- Ecosystem Indicators for Marine Strategy Framework Directive (2013) (EPA funded for OSPAR).

Agriculture

- Co-benefits for Water and Biodiversity from the Sustainable Management of High Nature Value Farmland (2017) (Sligo IT, EPA funded);
- Valuing Agricultural Catchment Ecosystem Services (SEMRU. EPA Funded)
- PROTECTS project (2017) on the protection of terrestrial ecosystems through sustainable pesticide use (NUIG/TCD. DAFM funded).

- Conservation Grazing with Native Irish Cattle in High Nature Value Environments (NPWS/IT Tralee).
- FarmEcos (2015) will identify novel, cost-effective measures to protect and enhance farmland biodiversity from farm to landscape scale. The project will build on international research to identify new agri-environment measures appropriate to Irish conditions (DAFM funded).

Forests

- ECOVALUE (2013). Research into the value of ecosystem services of forests. (UCD/UCC. DAFM funded).
- GEOFOREST (2013). Impacts of forest clearing on Kerry Slug (2014) DAFM. Investigators will examine population and food preference, and separate the effects of possible clear-felling impacts from environmental factors influencing the species(NUIG. DAFM funded).
- SHINE (2015). Research into support needed for Hen Harrier in Novel Environments. DAFM Builds on previous work to evaluate habitat selection, use of forested landscapes, breeding success, and interactions with wind energy development (UCC. DAFM funded).

General ecosystem service impacts and valuation

- ECORISK (2017) examined the potential for biodiversity, habitat and ecosystem service valuation to inform environmental liability assessments (UCD. EPA funded);
- SIMBIOSYS project (2013) on sectoral impacts on biodiversity and ecosystem services (TCD, EPA funded).
- EcoFinders (2014). An EU Framework project on techniques, indicators and economic valuation of soil biodiversity. In Ireland, this built on earlier work by the EPA funded CréBio project on soil biodiversity (UCD. EPA funded).
- A major new EPA funded project on Natural Capital Assessment was approved in 2018 and has commenced in 2019.

Health and biodiversity

- NEAR-Health (2018) examined how individuals and communities can benefit from nature and green space (NUIG. EPA/HSE funded).
- Health Benefits from Biodiversity and Green Infrastructure (2016) examined how biodiverse space can contribute benefits to physical and mental wellbeing (UCD. EPA funded)

Climate change

- Climate Change Impacts on Biodiversity in Ireland (2012, NUIM & NUIG).[8]

CASE STUDY: The ObSERVE Programme

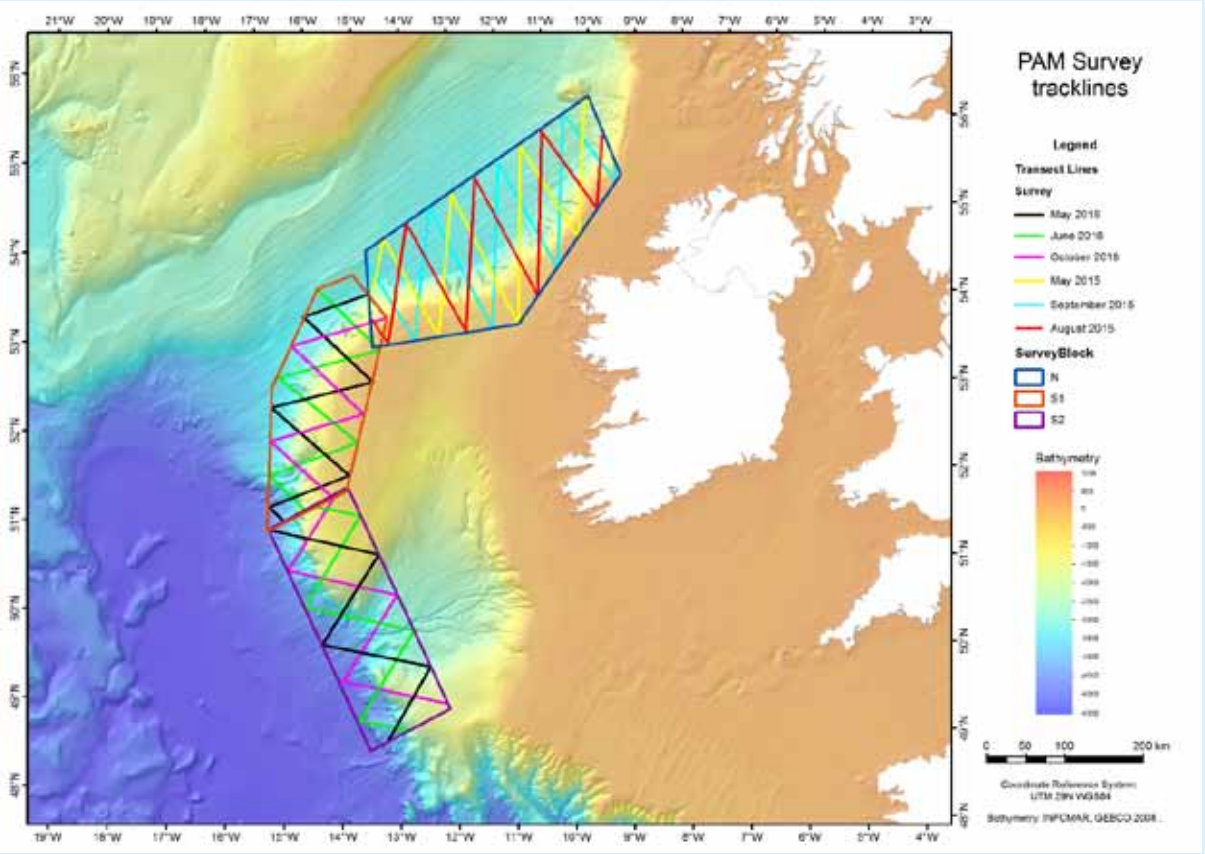
Although the land area of Ireland covers 84,420km^2, its marine territory represents an Exclusive Economic Zone (EEZ) that extends to 420,000km^2. This area is important for fishing, but is increasingly being considered for economic activities such as hydrocarbon exploration, wave or wind energy and other development. These activities need to proceed cautiously if they are to be sustainable and impacts on biodiversity are to be avoided. In particular, marine mammals are known to be sensitive to acoustic based exploration, although very little is known about the distribution and behavior of these animals or of the offshore distribution of seabirds.

A 2014, a major marine scientific programme was set up by the Department of Communications, Climate Action and Environment (DCCAE) in partnership with the Department of Culture, Heritage and the Gaeltacht (DCHG). The **ObSERVE Programme** provided funding of euro 2.7 million for two projects to improve our understanding of marine species and sensitive habitats, focusing on the "Atlantic Margin" where the continental shelf meets the much deeper oceanic basin along an edge intersected by impressive and complex canyons.

The **Aerial project** involved a consortium led by University College Cork (UCC) with international partners IMARES, Alnilam and Aerosotravia, and consisted of a series of high quality aerial surveys of whales, dolphins and seabirds over two years, together with an intensive seabird survey of the western Irish Sea. A specially equipped aeroplane recorded the occurrence, distribution, abundance and migration habits of these species over 16,802km^2 in 2015-16 and 20,295km^2 in 2016-17. Finer-scale aerial surveys of seabirds were also carried out in 2016 over 6,687km^2 in the Irish Sea. The project provided detailed observations and analyses of 43 species, including specialised, but rarely seen, deep-diving species such as beaked whales, as well as sightings of *Minke whale* calves, and unexpected species such as the *Beluga/White whale* - a mainly Arctic species. The survey observed significant seasonal differences in estimated numbers of animals, including *Minke whale* numbers of approximately 12,000 in summer and 5,000 in winter. It also identified the importance of areas of the continental slope basin for the feeding and/or migration of *Fin whales* and of the deep ocean basin for beaked whales numbering 2,500 in summer and 4,000 in winter. The survey also identified the seasonal importance of the Atlantic margin and western Irish Sea for over half a million seabirds.

The **Acoustic project** was led by the Galway-Mayo Institute of Technology (GMIT) in partnership with the Marine Institute, JASCO, SMRU Consulting and the Irish Whale and Dolphin Group. It took place over the same area as the former project, but tapped into the array of underwater sounds made by more than 20 species of whale, dolphin and porpoise. It applied a combination of fixed and moving surveillance methods over three seasons to identify a variety of seasonal sound patterns produced by species from the smallest *Harbour porpoise* to the highly endangered, immense *Blue whale*. For the first time, density and abundance estimates were generated for *Sperm whales* numbering from one individual per km^2 in the south to 4.6 individuals per km^2 in the west of the study area, an overall cumulative abundance of 380.

Areas surveyed using passive acoustic monitoring



Conclusion & Future work

The ObSERVE Programme is contributing vital information on the occurrence, distribution and density of sensitive species within key offshore areas. This and future information generated under the programme will provide robust environmental baseline data for the authorities responsible for the protection of marine biodiversity and to inform and regulate offshore activities such as oil & gas exploration.[6]

6 See also: https://www.dccae.gov.ie/en-ie/natural-resources/topics/Oil-Gas-Exploration-Production/observe-programme/Pages/ObSERVE-Programme.aspx and https://maps.biodiversityireland.ie/Dataset/278

Rationale for assessment of effectiveness

2.2.12 These projects have provided positive outputs for biodiversity, but more evidence is needed of the recommendations being taken up and included in policy. A division persists between research, even applied research, and policy making, although efforts are being made by both universities and funding bodies to address this. Future priorities are likely to include more research into biodiversity adaptation to climate change.

Measures taken have been effective

Objective 3. Increase awareness and appreciation of biodiversity and ecosystems services

Target 3.1 Enhanced appreciation of the value of biodiversity and ecosystem services among policy makers, businesses, stakeholders, local communities, and the general public

2.3.1 Target 3.1 acknowledges the importance of awareness of biodiversity by the public and key stakeholders. This awareness and understanding of biodiversity issues by members of the public and stakeholders, such as government, landowners, business, farming, scientific and conservation, is vital to the protection of biodiversity.

2.3.2 Target 3.1 also foresees engagement with **local communities** through specific actions such as the annual **National Biodiversity Week** and an annual **Biodiversity Award** for local communities, sectoral and education projects. This objective includes an action to increase knowledge of biodiversity and ecosystem services through the provision of relevant courses at primary, secondary and tertiary education levels.

2.3.3 The **Heritage Council** (www.heritagecouncil.ie) provides grant support for communities interested in protecting their local heritage, including biodiversity. It also supports awareness initiatives in schools, for example through talks by local Heritage Officers and experts. In recent years, the EPA (www.epa.ie) has worked to improve its communication of the state of the environment to the wider public with easily accessible information and mapping on air and water quality, waste/recycling and climate change together a My Local Environment page and advice on measures that can be taken at household level, e.g. maintenance of domestic septic tanks.

2.3.4 The **National Biodiversity Data Centre (NBDC)** has an important role in raising awareness and direct engagement. Its website (www.biodiversityireland.ie) provides information for a range of stakeholders on various aspects of biodiversity. It delivers over 20 IAS identification workshops per year, manages the National Vegetation Database and Biodiversity Indicators. Information is directed at individuals, community groups, schools, NGOSs and other organisations who have an opportunity to participate in biodiversity events, submit sighting or to contribute to citizen science. The centre coordinates Bioblitz events at national and local level to increase public awareness and participation in biodiversity surveys. An invasive species awareness week was launched in March 2018.

2.3.5 The **All-Ireland Pollinator Plan 2015-2020** is managed by the **NBDC**. Ireland is one of the first European countries to have a strategy to protect the vital ecosystem service of pollination. In terms

of species, the plan has had particular success in schools and in raising awareness among gardeners, communities and farmers. In addition, 90 government and non-government organisations have signed up to make their lands or products more pollinator friendly. A GIS-mapping tool has been set up to identify the 600 areas that are benefiting, to identify actions taken and to track progress. In terms of distinct benefits, progress will depend on transforming awareness into evidence of improving bee and pollinator populations due to changes in a high proportion of Ireland's land managed by farmers, businesses, gardeners, and local authorities.

2.3.6 **Schools** are participating in increasing numbers in biodiversity awareness activities, for example through talks provided by the Heritage Council's Heritage in Schools Scheme and through the An Taisce Green Schools programme under which 1,000 schools have been awarded a biodiversity flag.[7] School educational programmes are also run by Bord na Móna (BnM), the Burren Beo Trust, the Irish Peatland Conservation Council (IPCC), the Marine Institute (MI), National Parks (NPWS), Inland Fisheries Ireland (IFI) and the EPA.

2.3.7 *An Taisce* **Green Communities** has been supporting 30 community groups since 2008 and is now providing specific environmental training too. The popular national Tidy Towns competition, which supports community led enhancement of town and villages, now includes a Wildlife, Habitats and Natural Amenities award. Since 2015, 140 local communities have entered the special Pollinator Award associated with the All-Ireland Pollinator Plan.

2.3.8 Input by the **private sector** is being provided by Business in the Community Ireland to embed biodiversity into decision making. A booklet [9] produced by the organisation explains the instrumental value of biodiversity makes to the economy and the business case for protecting it. The booklet sets out five pillars of corporate responsibility whereby business can input positively to the environment, illustrating these with case studies that include biodiversity action plans, integrated constructed wetlands, support for biodiversity on supplier farms, wildflower meadows and pollination, etc. A business and Biodiversity Platform will be launched in 2019.

2.3.9 The IFNC has also organised specific initiatives to promote natural capital awareness for businesses, for example through seminars on CNCA and "breakfast meetings". The annual Environment Ireland national conference attracts representatives from industries such as wastewater treatment, waste management and environmental auditing, but also typically includes sessions focused on biodiversity and climate change. In 2018, Lean Business Ireland and the Community Foundation supported Community Biodiversity Grants, the Dublin Port Company funded the **Together for Biodiversity Awards**[8] and a **National Farming for Nature Awards** scheme was supported by Bord Bia and the National Rural Network Specific actions are proposed to raise private sector awareness of our dependence on biodiversity and ecosystem services. Enhanced communication across all sectors is foreseen to target information to particular audiences via the wide range of media now available, including through a communications campaign in support of public and sectoral understanding of the value of biodiversity.

2.3.10 **Catchment and water management** has been provided with a new information portal, catchments.ie, supported by the DHPLG, EPA and the Local Authorities Water Programme (LAWP), to provide information on, and to foster public awareness of, water policy and its interactions with health,

7 *An Taisce* is an NGO which works to protect Ireland's environment and which has active campaigns on sustainability, heritage, education, planning and climate change.

8 https://www.leanbusinessireland.ie/community-biodiversity-grants/ and https://iwt.ie/biodiversity-awards/

agriculture, recreation and biodiversity. A significant number of meetings have been held, particularly in relation to public consultation on the 2nd Cycle River Basin Management Scheme (RBMS). The LAWP has also assisted in the establishment of River Trusts by local stakeholders keen to engage diverse public awareness and involvement with rivers and to attract funding. Three trusts have now been established (Slaney, Nore/Suir and Blackwater) with several others in the process of formation. In south-east Ireland, the Nore Suir River Trust has, for example, been active in replacing barriers such as weirs with rock ramps for migrating fish and in eradicating invasive weeds along the two rivers.

2.3.11 Many **Local authorities** have prepared Biodiversity Action Plans. Local authorities are actively involved in numerous small projects that increase awareness of biodiversity. For example, Dublin and Fingal run extensive events programmes working with schools and community groups. Galway County Council also runs education and engagement activities. Local Agenda 21 funding is available for communities to develop wildlife gardens or allotments, bird boxes and bee hives. There has also been funding from the EU Interreg Programme, for example for the MISE (Mammals in a Sustainable Environment) project which involved collaboration between the Local Authority and Institute of Technology in Waterford, the NBDC and organisations in Wales to increase awareness and citizen science in studies of small mammals (2011-2015). Twenty-two Local Authorities also received nearly €200,000 in funding from DCHG to implement biodiversity actions at a local level, together with ten 10 Local Authorities who received €43,800 from DCHG to tackle IAS at local level. A more ambitious programme is proposed for 2019.

2.3.12 The **Environmental Pillar** represents the views of 26 NGOs, the majority of whom advocate for biodiversity and sustainability in Irish policy along with the Irish Environmental Network. Environmental NGOs that are particularly active in increasing awareness and support for biodiversity conservation include *An Taisce*, Irish Wildlife Trust, the IPCC, Irish Wetlands Forum (IWF), Bat Conservation Ireland, the Irish Whale and Dolphin Group (IWDG) and the Curlew Trust.

2.3.13 The **National Association of Regional Game Councils (NARGC)** have been active in promoting conservation and support for farmland, upland and wetland habitat and game cover. Projects have included Red Grouse rehabilitation projects and breeding and release projects for Grey Partridge.

Rationale for assessment of effectiveness

There has been a range of good initiatives to promote biodiversity awareness amongst the public and stakeholder and also funding for small community projects that have a biodiversity element or which encourage awareness and interest in biodiversity. Actions related to awareness received funding of €69 million between 2010-2015.

Measures taken have been effective

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.1. Optimised opportunities under agriculture and rural development, and forest policy to benefit biodiversity

2.4.1 Most of Ireland's biodiversity and ecosystem services are not located in protected areas, but rather in the wider countryside. Ireland's Article 17 Report to the Habitats Directive on the condition of protected habitats and species [1] shows how this biodiversity is subject to pressures and threats from agricultural intensification, land use change and modification, invasive species and human disturbance. Responses to these pressures and threats are addressed by EU Directives on Water, Habitats, Birds and Nitrates and by Regulations on IAS. Protected areas cover 17% of the country, but a much larger area is subject to agriculture and forestry where management is regulated by major policies including the EU Common Agricultural Policy (CAP), specifically the Agricultural and Rural Development Programmes and the Forestry Programme. Land use and domestic and urban wastewater also effect water quality in Ireland's rivers, estuaries and lakes for which policy is driven by the EU Water Framework Directive (WFD). While these areas contain many habitats that are not designated, this wider terrestrial environment is vital to a healthy biodiversity.

Agriculture

2.4.2 Agriculture is the dominant land use in Ireland and shapes its countryside and landscape. Out of a total land area of 6.9 million ha, 63% is devoted to agricultural use [10, 11]. The Irish agricultural sector is predominantly grass based and linked to beef and milk production which account for around 60% of agricultural output. At a national level, there has been specialisation towards these activities and a reduction in the area under tillage. This trend has been accompanied by structural changes including production intensification characterised by a decline in the number of holdings, a move towards larger farms, a reduction in the labour force, an increase in machinery and other non-labour inputs, and growth in part-time farming.

2.4.3 Support for agricultural production, environmental protection and rural development is administered through DAFM, using farm subsidies and grants. Funding for agricultural production, farm incomes and the agri-environment fall under the **Common Agricultural Policy (CAP)** for which reform is on-going to 2020. The **EU CAP Pillar I** supports farmers through direct payments, principally the Basic Payment Scheme (BPS) which supports farmers' incomes, but also requires that holdings are kept in *good agricultural and environmental condition*, for instance through the maintenance of landscape features such as hedgerows. Although this requirement can benefit biodiversity, the BPS does not have specific biodiversity objectives. 'Greening' payments are currently available for the maintenance of 'Ecological Focus Areas' (areas beneficial to climate or environment, e.g. field margins, green cover, buffer strips, etc.).

2.4.4 Of more significance for biodiversity is the **Rural Development Programme (CAP Pillar II)**. The DAFM has proposed substantial national funding to the RDP 2014-2020, bringing the total budget to over €4bn including the €2.2bn received from the EU. The RDP provides additional supports including a variety of schemes from compensatory allowances for disadvantaged areas to **agri-environment schemes (AES)**. To ensure minimum environmental impacts, Ireland's RDP has been subject to SEA.

A plan for improved evaluation of measures has also been submitted which will predominantly make use of environmental indicators, but will include some specific ecological monitoring. The NPWS has also submitted recommendations to DAFM to improve the management of commonages (commonly owned grazing land) which cover 8.5% of Ireland's agricultural land.

2.4.5 **Target 4.1** includes proposals to develop new AES which will provide a higher level of management and protection of biodiversity. The principal national AES is the Green Low Carbon Agri-environment Scheme (GLAS) which financially supports farmers to sensitively manage important habitats and water quality. The NBAP aims to ensure AES achieve a quantifiable net gain for biodiversity and ecosystems, and that new measures are developed to support biodiversity in areas of High Nature Value (HNV) farmland. AES provide payments to farmers who subscribe to environmental commitments related to the preservation of the environment and maintenance of the countryside. Measures include:

- Management of low-intensity pasture systems,
- Integrated farm management and organic agriculture,
- Preservation of landscape features, or
- Set aside of land for biodiversity.

2.4.6 The current GLAS AES was launched in 2015 and supports 49,000 farmers to manage lands of conservation value. The scheme includes priority actions targeted at vulnerable habitats and commonage, threatened farmland species, and also measures which will have wider biodiversity benefits. In addition, it includes a focus on water quality and climate actions such as minimum tillage for soil carbon retention with added benefits for ecosystem services. Payments for Natura 2000 sites have been integrated into the scheme and farmers in the NPWS Farm Plan Scheme (FPS) are given prioritised entry to GLAS. Participating farms must already have a Nutrient Management Plan to manage and minimise losses of nitrogen and phosphorous.

2..4.7 In addition to GLAS and the pilot schemes, the DAFM also incentivises organic production under the Organic Farming Scheme (OFS) which was previously part of a former AES. Although not specifically directed at biodiversity, organic farming does help to sustain soil biodiversity and provides a high level of environmental protection (sustainable use).

2.4.8 In common with other EU Member States, new **Locally Led AES (LLAES)** schemes are also being piloted to focus on areas of high nature conservation value, including **Results-Based Agricultural Payment Schemes (RBAPS)** coordinated by the European Forum on Nature Conservation and Pastoralism (EFNCP). The RBAPS has been funded since 2016 under the RDP and aim to reward environmentally sensitive farming based on both implementation of actions and evidence of positive biodiversity outcomes. Pilot schemes are in effect in Ireland for species-rich grassland in County Leitrim and for the Shannon Callows riparian meadows. The Burren Programme, operating in the karst landscape of County Clare, is an example of an established scheme. It developed out of the former BurrenLIFE Project (2005-2010) which was widely regarded as having been successful in maintaining traditional farming practices beneficial to biodiversity.

2.4.9 The Heritage Council has funded reports on the potential of HNV farming based on EU LIFE projects in the Aran Islands and the Iveragh Peninsula [12]. These projects are not prescription based, but rather allows farmers to decide themselves on the management practices to adopt. Payments have

been based on scores linked to the maintenance or improvement of biodiversity. The AranLIFE project seeks to manage coastal machair and calcareous grassland and is proposed for conversion into a LLAES **European Innovation Project (EIP)**. The pilot projects have been accompanied by habitat and species surveys and mapping. A 'nature value index' has also been developed to assess performance should measures be developed.[9]

Rationale for assessment of effectiveness

Positive AES measures have been instigated within agricultural policy, principally GLAS, but accompanied recently by Locally-Led and Results-Based schemes which focus on areas of HNV farmland and make financial transfers to farmers based on evidence of implementation and positive biodiversity outcomes. While positive, these measures and new approaches remain secondary to the principle agricultural supports, retain some weaknesses (see Sections 3.4.2 to 3.4.10) and have been long coming or are still at the stage of being pilot schemes. The measures are relatively new so that their effectiveness is still largely unknown at this stage.

😐 **Unknown**

Forestry

2.4.11 The **Forestry Act** passed into law in October 2014. The Act provides new provisions for the protection of the environment, new environmental conditions for planting approvals, and integrated the requirements and procedures of the EIA Directive, the Birds and Habitats Directives, and the WFD. DAFM Forest Service (FS) Environmental Requirements for Afforestation, compliant with these Directives, have been in place since December 2016.

2.4.12 Ireland remains one of the least forested countries in Europe, although the area of forest has been increasing rapidly to cover 770,000ha or 11% of total land area. The current forest estate contains a high proportion of commercial plantation, much of which is comprised of single-age, non-native conifer species of which 52% is fast-growing Sitka Spruce [13]. The species grows rapidly in the damp Irish climate, although the softwood produced is typically used for low value products. As of 2012, this was the main species in the 30% of the forest estate that was monoculture [14]. Non-native conifers are especially dominant above 600m. Broad leaf woodland now accounts for 29% of the total forest area of which around 92% is comprised of native species [15]. However, true native woodland is estimated to account for 100,000ha or 14% of the current total forest area [16]. The main native species are willow, ash and birch, of which willow has a high value for dependent fauna. Oak accounts for 3.0% of the forested area [13]. Only a very small area, c20,000ha, of ancient, or old-growth, forest remains. However, this is of highest biodiversity value [17], is protected from felling and has access to grant supports.

2.4.13 The current **Forestry Programme 2014-2020** was subjected to SEA prior to launch. The accompanying environmental report concluded that the programme would have a net environmental positive impact for water quality and wildlife [18]. This assessment examined the environmental requirements placed on recipients of all forestry grants. Among various recommendations and mitigation, it noted the need to take account of recent research findings, to implement Sustainable Forest Management and to

9 Details of EIP projects currently being funded: https://www.agriculture.gov.ie/press/pressreleases/2017/may/title,107851,en.html & https://www.agriculture.gov.ie/press/pressreleases/2018/february/title,114710,en.html

promote producer groups who can coordinate forestry planting to achieve environmental benefits at a landscape scale (an approach not easily encouraged by individual voluntary prescriptive measures to date). Key measures introduced in recent years include the Land Types for Afforestation Procedure (March 2016) and the Environmental Requirements for Afforestation (Dec. 2016). In summary, all sites presented to the DAFM for afforestation must meet these requirements, which effectively rule out land use change to forestry within a wide range of habitats and water-sensitive landscapes. If a site meets these requirements, it undergoes a detailed assessment by DAFM, involving inspections, referrals (including internally to the Forest Inspectorate Ecologist), public consultation, AA and EIA screening, protocols regarding (inter alia) small white orchid (*Pseudorchis albida*), curlew (*Numenius arquata*) and acid sensitivity, and an appeal process. If approval is issued (with or without grant aid), the work must adhere to the Environmental Requirements for Afforestation, which set out a wide range of protective measures regarding biodiversity and water.

A key biodiversity-focused measure of the Forestry Programme is the **Native Woodland Scheme (NWS)**.[10] The NWS contains two separate elements, Establishment[11] and Conservation, both operated in partnership with Woodlands of Ireland and other environmental stakeholders. As of 2019, new planting of native broadleaf trees under the NWS Establishment 2013-2018 totalled 1,211ha., making for a total area of 2,281ha since 2000. The parallel NWS Conservation, which supports the restoration of existing native woodland and the targeted conversion of conifer stands into native woodland, was reactivated under the 2014-2020 Forestry Programme following its temporary suspension during the 2008-2011 financial crisis. Planting under the Conservation element was 104ha of 2019, although further applications are being processed. The total area planted under this element is 2,271ha since 2000. Both elements were strengthened under the mid-term review of the Programme.[12] The area covered by the scheme between 2016 and April 2018 was 350ha. In 2017 and 2018, under a project involving Microsoft, Natural Capital Partners and the forestry company Green Belt, an additional top-up payment to landowners supported additional new native woodland.[13]

2.4.14 In addition, the **Afforestation Grant and Premium Scheme** includes 12 different Grant and Premium Categories (or GPCs) from commercial conifers to native woodland to enable the design of diverse multi-purpose woodlands and forests. The minimum mandatory broadleaves requirement per forest plantation is 15%. Individual sites can also comprise up to 15% open space to protect and enhance biodiversity, water and other environmental receptors. Overall, the scheme offers higher grant and premium rates for broadleaved GPCs, and measures introduced in the mid-term review of the Programme in early 2018 strengthening this differential. Broadleaf planting was 27% of all planting in 2018 up from 21% in 2017.

2.4.15 Other FS schemes that are not necessarily directed at native tree species, but which have value for biodiversity, include the AgroForestry Scheme, the Reconstitution (Charlara) Scheme, the Seed Stand and Seed Orchard Scheme, the Neighbourwood Scheme (for restoration and amenity), and Deer Tree Shelters and Deer/Hare Fencing Scheme. Felling & Reforestation Policy (May 2017): sets out a Reforestation Objective Framework to enable forest restructuring at clearfell to facilitate reforestation with native woodland and semi-natural habitats, to protect biodiversity and water. The policy also clarifies situations where forest removal may be considered, due to 'over-riding environmental considerations'.

10 FS-DAFM Circular 05/2018.
11 As represented by GPC 9 and 10 of the Afforestation Scheme.
12 For example, increases in the available grants, additional supports regarding deer protection – see Circulars 3 and 5 of 2018.
13 This project provided a useful template for the subsequent release of the Woodland Environmental Fund by DAFM in May 2018 (see Circular 12 of 2018).

2.4.16 Woodlands and forests have an important role in protecting and enhancing Ireland's waters and aquatic ecosystems. The document *Forests & Water: Achieving Objectives under Ireland's River Basin Management Plan 2018-2021* summaries the range of measures being implemented by the DAFM-FS to protect and enhance water quality and aquatic ecosystems. This includes a model setting out how NWS Establishment can be used strategically for this purpose. Within the context of the Water Framework Directive (WFD), the overall approach is (i) to safeguard water during all forestry operations; (ii) to restructure existing forests to reflect water sensitivities, and (iii) to situate and design new woodlands and forests in a way that protects water quality using the WFD's 'source-pathway-receptor' model. FS-DAFM is also developing a Plan for Forestry and Freshwater Pearl Mussel (*Margaritifera margaritifera)*. DAFM is co-beneficiary on the KerryLIFE project, focused on the 'Sustainable land use management for the conservation of the freshwater pearl mussel'. The FS-DAFM is also directly participating into various initiatives and forums, including the Hen Harrier Threat Response Plan, the Curlew Task Force, the All-Ireland Pollinator Plan, the Corporate Social responsibility Forum, EIPs regarding Hen Harrier and Freshwater Pearl Mussel, the People's Millennium Forests Project and Woodlands of Ireland.

2.4.17 The NPWS has 5,482ha of native woodland within its Nature Reserves and National Parks and is actively protecting this area, for example by clearing invasive *Rhododendron* and controlling deer numbers. Coillte also manages 22,000ha of natural woodland under Natura 2000. Fifteen percent of Coillte's landholding is managed for biodiversity, including examples of the priority habitats of alluvial woodland, bog woodland, karst woodland and yew woods. Coillte also manages over 607ha which were planted as Millennium Forest in areas of existing native woodland or SAC (a tree for each household in Ireland) with the support of the DAFM-FS and the NGO Woodlands of Ireland. Community events are often held on these landholdings. Another NGO, the Native Woodland Trust, is involved in the volunteer-run restoration and planting of six woodlands. Native species are also now planted alongside major new road developments.

2.4.18 A framework for **Deer Management** was launched by DAFM in 2015 [19]. While deer are an important element of Ireland's biodiversity, browsing by deer can have a significant adverse effect on natural regeneration of native woodland, forestry and agriculture. Deer numbers are thought to be increasing as the area of new forest expands, most especially non-native deer species. A Deer Management Forum consisting of stakeholders from Government Departments, farming and forestry organisations, and NGOs was established in 2015. Recommendations have included development of effective policy, sufficient research and monitoring of numbers and impact. Hybridisation of native red deer (*Cervus elaphus*) with red deer of unknown genetic origin and non-native Sika deer (*Cervus nippon nippon*) is also of concern.

Rationale for assessment of effectiveness

2.4.19 A range of measures have been undertaken by DAFM to enhance the biodiversity value of the forest estate. These include new policies, procedures and requirements governing key forestry activities, particularly afforestation and clearfelling/ reforestation, and a number of support measures under the Forestry Programme 2014-2020. Most of the area under forest cover in Ireland comprises commercial conifer plantations of a relatively low biodiversity value, compared to native woodland. However, the application of the above measures will accelerate the ongoing diversification of forests, and the promotion of native woodlands (through afforestation, restoration and conversion) as a landscape scale approach to reverse habitat fragmentation and to protect water.

Measures taken have been partially effective

Other aspects of land management

2.4.20 **Target 4.1** also addresses other aspects of land management in the wider countryside. **Peatland**, as protected habitat, is addressed under Objective 6 of this Plan. Ireland has the largest area of blanket bog in the EU as well as raised bogs which contain unique flora and habitats for amphibians and other rare fauna, and are a major carbon store. However, at least 92% of raised bog and 75% of blanket bog has been degraded [20], and less than 4% of Raised bog is thought to be actively peat-forming [21]. Peatland has in the past been planted with forestry or drained for grazing, but is still exploited for fuel and for horticultural products. It is cut as turf by (or for) individuals with turbary rights who use dried peat to heat domestic households, as well as being harvested commercially by private contractors and by Bord na Móna (BnM).

2.4.21 The NBAP objectives include the management of works in line with best practice, monitoring of biodiversity, awareness raising and rehabilitation. Actions include the protection of bogs, and the control of invasive plant species to which areas of bare peat are vulnerable. Restrictions were already in place on the private household cutting of turf on 53 raised bog SACs in return for compensation payments or relocation to undesignated bog. These arrangements were extended to 36 raised bog NHAs in 2014.

2.4.22 Target 4.1 foresees implementation of the BnM Second Biodiversity Action Plan 2016-2021. BnM proposes to move out of peat production by 2030. To this end, co-firing with biomass is being pursued at its Edenderry power plant and at other plants that were traditionally fuelled by peat. This move also takes account of Government policy to reduce dependence on carbon-based fuels in energy production. The company is required to rehabilitate its worked bogs and has already restored 1,000ha of raised bog and contributed to the rehabilitation of around 15% of its original 80,000ha landholding with input also from NPWS, NGOs and community groups. Its Lough Boora Discovery Park is managed for conservation and amenity.

2.4.23 A National Peatlands Strategy was published in 2016 (see 2.6.3), bringing together stakeholders from various Government Departments and Agencies. Key actions include restoration of the raised bog network, management of IAS and the mapping of ecosystem services benefits. Coillte have already restored over 3,000ha in partnership with an EU LIFE Project. Restoration has involved the removal of conifers and damming of drains.

2.4.24 The Peatland Strategy also encourages community engagement and networking around peatland protection. Local peatlands, such as those at Killaun and Abbeyleix, have been adopted by communities for their wildlife, heritage and health (exercise) benefits. However, there are many smaller bogs which are owned or recently purchased by private contractors on which peat extraction can be extended so long as new works fall below the 50ha threshold required for EIA.

Case study: Wild Nephin

Wild Nephin includes an area of area 4,000ha of coniferous plantation forestry. Much of this forestry is rather unproductive and Coillte, the semi-State forestry company, are allowing it to be taken out of commercial production and returned gradually to wilderness over a 15 year period. The total area of 11,000ha is located beside the large Owenduff Atlantic blanket bog, an area of peatland that, along with the forest and surrounding mountains, will extend to the largest area of unbroken wilderness in Europe and be combined into the Ballycroy National Park. Although the area contains some long distance trails, it is remote and only lightly visited. Wildlife includes red deer, pine marten, Greenland white-fronted geese (*Anser albifrons flavirostris*) and breeding golden plover (*Pluvialis apricaria*), merlin (*Falco columbarius*), peregrine (*Falco peregrinus*), hen harrier (*Circus cyaneus*), and crossbill (*Loxia curvirostria*), as well as rare plants such as marsh saxifrage (*Saxifraga hirculus*) and shining sickle moss (*Drepanocladus vernicosus*).

However, while it remains the plan to allow the forested area to return to wilderness, some continued management will be necessary including the formation of glades and removal of invasive non-native plants species. Non-native rhododendron will place additional pressures on the restoration plans as it could flourish as the forest is opened to greater light, but is very costly to control.

2.4.25 Other actions in the wider countryside include a review of the **National Plant Conservation Strategy** and support for implementation of the NGO **BirdWatch Ireland (BWI)** 'Group Species Action Plans' for birds associated with various habitats (see Target 6.3). BWI manages or owns 17 reserves and assists with recording rare birds and migration from its Cape Clear Bird Observatory in the extreme south-west of Ireland. It also works on advocacy in Ireland, the EU and internationally with overseas partner organisations Members of Birdwatch Ireland (BWI) regularly undertake surveys of local breeding birds and other birds of conservation interest or concern such as waders and wintering geese for the Irish Wetland Bird Survey (I-WeBS). They also contribute to records of rare sightings and breeding birds maintained for Ireland by the British Trust for Ornithology (BTO).

Rationale for assessment of effectiveness

2.4.26 Positive, if belated, steps have been taken to address deer management. The Government implemented commitments post 2020 to curtail household cutting on some peatlands in respect of the Habitats Directive, and the NPWS has responsibility for making compensation payments to people with peat cutting rights to 89 raised bog SACs or NHAs. The semi-state company responsible for peat extraction has expressed its intention to move out of peat production by 2030 and is contributing to the rehabilitation of some former worked bogs. However, large areas of peatland of former or remnant biodiversity value continue to be harvested for now by the company along with other areas of peatland being cut by private individuals and contractors.

Measures taken have been partially effective

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.2. Principal pollutant pressures on terrestrial and freshwater biodiversity substantially reduced by 2020

2.4.27 **Target 4.2** includes actions to protect, enhance and monitor the ecological status of water during the second cycle of the **EU Water Framework Directive (WFD) 2017-2021**. Complementary actions include encouragement to Irish Water to protect and enhance the environment under its Water Services Strategic Plan 2015-2040, and the implementation of recommendations from research projects supported by the EPA STRIVE Programme Series 99 on Management Strategies for the Protection of High Status Waterbodies. Key partners include EPA, DAFM and Irish Water.

2.4.28 Clean water is a key resource for biodiversity. The WFD is the principal legal measure in this area and aims to maintain high and good status waters, to prevent any deterioration in the status of water quality and aims to achieve at least Good Environmental Status by 2021 (originally 2015).[14] Water quality status is determined on the basis of chemical and biological criteria with a key element of the latter being the diversity of macroinvertebrate fauna. A network of 3,500 monitoring sites is maintained by the EPA to record the status of Ireland's waters in line with the requirements of the WFD. The objectives of the WFD are supported by those of the earlier Nitrates Directive (1991) which address nitrate pollution from agriculture.

14 http://www.epa.ie/water/watmg/wfd/

2.4.29 The EU **Urban Waste Water Treatment Directive** (91/271/EEC) and the Urban Waste Water Treatment Regulations aim to reduce the nutrient contribution of urban effluent into receiving waters, particularly in Nutrient Sensitive Areas for which higher levels of treatment are required. Under the **Water Services (Amendment) Act 2012** regulations were put in place to require single houses to register septic tanks which would then be subject to inspections.

2.4.30 The WFD proposed a single system of water management through river basin areas. In 2018, the Department of Housing, Planning and Local Government (DHPLG) launched the 2nd Cycle **River Basin Management Plan (RBMP) 2018-2021** to identify key threats to water quality on a catchment basis and to develop evidence-based measures for their mitigation [22]. Measures have been taken to improve governance through a consistent approach to implementation within a single national River Basin District. A catchment approach has been adopted to ensure consideration of both water and flooding issues within land use planning and a total of 190 waterbodies have been identified as priority Areas for Action. The RBMP will ensure improved targeting of measures, for example through advice to farmers and through financial support for urban wastewater treatment and for improved domestic treatment systems.

2.4.31 The **Local Authority Waters Programme** (formerly LawCo) has been established to foster public awareness and engagement with water management policy and to encourage community initiatives, including the establishment of River Trusts, which have also been promoted by the Sustainable Water Network (SWAN).

2.4.32 **Irish Water** is the country's single water utility and is responsible for managing the infrastructure for water supply and wastewater. Its Water Services Strategic Plan has a specific objective to protect and enhance the environment and deliver on the requirements of the Urban Waste Water Treatment Directive. As identified in the RBMB, Irish Water will invest approximately €1.7 billion in waste-water projects, programmes and asset maintenance. This investment will include €880 million for 255 major waste-water treatment projects, €350 million in capital investment in collection systems in 41 areas, and €465 million for capital maintenance and national upgrade programmes. This investment will significantly reduce the pressure on water quality and biodiversity from urban sources of water pollution.

2.4.33 The **KerryLIFE** project (see 2.6.17) is working on catchment scale initiatives to introduce land conservation measures to improve conditions for freshwater pearl mussel (*Margaritifera margaritifera*) which will have benefits for many other species.

2.4.34 The EPA also has responsibilities relevant to Target 4.2. Measures applied by IFI include fish species management plans or catch quotas for species of conservation concern such as Atlantic salmon (*Salmo salar*), sea trout (*Salmo trutta*) and eel (*Anguilla anguilla)* which are guided by respective independent Standing Scientific Committees. These catch restrictions have been imposed in response to multiple pressures, although pollution, principally eutrophication, is probably the most significant pressure. To address some of these pressures locally, the IFI administers the Salmon Conservation Fund which is supported by salmon license income from anglers. A proportion of expenditure by the fund supports rehabilitation of salmon habitat with co-funding provided by angling clubs.

Rationale for assessment of effectiveness

2.4.35 The WFD is a progressive policy which aims to achieve targeted improvements in water quality through a comprehensive approach at the level of river basins using catchment management. The policy is complemented by actions to reduce nitrate run-off, to provide for investment in improved urban waste water treatment and improved treatment of domestic effluent from small rural communities and individual properties. Public engagement with the river basin management is being supported through LawCo. These measures should, over time, lead to improvements in water quality and the environment for freshwater biodiversity, including healthier populations of aquatic flora, invertebrates, amphibians, fish and mammals.

Measures taken have been partially effective

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.3. Optimised benefits for biodiversity in Flood Risk Management Planning and drainage schemes

2.4.36 **Target 4.3** includes an action to ensure that **flood risk management** minimises losses of biodiversity and ecosystem services.[15] This target includes an action that all significant drainage, including new projects and maintenance, will be assessed for its implications for biodiversity, particularly for wetlands. Land drainage in Ireland in the past has had a significant negative impact and removed the capacity of many former wetlands to hold back water in times of high rainfall.

2.4.37 The OPW is the agency responsible for the implementation of the EU Flood Directive and the maintenance of drainage. The principal approach is now one of catchment-based flood risk management. The OPW and IFI are also cooperating on the Environmental Rivers Enhancement Programme (EREP) through which the natural profile of previously drained rivers is being re-established with input also from angling clubs.

2.4.38 Forests are well-positioned to deliver flood risk management objectives through the attenuation of peak flows, enhancing water quality and biodiversity, enabling timber production and mitigating climate change.[23] DAFM and the wider forest sector recognise the role of woodlands and forests (together with shelter belts and hedgerows) as a natural means of flood attenuation, when applied strategically as part of a wider integrated catchment approach.

2.4.39 Past planning decisions and under-investment in flood management have worsened the social impact of major storm events in recent years. There is also an expectation of rising sea levels, more high rainfall events, groundwater based flooding and intense storms due to climate change [24-26]. Several flood mitigation schemes that were delayed by planning and funding constraints are now proceeding, although these entail conventional hard engineering methods to protect urban populations from major events. The OPW is the agency responsible for the implementation of the EU Flood Directive and the maintenance of drainage, issues addressed by Target 4.3 of the NBAP, although policy is

15 Public information on flood risk has been made available at http://www.floodinfo.ie/

guided by an Inter-Departmental Flood Policy Coordination Group. The principal approach is now one of catchment-based flood risk management. Although the NBAP calls for more non-structural flood risk management measures, most capital investment to date has been in management systems and emergency response. The OPW works with the EPA and other authorities to identify measures, including natural water retention, that can benefit ecosystems and biodiversity. The Climate Change Sectoral Adaptation Plan [27] also includes reference to the re-establishment of the hydrological services provided by uncut bogs.

Rationale for assessment of effectiveness

2.4.40 The application of a catchment-based approach to flood risk management is consistent with that being taken on water quality by the WFD and is informed by River Basin Management. In time this approach should give more consideration to the contribution of land use, riparian buffer strips, and the functionality of natural wetlands. The foundations are therefore in place to draw on the ecosystem services provided by the natural environment and, in doing so, benefit species which depend on habitats such as wetlands and flood plains.

Measures taken have been partially effective

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.4. Harmful invasive alien species are controlled and there is reduced risk of introduction and/or spread of new species

2.4.41 In common with countries worldwide, IAS represent a significant threat to native biodiversity, habitats and ecosystem services in Ireland. **Target 4.4** of the NBAP includes actions to implement the **EU Invasive Alien Species (IAS) Regulation (2015)**[16] and relevant sections of the EU (Birds and Natural Habitats) Regulations 2011, including continued identification and monitoring of high risk IAS, the development of biosecurity plans, and coordination of IAS surveillance and monitoring data, including with Northern Ireland and Britain. The regulation places a legal obligation on member states to *'prevent, minimise and mitigate the adverse impacts of the introduction and spread, both intentional and unintentional, of invasive alien species'.*

2.4.42 A key stream of work under this target has been to engage and encourage cooperation with the pet trade, horticultural businesses and nurseries to ensure that the importation of species or products do not introduce IAS. Public bodies have also been encouraged to use native species, particularly native wildflower meadows, provide risk assessments for potentially non-native species, and to extend responsibilities and powers for control of invasive aquatic species to IFI. Key partners include DCHG, DAFM, NBDC, Local Authorities, TII and IFI.

2.4.43 Agreement has been reached by the principal Government Agencies and stakeholders to exchange information on invasive species, a process coordinated by the NBDC who also support an early detection notification system linked to the European Commission's European Alien Species Information

16 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R1143&from=EN

Network. Invasive aquatic species are a particular problem, requiring cooperation between various agencies including IFI and the cross-border organisations Waterways Ireland and the Loughs Agency. IFI has been proactive in providing training to staff and also hosted an international conference on the subject in 2013 [28]. The National Botanic Gardens have considerable data and expertise to support these activities. A dedicated Invasive Species Group has also been established for the RBMP. The OPW manages invasive plants where water-based works may cause further dispersal. Their recent expenditure in this area has predominantly been directed at the control of Japanese knotweed & Himalayan balsam, the two most common riparian invasive plant species encountered during arterial drainage maintenance operations.

2.4.44 Invasive animal species of concern include North American freshwater crayfish species. To date none have been found in Ireland but the crayfish plague organism (*Aphanomyces astaci*) carried by these species arrived in Ireland in 2015, and has reached five rivers in Ireland and has the potential to cause local, or even national, extinction of the native white-clawed crayfish (*Austropotamobius pallipes*). This species has been lost from much of its natural range in Europe and the Irish population is particularly important. New regulations have been introduced to ban the import, sale and distribution of 5 species of non-native crayfish.[17]

2.4.45 The DAFM is responsible for implementing: (i) forestry aspects of the EU Plant Health Directive (Council Directive 2000/29/EC) on protective measures against the introduction and spread of organisms harmful to plants or plant products; and (ii) Council Directive 1999/105/EC on the marketing of forest reproductive material. The DAFM Forest Service is the designated National Plant Protection Organization for the IPPC and implementation is overseen by the Department's Forestry Inspectorate. FS-DAFM is also the Designated Authority for the OECD Scheme for the Certification of Forest Reproductive Material Moving in International Trade. Controls have been reinforced following the introduction of ash die-back disease (Chalara). Regular updates on Chalara are available from (www.agriculture.gov.ie/forestservice/treediseases/ashdiebackchalara/) and for other tree diseases such as *Phytophthora ramorum*.

2.4.46 Direct action for IAS in protected sites has been pursued through two key LIFE programmes, i.e. CAISIE LIFE 2009-2013 and, the Duhallow LIFE Samock project (2010-2015). The 2015 Regulation has also catalysed local action to combat IAS which has included the preparation of the first IAS Action Plan by Dublin City Council (2016-2020) and the development of local Community Action Groups such as Upper Achill, County Mayo which has been worked to eradicate Giant Rhubarb and Japanese Knotweed since 2016.

2.4.47 To minimise the risk of marine invasive species, the International Convention for the Control and Management of Ships' Ballast Water and Sediments was ratified in 2017.

Rationale for assessment of effectiveness

2.4.48 Renewed efforts to address IAS under the impetus provided by the recent EU Invasive Alien Species Regulation have the potential to reduce the spread of invasive plants and animals. However, many invasive species are now established in Ireland and significant pressures remain on many fronts, especially in the freshwater environment, which need to be addressed by firm and well-funded implementation measures.

😐 **Unknown**

17 S.I. No. 354 of 2018; The European Union (Invasive Alien Species) (Freshwater Crayfish) Regulations 2018

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.5. Improved enforcement of wildlife law

2.4.49 Wildlife crime in Ireland includes persecution of raptors and the sale of birdlife abroad, as well as deer and salmon poaching, badger baiting and unlawful hare coursing. Actions under Target 4.5 include enforcement of the legislation by the DAFM, NPWS and An Garda Síochána (Irish police service), including through training in wildlife crime detection. Actions have included the continued enforcement of Wildlife Acts and Habitats Regulations (2011), and implementation and enforcement of the EU Environmental Liability Regulations.[18] There continues to be ongoing and more formalised interaction between NPWS and other Government Departments in relation to wildlife crime e.g. RAPTOR Protocol[19] (DCHG, DAFM and DPER in relation to the poisoning and persecution of birds of prey, Operation Bambi against deer poaching (DCHG and AGS), and on the ground engagement (e.g. with EPA, AGS, DAFM, IFI, Local Authorities).

2.4.50 A protocol for dealing with suspected poisoning or persecution has been in place since 2011 between NPWS, the Veterinary Laboratory Service and The State Laboratory. Under the Wildlife Act, a license is required before birds or animals can be hunted or shot. EC 'Restrictions on use of Poison Bait Regulations' were agreed in 2010.

2.4.51 To raise awareness and collaboration, Ireland's first Wildlife Crime Conference was held in September 2013 followed by a second in 2015. In 2018, a workshop was organised by NPWS which brought together Regional Conservation Officers, An Garda Síochána, the national police force, and other stakeholders. Conservation Rangers have been sanctioned as Authorised Officers and are being trained along with representatives from the Garda. The website www.wildlifecrime.ie provides information on legislation, hunting licenses/permissions, protected species, reporting and prosecutions. Raptors have been victims of shooting, trapping and poisoning. Although most farmland poisoning has probably been accidental and intended for rodents, it demonstrates a careless attitude to wildlife. In addition, IFI is active in the area of salmon poaching with officials on the ground often being innovative in their use of methods and willing to confront occasionally violent individuals. In some locations, illegal netting is a major threat to local populations, although resources for anti-poaching patrols have been reduced in recent years.

2.4.52 Irish Customs enforces CITES regulations in respect of the illegal trade in endangered flora, wildlife and wildlife products.

Rationale for assessment of effectiveness

2.4.53 Positive measures have been taken, but a legacy of problems remain in relation to stocks of poison and illegal poisoning, as well as hunting or shooting of wildlife, including hares, badgers, seals and raptors. Limited public access to the countryside compounds the availability of evidence or opportunities for incidents to be witnessed.

Measures taken have been partially effective

18 EU Wildlife Trade Regulations (http://ec.europa.eu/environment/cites/legis_wildlife_en.htm), Irish Wildlife Act 1976 and Wildlife (Amendment) Act 2000), and EU Environmental Liability Directive (2004/35/EC).

19 https://www.npws.ie/research-projects/animal-species/birds/raptor-protocol

Objective 5. Conserve and restore biodiversity and ecosystem services in the marine environment

Target 5.1. Progress made towards good ecological and environmental status of marine waters over the lifetime of this Plan

2.5.1 Target 5.1 is being addressed at several levels. A Strategic Marine Plan, *Harnessing Our Ocean Wealth*, has been produced consistent with the EU **Marine Strategy Framework Directive (MSFD)**. Protection and conservation of marine biodiversity is one of three high level goals of the MSFD (along with a thriving maritime economy and engagement with marine heritage). A Key Action of the plan, an initial assessment of environmental status, has been completed. A **Marine Spatial Plan** has been prepared by the DHPLG for public consultation and Government approval. The plan will provide guidance for future development affecting the marine environment.[20]

2.5.2 The Marine Institute (MI) and the Geological Survey of Ireland (GSI) are working on the **Integrated Mapping for Sustainable Development of Ireland's Marine Resource** (INFOMAR) in line with the Marine Spatial Planning Framework and the Strategic Marine Plan. The framework aims to provide sustainable planning and management of marine resources, balancing ecological, economic and social objectives in relation to aspects such as the environment and biodiversity, commercial fisheries, renewable energy and hydrocarbons. Once developed, INFOMAR will be an important tool to underpin decisions on future policies and actions to protect biodiversity, and will be a stepping stone towards long term measures.

2.5.3 A classification of marine benthic communities is currently being finalised by DCHG and the National University of Ireland Galway (NUIG) in accordance with the pan-European EUNIS classification system. A number of sensitive marine communities, including maërl beds and seagrass meadows have been mapped to date. These communities, with a few exceptions, occur within SACs where they are afforded the highest degree of protection with no disturbing activity allowed within a 50m buffer zone. Ireland is also mapping offshore reef habitat with the support of the European Maritime and Fisheries Fund. This programme will survey biogenic reef formed by the cold water coral species Lophelia, Madrepora and Solenosmilia and also geogenic reef on which deep water coral gardens and sponge fields occur. Two of the proposed three surveys have taken place in 2017 and 2018 and have covered two thirds of the shelf area; the remaining area to be surveyed will be completed in summer 2019. This survey work is complemented by on-going environmental research, for example, the mapping of cetacean populations and movement, being undertaken by institutes and universities such as UCC and GMIT (see Objective 4).

2.5.4 Measures to require the correct disposal of waste at harbour have been introduced. An OSPAR/BIM pilot project, 'Fishing for Litter', to encourage fishermen to 'harvest' discarded gear, has involved over 70 vessels.

20 https://www.housing.gov.ie/planning/maritime-spatial-planning/maritime-spatial-planning-directive/maritime-spatial-planning

Rationale for assessment of effectiveness

2.5.5 Positive policies have been developed to protect marine natural resources and to map habitats. Rather little is currently known about cetacean movement and marine habitats. The largest obstacles are the sheer size of the area extending up to 200 nautical miles from the coast and the depth of deep water habitats (over 5,000m).

Measures taken have been partially effective

Objective 5. Conserve and restore biodiversity and ecosystem services in the marine environment

Target 5.2. Fish stock levels maintained or restored to levels that can produce maximum sustainable yield, where possible, no later than 2020

2.5.6 **Target 5.2** principally deals with the management of fish stocks. Under the EU Common Fisheries Policy (CFP), stocks have begun to be managed in accordance with a Maximum Sustainable Yield (MSY) framework for which Total Allowable Catches (TAC) are estimated. The MSFD aims to ensure that Good Environmental Status (GES) is achieved by 2020. This requires that commercial fisheries are managed using an Ecosystem Approach that takes account of population and reproduction and which includes the provision that all stocks are maintained within safe biological limits. The MSFD is the first EU marine legislation that specifically addresses biodiversity.

2.5.7 The fishing sector is managed by Fishery Control Regulations and Landing Quotas agreed under the CFP. The regulations require that vessels, and vessel size, are registered, that gear meet species size requirements, and that catches are logged on board. Landing Obligations that require boats to land all that they catch have been phased in for pelagic and demersal fish since 2015 and will apply to all TAC species by 2019.[21] The obligations were introduced to encourage more responsible fishing, ending the long-held practice of discards which had undermined sustainable fishing by tolerating bycatch of non-target species due to poor practice or the use of inappropriate gear. Inspections at sea and on landings are undertaken by the Sea Fisheries Protection Authority (SFPA) to ensure that catches and gear conform to quota or other requirements of the CFP.

2.5.8 A ban on large trawlers in inshore waters was announced by the Minister in 2018 to prevent the disproportionate impact that such boats have on inshore fisheries. The ban comes into effect in January 2020.

2.5.9 Collective fisheries advice is provided by the International Council for the Exploration of the Sea (ICES) and the EU Scientific, Technical and Economic Committee for Fisheries (STECF). Environmental advice is provided by national government agencies, OSPAR and the European Environmental Agency (EEA). In Ireland, a *Stock Book* is produced annually by the MI Fishery Ecosystems Advisory Service and presents the population status of all commercial species [29]. The provision of fishery research is a key component of the CFP and forms the basis of estimates of MSY and TAC. Inshore fisheries, including for most crustaceans and shellfish, are not managed using international TACs, but may be

21 https://www.agriculture.gov.ie/seafood/sea-fisheriespolicymanagementdivision/landobligationsdiscardsban/

subject to national restrictions. Various long term management recovery strategies are in effect for several species which have been subjected to serious fishing pressures in the past, including cod, whiting and herring. Sixteen Irish vessels participated in the valuable albacore tuna fishery in 2016. Since 1969, the fishery has been regulated by the International Commission for the Conservation of Atlantic Tunas which has an interest in 30 species.

Rationale for assessment of effectiveness

2.5.10 Stocks of some key commercial species such as cod and haddock have been severely impacted by past unsustainable fishing practice. Positive steps are being taken through the CFP to ensure that commercial fish stocks are managed according to the principle of safe biological limits. In some cases, restoration of fish populations requires significant cuts and the uncertain duration of these has resulted in opposition from the fishing industry and rendering scientific advice subject to political negotiation. Gradually progress is being achieved. Forty-three percent of commercial stocks are fished below MSY, although 22% are still fished above MSY and 35% are unknown [29].

Measures taken have been partially effective

Objective 6. Expand and improve management of Protected Areas and Species

Target 6.1. Natura 2000 network designated and under effective conservation management by 2020

Expansion of Protected Areas

2.6.1 Ireland is required under the EU Nature Directives to secure the protection of a representative range of ecosystems and to maintain and enhance native flora and fauna through a suite of internationally and nationally **Protected Areas**. There are 818 protected areas in Ireland. These include 539 Special Areas for Conservation (SACs) and Special Protection Areas (SPAs) notified under the EU Habitats and Birds Directives which together make up the Natura 2000 network.

2.6.2 Since 2010, the NPWS has taken action to further expand the **Natura 2000 network** through the designated of 7 new marine SACs, 9 new Raised Bog SACs and 11 new SPA sites, resulting in an 18% increase in the area protected. Two of Ireland's National Parks have also been expanded. In 2017, the state purchased land to expand Wicklow National Park by 4,900 ha, whilst a 50% increase in the area of Ballycroy National Park was achieved through the transfer of forest lands from Coillte to the NPWS. Work has been ongoing to designate the new addition to Ballycroy National Park as a '*wilderness area*' by transforming 4,600 ha of commercial forestry into a landscape scale re-wilding programme to improve habitat and landscape quality over the next 15-years.

2.6.3 To replace permanently damaged areas in the existing raised bog SAC network, two new peatland sites, more than 50% owned by BnM, have been scheduled for designation in 2019. The area protected through nationally designated NHAs has, however, come under scrutiny. A '*Review of Raised Bog NHA Network*' in 2014 concluded that a reconfiguration was required, recommending a number of sites for de-designation and a complement of new sites selected for designation [30]. It is intended that there will be a total of 127 statutorily designated peatland NHAs and 7 sites that are partly designated

peatland NHAs. The Peatlands Strategy Implementation Group have also carried out an examination of existing and potential visitor facilities that are in the ownership of public, semi-State and voluntary bodies, to explore the potential development of a new National Peatlands Park.

2.6.4 The Natura 2000 network is managed through the development of sites-specific conservation objectives (**SSCOs**) and management plans (**SSMPs**) which aim to maximise the contribution they make to the conservation of target habitats and species. SSCOs specify the target conservation conditions for a particular habitat or species to maintain or reach '*favourable conservation status*', translated into actions through management plans (SSMPs). Since the last report to the CBD, the NPWS has continued a programme of work to finalise SSCO and SSMPS for all SPAs and SACs. Generic conservation objectives are in place for those sites which remain without SSCOs. Outside of internationally designated sites, management plans have been completed for just two of Ireland's six National Parks.

Improvement and Enhancement of Protected Areas

2.6.5 Since 2010, the NPWS and its partners have continued to invest in a number of programmes to improve the **conservation status** of Protected Areas. Significant efforts have been made by the State to resolve issues with the protection of **raised bog SACs** within the framework of the Habitats Directive. This has included intense and on-going engagement with peat (turf) cutting interests, the farming community, NGOs and the EC. The NPWS, in conjunction with the National Peatland Strategy Implementation Group, have worked to protect the integrity of raised bog SACs from turf cutting by prohibiting household cutting on the best remaining examples of raised bog SAC and NHA sites and establishing long-term compensation, including relocation where feasible, through the Cessation of Turf Cutting Compensation Scheme (CTCCS). In 2014, the NPWS extended the CTCCS to an additional 36 Raised Bog NHAs. Thus far, the CTCCS has had over 2000 applications and paid out an over €32m in compensation payments between 2010 and 2018 to prevent further damage.

2.6.6 To complement the progress made under CTCCS, the **National Raised Bog SAC Management Plan** sets out as comprehensive programme of restoration of Raised Bog SACs and NHAs from 2017-2022. Under the plan, the NPWS has published 53 SSCOs for raised bog SACs and commissioned 55 sites restoration plans (53 raised bog SACs plus 2 sites proposed for designation). The restoration plans, to be agreed with stakeholders, will also provide information on how benefits to local communities will be optimised, for example through the facilitation of educational or recreational facilities.

2.6.7 **Restoration** work on raised bog SACs has been also been advanced through two projects. The €5.4 million EU LIFE Living Bog project (http://raisedbogs.ie/) has completed restoration work on two SAC sites (166ha) in 2018 and work will continue for 14 other SAC sites in early 2019. The NPWS has partnered with Coillte to undertake restoration measures on state owned land for five SACs (including drain blocking to raise water levels). Further restoration works on State owned lands are planned for early 2019. Practical restoration work has been facilitated based on Irish Wildlife Manual No.99 '*Demonstrating Best Practise in Raised Bog Restoration in Ireland*' [31]. Alongside the restoration of Raised Bog SACs, the OPW and the NPWS are continuing to monitor hydrological information from a recently restored fen site, Tory Hill SAC, in County Limerick, to develop conservation measures and examine the impacts on landowners. This experimental pilot enables the OPW and NPWS to explore the implications of past drainage on the restoration potential of fen SAC sites with the programme having now been extended to the Ballymore Fen SAC.

2.6.8 The **EU LIFE Programme** has also been critical to the instigation of more sustainable land management regimes to improve and enhance the conservation status of protected areas. The success of the Burren Programme (see also Target 4.1) which places farmers at the centre of the conservation project, has been reinforced by the recent AranLIFE project (2013-2018) which worked to develop sustainable management regimes for habitats designated under Habitats Directive Annex 1 on the Aran Islands [32]. AranLIFE utilised €2.6 million of EU and state funding to develop the best possible farm management techniques to bring three key internationally important species-rich farmland habitats to favourable condition, i.e. calcareous dry grassland, limestone pavement and machair grassland. The project successfully improved the conservation status of 1,011 ha of priority habitats across the Aran Islands, working with 67 farmers to implement optimal grazing regimes vital to maintain species-rich grasslands. As a consequence, AranLIFE has been promoted as a model for High Nature Value (HNV) farming initiatives across Europe. The success of Aran LIFE is to be extended through a new European Innovation Partnership (EIP), Caomhnú Árann, funded through the Irish RDP [33]. The sustainable management of protected areas has been pursued through a variety of other EIP projects, including the Blackstairs Farming Future Partnership, and the Wicklow Uplands Council's Sustainable Uplands AES. The freshwater pearl mussel (*Margaritifera margaritifera*) EIP was launched in 2018 in eight priority catchments.

2.6.9 Balancing tourism and conservation interests is a key challenge for the management of the National Parks and National Nature Reserves. A number of Irish National Parks have reported increased pressures as a result of recreational use. To address the rapid expansion of visitor numbers and outdoor activities, the NPWS has partnered with Fáilte Ireland to increase infrastructure investment to meet this growing demand. In addition, €1.1 million was provided under the LIFE Environment Resource Efficiency Strand (2012-2017) to reconcile the integration of tourism and natural heritage in the Burren Region through the GeoLIFE 'Tourism for Conservation' project [34].

Case Study: AranLIFE

The Aran Islands contain some of Ireland's best dry grassland habitat, including Orchid-rich grassland/ Calcareous grassland, Lowland hay meadows, Limestone pavement and Machair grassland. While being only 40 km2 in area, the islands are home to approximately 500 plant species, some of which have limited distribution in Ireland like Pyramidal Bugle (*Ajuga pyramidalis*) or Roseroot (*Sedum rosea*). Over 75% of the total land area of the Islands is designated as a SAC under the EU Habitats Directive.

The Aran Islands have supported farming communities for over 4,000 years, operating low-intensity agricultural production of cattle and sheep traditionally with a small area of tillage for on-farm use. This has created a unique farmed landscape with high associated biodiversity, also known as High Nature Value Farming. However, the traditional farming systems associated with high biodiversity are being used less and less. The gradual reduction in traditional farming is leading towards abandonment and degradation of farmland in some areas and intensification of production in others. The loss of traditional farming practice and knowledge are a major concern for the priority semi-natural habitats present. Although past agri-environment schemes have benefited the island they have failed to adequately maintain the habitats designated under the EU Habitats Directive [35]

The Aran LIFE project (2014-2018) worked to assist farmers to reverse this negative trend and improve the conservation status of 35% of priority habitats [32], by developing and demonstrating the best conservation management practice of local farmers on designated Natura 2000 sites. To both maintain and bring sites back into favourable condition, the project brought together local farming knowledge and experience with the scientific expertise of other project partners to overcome some of the challenges of island farming. During the course of the project, the team worked with 68 project farmers across three different islands to return 1,011 ha of priority habitats to favourable conservation status. As part of the project, farm management plans were developed for 1,011 ha of grassland, to profile grazing potential and ensure optimal grazing of the priority habitats of the farm [36]. These actions were complemented by work to improve access to land parcels by clearing boreens (country lanes), scrub and bracken within fields, improving access to water for stock and enhancing education and public awareness through media campaign, public information meetings, educational and the dissemination of information on the wildlife of the islands.

Rationale for assessment of effectiveness

2.6.10 A range of measures has been taken to secure full designation of SACs and SPAs, and to improve the protection and management of protected areas, particularly peatlands and other areas dependent on environmentally sensitive farming.

Measures taken have been partially effective

Objective 6. Expand and improve management of Protected Areas and Species

Target 6.2. Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020

2.6.11 The **representativeness** of Protected Areas is vital to a coherent national network and to preserve healthy ecosystems, species richness and genetic diversity. Central to increasing the representativeness of Protected Areas has been to increase the extent of **Marine Protected Areas (MPAs)**. Ireland has an extensive marine territory, covering 880,000km^2 [37]. At present, just 1.4% of this marine territory has been designated for conservation under the EU Habitats Directive, including 19 sites which are also recognised under the OSPAR Convention to Protect the Marine Environment of the North East Atlantic. Ireland is committed to establishing a network of MPAs as a signatory to OSPAR and under the EU MSFD [38]. A long-standing programme of work by the Marine Institute and the Geological Survey of Ireland (GSI) is continuing on the Integrated Mapping for the Sustainable Development of Ireland's Marine Resource (INFOMAR) (see 2.2.6 & 2.5.2) and the National Seabed Survey (INSS). This provided a platform to inform the selection and designation of seven new marine SACs which were proposed to the EC in 2012 and 2015.

2.6.12 Ensuring that Protected Areas are managed as a network recognises the importance of **connectivity** to biodiversity over the long term. Actions to increase the number and extent of Protected Areas outlined under Target 6.1 should also act to increase their **resilience** in the face of climate change. Improving the sufficiency, coherence and connectivity of this network requires strategic long-term planning and large-scale programmes.

2.6.13 At the terrestrial level, the DCHG also published the **National Landscape Strategy** 2015-2020 which provides a platform for thinking more holistically at a landscape scale about the coherence and connectivity of Protected Areas within the landscape [39]. At the local scale, a number of Local Authorities have also worked to embed the concept of connectivity within their management of the environment and protected areas. These concepts have been prevalent in the development of green infrastructure plans (see also 2.1.19) which enhance the connectivity of existing green spaces and protected areas for purposes of biodiversity and ecosystem services. One example of this can be found in the Dublin City Biodiversity Action Plan 2015-2020.

Rationale for assessment of effectiveness

2.6.14 Some steps are being put in place to improve the protection of the marine environment and to establish a network of MPAs. The National Landscape Strategy and the development of green infrastructure strategies by Local Authorities are promising initiatives to improve connectivity and resilience, although more and better resourced measures are needed to address the threat presented to biodiversity by new development and, in particular, climate change.

😐 **Measures taken could be more effective**

Objective 6. Expand and improve management of protected areas and species

Target 6.3: No protected species in worsening status by 2020; majority species in, or moving towards, favourable status by 2020

2.6.15 Ireland hosts more than 31,000 species, including nationally and internationally threatened, vulnerable and rare species protected under European Directives (EU Habitats Directive and EU Birds Directive) and national legislation (Wildlife (Amendment) Act; Flora (Protection) Order). A range of species-based conservation programmes have been pursued by the NPWS since 2010.

2.6.16 Since its launch in 2006, the **NPWS Farm Plan Scheme** (FPS) has contributed to the conservation of protected species on agricultural land. The FPS, which is funded by the national exchequer, operates through the creation of bespoke farm plans targeted to assist farmers to go beyond their legal obligations and implement targeted habitat improvement for specific species, e.g. Chough (*Pyrrhocorax pyrrhocorax*), Corncrake (*Crex crex*), Hen Harrier (*Circus cyaneus*), breeding/wintering geese and waders, and Natterjack Toad (*Epidalea calamita*). Over 650 individual farm plans were implemented between 2006 and 2018. A key aspect of the work of the FPS is to engage land owners in some of the most important HNV farmland areas, including Natura and NHA sites, in positive actions for threatened species. The FPS programme aims to conserve species, but also to trial innovative and bespoke measures for particular habitats and species, which can allow better informed approaches to be up-scaled through national AES under the RDP 2007-2013 and 2014-2020 (outlined in Target 4.1). For example, all of the bird target species groups trialled under the FPS were prioritised under GLAS and some were taken forward under the EIP. DAFM also built on the success of the FPS by launching a €25 million Hen Harrier AES in 2017 to provide an additional income stream for farmers for species specific conservation actions. The FPS has been downscaled in recent years, but will continue to be an important agri-ecological scheme in the national context.

2.6.17 The **EU LIFE** Programme has been a major source of support for the conservation, management and restoration of habitats to support threatened and protected species. Twenty LIFE nature and biodiversity projects have been undertaken in Ireland since 1992 representing a total investment of €56 million, of which €33 million was contributed directly by the EU. Two species-focused projects were completed between 2010 and 2018, Mulkear LIFE (2009-2013) and Duhallow Samok (2010-2015) and, at present, there two active species-focused projects Raptor LIFE (2013) and Kerry LIFE (2013). The Mulkear LIFE project (2009-2013) restored and rehabilitated degraded river habitats in the Lower Shannon SAC to benefit populations of Sea Lamprey (*Petromyzon marinus*), Atlantic Salmon (*Salmo salar*) and European Otter (*Lutra lutra*). Duhallow Samok (2010-2015) improved the quality of the river bed and riparian zone in the Upper Blackwater SAC, to enhance habitat for Freshwater Pearl Mussel (*Margaritifera margaritifera*), Salmon, Otter, Hen Harrier, Merlin (*Falco columbarius*), Brook Lamprey (*Lampetra planeri*), and Kingfisher (*Alcedo atthis*). The Raptor LIFE (2015-2019) project is furthering the success of these programmes by working to connect and restore habitats for Hen Harrier, Merlin, Atlantic Salmon and Brook Lamprey. Kerry LIFE focused solely on the critically endangered Freshwater Pearl Mussel through catchment-scale conservation measures. The project was complemented by a programme of NPWS sub-basin management plans, a national FPM Conservation Strategy, a recent draft national plan for Forests and Freshwater Pearl Mussel in Ireland [40], and a FPM Farm Planning Protocol between 2017 and 2019.

2.6.18 The State and eNGOS have cooperated to conserve a number of **threatened bird species** through targeted programmes. For example, Ireland supports approximately 80% of the European breeding population of **Roseate Tern** (*Sterna dougallii*), a species of international concern. Work has recently begun to enhance a long-standing programme to conserve a key breeding colony at Rockabill Island and at two other colonies in the UK in cooperation with BWI and the RSPB through the Roseate Tern LIFE Recovery programme (2015-2019) [41]. The LIFE programme is working across the UK and Ireland to provide suitable conditions for Roseate Tern to reclaim their former breeding sites, alongside education and monitoring works.

2.6.19 With fewer than 150 breeding pairs, the **Curlew (***Numenius arquata*) is one of Ireland's most threatened species and there is a real possibility of this once familiar wetland wader becoming extinct as a native breeding species in Ireland within the next 10 years [42]. National initiatives to reverse its decline have included the setting up of a National Curlew Task Force in 2017 and a NPWS Curlew Conservation Programme. To avoid damaging activity and promote suitable habitats, the programme provides prioritised entry to the GLAS AES and additional income for farmers in seven key breeding sites. The programme has adopted a locally-led approach working to establish new Curlew Action Teams, Curlew Champions and Nest Protection Officers for these sites.

2.6.20 **Corncrake** (*Crex crex)* is another once familiar farmland bird that is now a Red-Listed species facing extinction in Ireland. Efforts to rebuild Corncrake populations have been in place since 1991. Between 2010 and 2015, an estimated €330,000 was distributed to farmers in SPAs with remnant breeding populations in return for actions to enhance Corncrake habitat through the NPWS FPS [43]. To provide additional support for Corncrake conservation, targeted grant measures have been integrated into GLAS. The NPWS has initiated a seasonal Corncrake Grant Scheme for farmers in core SPAs where breeding birds are present. BWI has also championed a specific conservation programme since 2010 supported by Heritage Council grants, focusing efforts on the Corncrake population on Tory Island and at their reserve in County Mayo. In response to continued declines over the last four years, the NPWS is currently developing a new management plan alongside the publication of a framework for Corncrake Conservation to 2022 [43].

2.6.21 The creation and management of suitable habitats has been complemented by ongoing **species reintroduction and breeding programmes**. Long-standing reintroduction programmes for raptors have continued for Golden Eagle (Aquila chrysaetos), White-Tailed Eagle (*Haliaeetus albicilla*) and Red Kite (*Milvus milvus*). Since 2010, there have been actions to reverse the near extinct Grey Partridge (*Perdix perdix*) through a breeding project in the Lough Boora Peatlands of County Offaly. Maintaining the genetic diversity of the Red Grouse (*Lagopus lagopus scotica*) population has also been a key concern, and work has been undertaken with Dublin Zoo and Fota Wildlife Park to assess the long-term viability of the species' isolated populations, coordinated by the Irish Grey Partridge Association and University College Dublin. Breeding programmes have been complemented by initiatives such as targeted payment for species conservation actions under the DAFM GLAS [44].

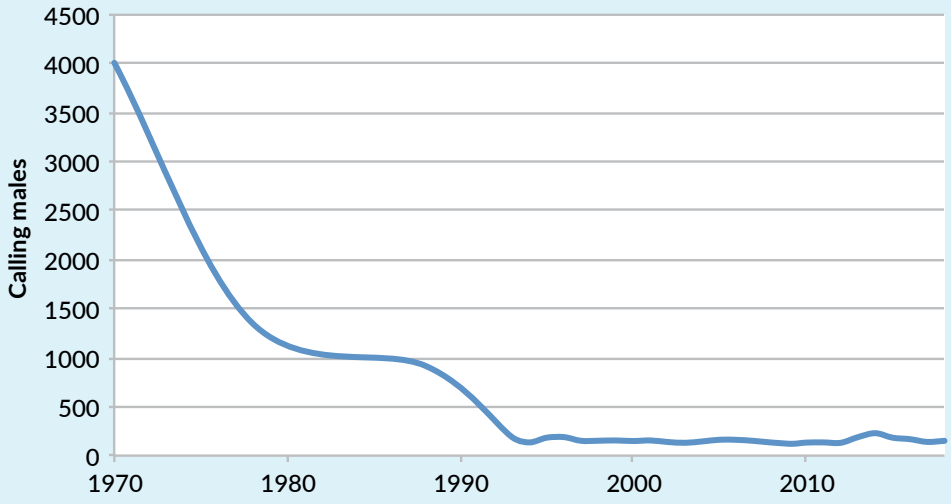
The Decline of Breeding Corncrake in Ireland

Corncrake are a species of European-wide concern which has experienced major declines across much of its range. Whereas the number of breeding Corncrakes have recently showed signs of recovered in the UK, with 1140 calling makes recorded in 2008, in Ireland the situation is much bleaker with ongoing declines in population placing the species on trajectory for local extinction. Reporting, under the EU Birds Directive, in 2014 revealed that this iconic and once commonplace arable species has seen an 85% decrease in population size since 1978 and a 92% decrease in range in Ireland. With a decline in the national population of around 4000 pairs in 1972, to fewer than 150 breeding pairs recorded in 2017. Systematic national surveying has shown that the extinction of a breeding site in the Shannon Callows in 2015 have left the entire Irish breeding population is confined to just two areas of Ireland: Donegal and West Connacht.

The drivers of decline in Corncrakes are well understood. Corncrake is an arable bird which thrived under the traditional mixed type of farming prevalent in Ireland from the 18th century through to the outset of the EU Common Agricultural Policy. The shift to modern intensive and specialised agriculture, with earlier mowing has severely impacted on the Corncrake ability to breed successfully and reduced its available habitat (NPWS 2015). Remaining populations of the species are now confined to areas where terrain has prevented modern practices, and tradition late-season haymaking still takes place.

Corncrake Population 1970-2015, Source: NPWS (2015) A Framework for Corncrake Conservation

Farming in a manner suitable for the species breeding requirements is essential for the conservation of Corncrake habitat and population recovery in Ireland. A Corncrake Conservation Programme has been in place in Ireland since 1991, however, Birdlife Ireland and the NPWS have recently accelerated efforts to try to reverse trends in Corncrake population, with the publication of the 'National Strategy for Corncrake Conservation 2022' in 2015. The framework includes a host of conservation actions to try to rebuild Corncrake populations. There are four established management schemes currently in existence: 1. NPWS Corncrake Grant Scheme (CGS) 2. NPWS Corncrake Farm Plan Scheme (CFPS) 3. Agri-Environment Options Scheme (AEOS) closed to new applicants, though existing plans may remain in operation 4. Green Low-carbon Agri-environment Scheme (GLAS).



2.6.22 **Threat-response plans for species** have been devised that provide detailed information on range, distribution and habitat, and which identify the particular threats facing each species and the measures required to address these threats over a three-year time frame. Between 2010 and 2018, species threat response plans were produced by the NPWS for Red Grouse and the Kerry slug (*Geomalacus maculosus*), while a plan for Hen Harrier is currently being drafted [45].

2.6.23 The **genetic diversity** of Irish flora and fauna is conserved by both public-sector bodies and NGOs. DAFM runs a national Genebank to preserve indigenous plant genetic resources for future use, as well as for seeds from indigenous varieties of cereals which were once cultivated in Ireland. The bank holds an important ex-situ collection of Crop Wild Relative (CWR) seeds. Genetic Heritage Ireland (GHI) promotes the conservation and sustainable utilisation of Ireland's plants and animal genetic resources. The NGO, together with Trinity College Dublin (TCD) Botanic Garden, manages the Threatened Irish Plants Genebank which contains some of Ireland's rarest species. Since 1992, the Irish Seed Savers Association (ISSA) has also held an important collection of agricultural genetic material including a native apple collection containing over 140 varieties, a native Irish Grain Collection with 48 varieties, and a seed bank contain more than 6,000 rare and endangered vegetable varieties. The NBDC manages the National Crop Wild Relative database.

2.6.24 Alongside the conservation of agricultural genetic material, the **National Botanical Gardens** (NBG) runs an ex-situ conservation programme for rare and threatened flora and maintains the Irish Threatened Plant Species Conservation Programme which carries out research on the cultivation of these threatened species. The work of the NBG also entails assessment of plant species and their genetic diversity, maintenance of live plants, seed banking and cryopreservation. The primary focus of the DNA and Tissue bank is to conserve wild Irish species, including crop wild relatives and heritage crop varieties. However, it also contains taxa from a world-wide distribution and specimens in the living collection in the Gardens. The NBG is currently involved in a number of active genetic conservation programmes for rare Irish plant species including the Killarney Fern (*Trichomanes speciosum*), Irish Fleabane (*Inula salicina*), and Club Sedge (*Carex buxbaumii)*, and works in partnership with the NPWS to build information on rare and threatened Irish flora. Since 2013, the NBG has also hosted 260 different taxa of Forest tree species in the National Forest Tree DNA bank developed by the ForGen project to understand the phylogeography and genetic diversity of Irish tree species [46]. Fota Wildlife Park, Dublin Zoo and Tayto Wildlife Park all participate in a number of ex-situ conservation programmes including the European Endangered Species Breeding programme, as well as contributing to conservation and breeding programmes for a number of native species, namely Red Squirrel, Corncrake, White Tailed Eagle, Grey Partridge and Barn Owl.

Rationale for assessment of effectiveness

2.6.25 Measures have been taken to protect threatened species and their habitats, and in some cases, to reintroduce species that have been lost to Ireland. The wide loss of habitat, due to such pressures as degradation of habitat or land use intensification, continue to threaten many species. Species-focused measures have included FPS, EU LIFE, GLAS and other projects and schemes to maintain areas of prime habitat, but these remain peripheral to the main agricultural supports to which only basic greening measures apply.

Measures taken have been partially effective

Objective 7. Strengthen international governance for biodiversity and ecosystem services

Target 7.1: Strengthen support for biodiversity and ecosystem services in external assistance

2.7.1 The **Nagoya Protocol**, on access to genetic resources and the equitable sharing of benefits, ensures that ecosystem service benefits arising from living resources or biodiversity are available for the benefit of everybody. The protocol was signed by Ireland in 2012 and national regulations will be drawn up early in 2019

2.7.2 **Irish Aid** is active in the area of climate change adaptation in developing countries and has prepared a detailed dataset to the DCCAE on its climate financing, including biodiversity as one of four Rio markers.

2.7.3 Ireland supports FLEGT (Forest Law Enforcement, Governance and Trade) to tackle **illegal logging** and trade in timber from developing countries.

2.7.4 New cross-border collaborative projects are being developed, including **Cooperation Across Borders for Biodiversity (CABB)** (2017-2022), a major new cross-country initiative by Birdwatch Ireland (BWI). CABB is funded by EU INTERREG VA to improve the condition of upland SACs and SPAs, and **Collaborative Action for the Natura Network (CANN)**, another Interreg project with Northern Ireland and Scotland working to save peatlands and other wetlands supporting threatened species such as curlew and hen harrier.

2.7.6 Cross-border coordination of **IAS surveillance** and monitoring data occurs between the Republic, Northern Ireland and Britain in relation to EU Invasive Alien Species (IAS) Regulation with the support of the British Irish Council.

Rationale for assessment of effectiveness

2.7.7 Irish Aid has been active in support rural livelihood and climate change initiatives in developing countries, a modest element of which has included secondary biodiversity objectives. In addition, an increasing level of cross-border biodiversity activities are being developed.

Measures taken have been partially effective

SECTION III

Assessment of progress towards each national target

Objective 1. Mainstream biodiversity into decision-making across all sectors

Target 1.1. Shared responsibility for the conservation of biodiversity and the sustainable use of its components is fully recognised, and acted upon, by all sectors.

3.1.1 Government Departments and Agencies have increasingly included sustainability objectives within their policies and, in some cases, include reference to their responsibility in relation to the maintenance of biodiversity. However, more evidence of shared responsibility in the form of tangible measures is necessary in terms of taking biodiversity fully into account in situations where other aspects of policy potentially compromise stated policies in relation to sustainability or biodiversity. National Biodiversity sub-indicator E.4.i indicates that 16 biodiversity-related guidance documents were published in 2012-14 compared with 27 in 2009-11.

3.1.2 The Central Statistics Office (CSO) is continuing to work on integrating **natural capital accounts** into its reporting systems as discussed in Section 2.1.16. The Eurostat Environmental Accounting Regulation is intended to inform EU policy and activities including the 2020 Biodiversity Strategy and the 7th Environmental Action Programme. For example, Irish data is now available in line with the EU Regulation 691/2011 on the destination and size of environmental taxes, subsidies and transfers.[22] Figure 3.2, for instance, shows how biodiversity-related subsidies and transfers have fallen in real terms since 2010 and relative to other environmental priorities such as support for renewable. The CSO data can be used to inform a further NBAP Action on environmental subsidies by further identifying those payments which are having a harmful effect on biodiversity and inform measures that could increase the effectiveness of those taxes or transfers that

22 https://www.cso.ie/en/releasesandpublications/er/esst/environmentalsubsidiesandsimilartransfers2016/

can have a positive effect on biodiversity. Published statistical releases are also available on material flows and air emissions. Statistics on the other three modules have been submitted to Eurostat, but it is hoped to publish reports on Physical Energy Flows, Environmental Protection Expenditure in early/mid 2019 and Environmental Good and Services in late 2019. In due course, these data will form the basis of a System of Environmental and Economic Accounting (SEEA) consistent with Eurostat guidance on accounting on taxes, material flows and the green economy. Figure 3.1 shows how much is spent on different aspects of environmental protection, including a declining trend, but also the continued dominance by wastewater management and biodiversity protection. By comparison, Figure 3.2 shows the distribution of these transfers by resource management domain, illustrating the dominance of energy related subsidies such as those for renewable energy.[23]

Much of the biodiversity-related expenditure in the State is delivered through agri-environment schemes and the European Innovation Partnership operated by the Department of Agriculture, Food and the marine. The Department uses a combination of EU and national funding to deliver measures for the Natura 2000 network in Ireland, mainly through its GLAS and European Innovation Partnership programmes, and also on marine surveys and monitoring.

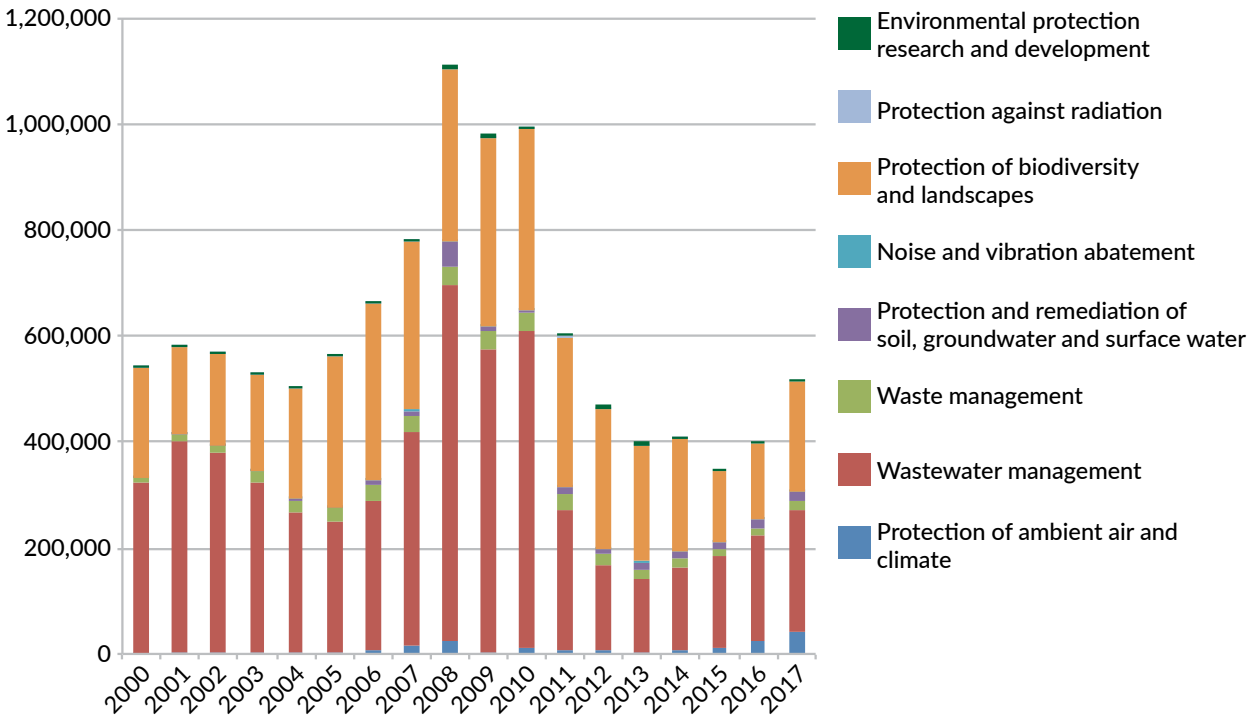


Figure 3.1: Environmental protection transfers 2000-2016 €,000s (source: CSO, 2018)

23 https://www.cso.ie/en/statistics/environmentaccounts/environmentalsubsidiesandsimilartransfers/

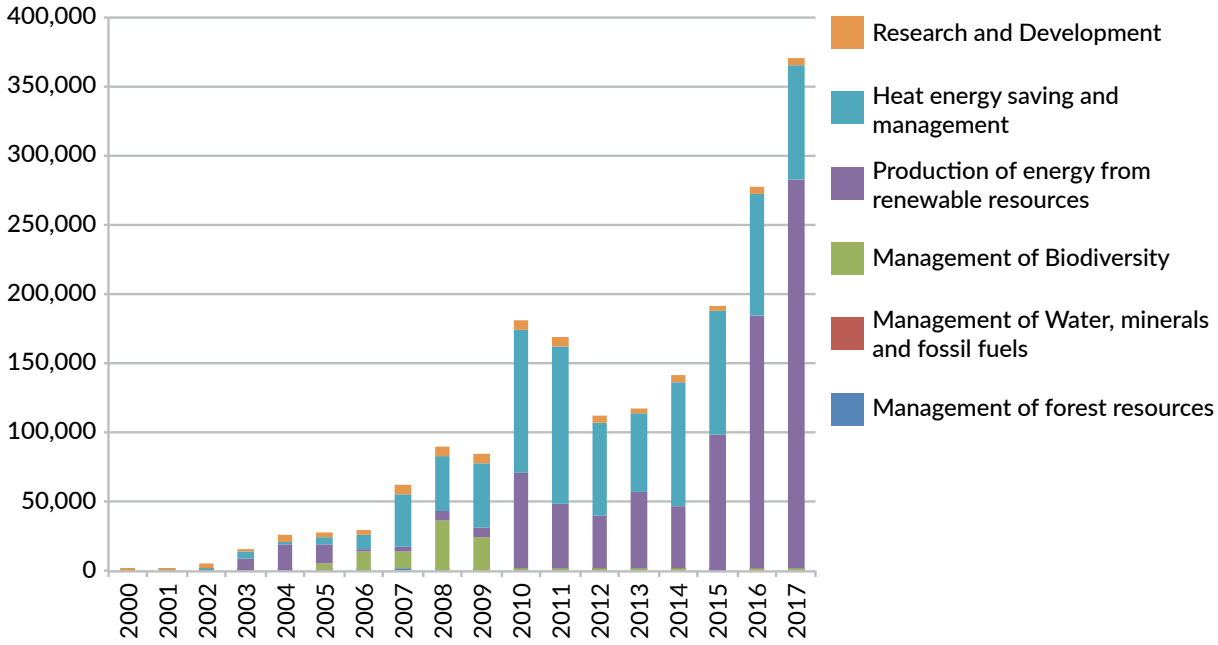


Figure 3.2: Resource Management Transfers 2005-2016 €,000s (source: CSO, 2018)

3.1.3 In addition, significant EPA funding has also been announced (October 2018) for a two year project to develop a **Natural Capital Accounting** system related to catchment management (with input from CSO, IFNC, DCHG) in line with Target 1.1. Corporate Natural Capital Accounting is also beginning to be undertaken by state and private companies in Ireland. For example, the state forestry company, Coillte, compiled Corporate Natural Capital Accounts (CNCA) in 2017 [1]. Overall, progress on Natural Capital Accounting is on track to achieve NBAP targets for 2020.

3.1.4 A **National Biodiversity Expenditure Review (NBER)** was completed in 2017 [2] as also proposed in Target 1.1 detailing the sources of relevant expenditure across Government Departments and Agencies, semi-state and private bodies. The report assessed the amount of expenditure and the strength of its relationship with biodiversity outcomes. It also examined the sustainability and effectiveness of current expenditure, finding, for example, that most expenditure (78%) corresponds to Objective 4 of the NBAP, i.e. to conserve and restore biodiversity in the wider countryside, particularly through AES and related schemes. Although biodiversity-related expenditure by other Government Departments and Agencies can be presumed to have a positive impact, it is evident that much expenditure has objectives other than biodiversity alone, e.g. transfer payments to support agricultural livelihoods, and that expenditure in some sectors is correcting for policies that are having potentially harmful effects on biodiversity. Only 0.4% of expenditure was categorised as supporting Objective 1 of the NBAP.

3.15 In 2019, work will commence on a **Financial Needs Assessment** and **Resource Mobility Strategy** in line with the UNDP Biodiversity Finance Initiative (BIOFIN) methodology. This work will outline where resources are most needed and will examine how alternative sources or arrangements for finance could be secured. The results of the first phase of this work was presented and discussed at the

National Conference on Biodiversity organised by the DCHG and the Irish Forum for Natural Capital in February 2019. Progress on biodiversity expenditure is therefore on track to achieve a National Biodiversity Finance Plan as required by Target 1.1.

3.1.6 **Strategic Environmental Assessment (SEA)** is now routinely applied to programmes and plans for Government and many private infrastructure investments which involve physical developments affecting the terrestrial or marine environments as well as for Regional and Local Authority land use and development planning. Individual projects meeting criteria in relation to scale or potential environmental effects are subjected to environmental impact assessment (EIA) for which ecology is typically a component chapter. These developments are in line with the EU SEA Directive (2001/42/EC) and the recently amended EU EIA Directive (2009/31/EC). An initial assessment of the application of SEA in Ireland was completed in 2012 [3] and found that SEA procedures were generally being followed, but that there were weaknesses in the selection of practical alternatives and that environmental outcomes could be improved. The report recommended the establishment of a National SEA Forum which is widely agreed to have achieved inter-departmental momentum in improving the application of SEA. A second national assessment is now underway funded by the EPA and is focusing more on SEA outcomes. A large-scale assessment of SEA is also being undertaken by the EC and is due for completion in 2019.

3.1.7 Initial indications are that cumulative experience in undertaking SEA has improved the quality of assessment, including the consideration given to environmental effects, and has increased environmental awareness amongst commissioning and participating stakeholders. Progress is positive, particularly in relation to raising the experience of environmental assessment within Government Departments, Agencies and Local Authorities in line with actions contained in the NBAP. However, more evidence of proactive implementation of recommendations and evidence-based monitoring is needed [3, 4]. A strong stimulus has often been provided by the EU requirement for AA under the Habitats Directive (92/43/EEC) in situations where Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) are at any risk of being impacted by development. However, more evidence of proactive implementation of recommendations and mitigation measures is needed. In many of the cases examined, monitoring has relied on general data (e.g. as provided by EPA) and has not been adequate. Monitoring may not be regarded as a core activity for the commissioning organisation and so on-going funding is not defined [3]. Furthermore, biodiversity input to plans, programmes or the project design for EIA is usually limited to consultation with DCHG and An Taisce as statutory organisations. NGOs are not routinely consulted and resource and staffing limitations apply to all consultees within the heritage sector.

3.1.8 SEAs of high relevance to biodiversity include those undertaken for Ireland's 2040 National Planning Framework, the River Basin Management Plan 2018-21, the Shannon Flood Risk Assessment 2011, the National Forestry Programme 2014-20, Foodwise 2025 (agri-food strategy), and the Wild Atlantic Way (Ireland's coastal tourist trail which aims to protect its key ecological and landscape asset). New baseline ecological evidence-based studies have been prepared by EirGrid (the electricity infrastructure utility) and other commissioning bodies to fulfil the requirements of SEA for future ecological assessments of projects. National Biodiversity Indicator E.1.viii (Figure 3.3) reveals the levels of SEA related correspondence received by the EPA.

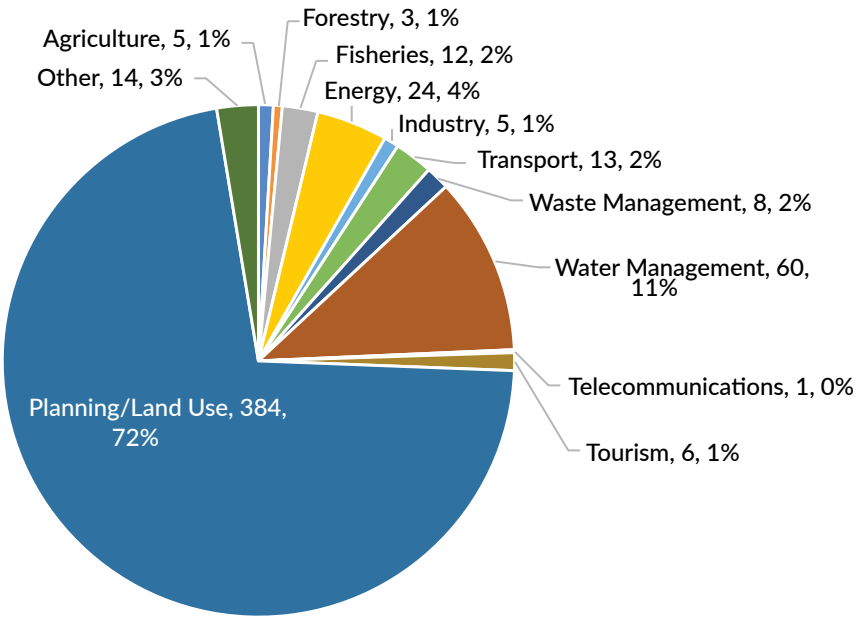


Figure 3.3. National Indicator E.1.viii: Sectoral breakdown of SEAs undertaken 2008-2019

3.19 **Local Authority** Development Plans are important planning policy statements. They all include a chapter on the environment which includes explicit objectives and with evidence of more attention being given to biodiversity, including lists and maps of areas designated for nature protection. Many Local Authorities also now have Biodiversity Action Plans (Indicator E.1 iii Figure 3.4). Biodiversity Officers can be highly influential in ensuring that planning is cognisant of biodiversity, although only four authorities funded these posts in 2017. Rather, in most counties, biodiversity is one of a range of responsibilities handled by the Heritage Officer. Local Authorities in Ireland receive a significant amount of their revenue for discretionary expenditure from Central Government, but have been subject to resource constraints given competing funding demands. The DCHG does provide funding for local authorities to support actions for biodiversity contained in the NBAP targeted at local communities.[24] Overall, the bulk of Local Authority spending on biodiversity was on habitat or species protection/restoration at 55%, followed by awareness related work at 24%. However, a large proportion of the former was made on one project in respect of the Environmental Liability Directive to restore sand dunes in County Waterford following the encroachment of a landfill. As a consequence of restrictions on funding, Local Authority biodiversity actions often depend on the existence of co-benefits for other authority objectives such as recreation, tourism or health. In addition, there is a tendency to support activities that are presumed to have higher public appeal such as awareness or amenity related projects rather than projects with a distinct biodiversity outcome.

24 https://www.chg.gov.ie/department-of-culture-heritage-and-the-gaeltacht-opens-applications-for-biodiversity-funding-to-local-authorities/

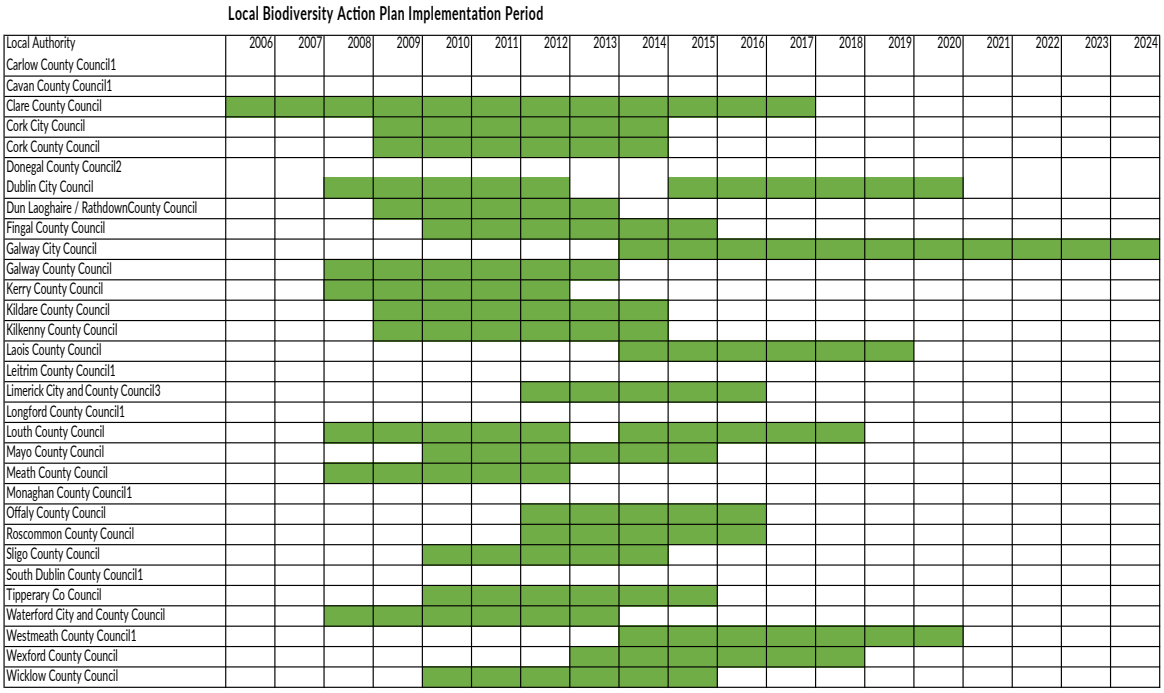


Figure 3.4: National Biodiversity Indicator E.1.iii: Number and period of implementation of Local Authority Biodiversity Action Plans

3.1.10 Although biodiversity-related funding by Local Authorities is constrained, an increasing number of authorities have grasped the concept of **green infrastructure**, including its potential for nature-based solutions in relation to amenity, surface and storm water management. This has also had the benefit of improving authorities' ability to satisfy the requirements of the EU Water Framework Directive and Flood Directive. Green infrastructure has provided a strengthened rationale for biodiversity protection and public amenity. It has contributed to the active protection of Natura and other nationally designated sites (e.g. Natural Heritage Areas), but also that of all natural areas, especially where located along rivers and coastlines in the vicinity of urban areas. The concept of 'no net loss' (NNL) of biodiversity is also gaining traction at Local Authority level with the stimulus of the EU Biodiversity Strategy, the Habitats Directive and SEA. However, there rather few local authority officials appear currently to perceive the potential role they could have in biodiversity management [6].

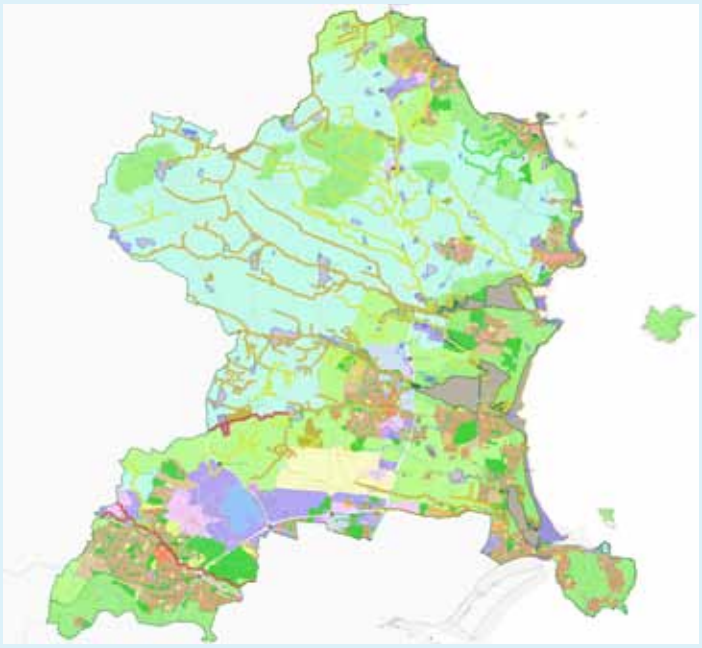
3.1.11 The concept of Green infrastructure is especially advanced in the Fingal County Development Plan (see box below). An example here has been the allocation of space for floodwater storage in the Rogerstown Estuary to provide for adaptation of climate change in prospect of rising sea levels (NAF, 2018). The estuary and adjoining land, which includes a closed council landfill, is also being developed for the protection and viewing of wetland and migrating bird species. Similar biodiversity and green infrastructure initiatives are being pursued by Dublin City Council whose responsibilities include Dublin Bay which is internationally important for migrating and wintering birds. The Council's Biodiversity Action Plan contains 29 Actions. To the south, the Dublin Port Company launched a Sustainability Report in 2013 acknowledging the importance of Dublin Bay by outlining a programme of waterbird monitoring and plans to establish an artificial tern nesting island.

Case Study:
Fingal County Green Infrastructure and the Final Development Plan 2017-2023

Fingal is the northern part of Dublin City and County. Fingal has experienced rapid urban expansion over the last 20 years with accelerated development in the major towns, and increased development in smaller rural settlements across the county and along the coast. A key challenge for Fingal is to manage growth so that the county's agricultural production capacity is maintained as urban expansion continues and in a way which protects the county's natural and cultural resources for the future. To response to this challenge FCC has developed a green infrastructure strategy to ensure that natural resources are identified, protected, enhanced, managed and created to provide a wide range of environmental, social and economic benefits to communities. The preparation of local area plans provides a key opportunity for the protection, management, enhancement and provision of natural resources in a way which is fully integrated with new development (FCC 2017)[25].

The objectives for the FCC green infrastructure strategy include:

- Create an integrated and coherent green infrastructure for the County by requiring the retention of substantial networks of green space in urban, urban fringe and adjacent countryside areas to serve the needs of communities now and in the future including the need to adapt to climate change.
- Develop the green infrastructure network to ensure the conservation and enhancement of biodiversity, including the protection of European Sites, the provision of accessible parks, open spaces and recreational facilities (including allotments and community gardens), the sustainable management of water, the maintenance of landscape character including historic landscape character and the protection and enhancement of the architectural and archaeological heritage.
- Seek a net gain in green infrastructure through the protection and enhancement of existing assets, through the provision of new green infrastructure as an integral part of the planning process, and by taking forward priority projects including those indicated on the Development Plan green infrastructure maps during the lifetime of the Development Plan.
- Seek to increase investment in green infrastructure provision and maintenance by accessing relevant EU funding mechanisms and national funding opportunities including tourism related funding.
- Resist development that would fragment or prejudice the County's strategic green infrastructure network.



25 https://consult.fingal.ie/system/files/materials/2018/Plan%20-%20Chapter%208.pdf

3.1.12 **Local Agenda 21** funding is available via Local Authorities for a variety of community or local projects of which biodiversity is one element. LA21 funds are directed at sustainability as a consequence of agreements made at the UN Conference for Environment and Development held in Rio de Janeiro in 1992. Funds are channelled via DCCAE to Local Authorities who co-fund various community initiatives under the Environmental Partnership Fund. In the last five years these have included support for the Irish Environmental Network (IEN), community organic or wildlife gardens, along with small amounts of expenditure on habitat restoration and species management. However, average project funding was modest between 2010-15 at between €400-€600. LA21 environmental projects are also supported by the **Environment Fund** which is raised from the levies on landfill waste and sales of single-use plastic bags, but this revenue is predicted to decline due to improved waste management with no replacement revenue source yet identified [7].

3.1.13 On average, between 2010-15, 23% of Local Authority biodiversity-related expenditure derived from the **EU LEADER or Interreg** programmes. The EU Rural Development Programme LEADER Programme has supported local communities (Local Action Groups) with projects providing access to nature (e.g. nature walking circuits), biodiversity education, biodiversity surveys, species recovery, and river or bog restoration. However, there were relatively few applications under the Rural Environment theme compared with the Economic Development and Social Inclusion themes, such that its share of total expenditure was only just over 3% between 2014-17 (DAFM, 2017). Funding for biodiversity conservation within LEADER projects has slipped in recent years and fallen below other objectives in the 2014-2020 cycle. Average project funding under the Environment theme between 2010-15 was €24,000. A detailed evaluation of projects is expected at the end of the current RDP in 2020. Local Authorities are commonly partners in EU Interreg funding for cross-border and territorial cooperation including for environment projects. Project spending under this programme has ranged between €815,000 to €2.2m, with some projects having a high biodiversity benefit.

3.1.14 The drafting of the **Biodiversity Sectoral Climate Change Adaptation Plan** has revealed challenges related to adaptation planning in the biodiversity sector. These include a) a lack of data on the impacts and consequences of past extreme events and climate variability; b) inadequate monitoring of biodiversity and exposure to climate risk; c) the need for a detailed vulnerability assessment for the sector; and most critically d) the fact that biodiversity is a cross cutting issue where responsibility for protection, management and restoration spans multiple government departments as well local authorities and non-state actors. The NPWS is not empowered or resourced to implement actions or oversee the actions of other sectors. This poses unique challenges to the further development and implementation of the plan.

Rationale for assessment of effectiveness

3.1.15 Although responsibilities towards biodiversity are more frequently included in the objectives of Government Departments and Agencies, more evidence is needed of proactive policies, particularly where objectives are potentially compromised by other higher or core Government policies. There has been positive progress on the NBAP in relation to environmental accounting and reviews of biodiversity expenditure. Local Authorities are struggling with resource constraints, but some biodiversity funding is being maintained. An increase in the number of Biodiversity Officers would help to ensure that more attention is given to biodiversity, but there is an interest in green infrastructure which could have some biodiversity dividends. There has been little concrete progress in adaptation planning to ensure that biodiversity is protected from climate change.

a) Evidence of shared responsibility for biodiversity in Department or Agency policies.

Progress towards target, but at insufficient rate.

b) Environmental accounting, biodiversity expenditure review, SEA application.

Measures are on track to achieve target.

c) Local Authority, LA21, LEADER and Interreg funding

Progress towards target, but at insufficient rate.

Overall progress Target 1.1

😐 Progress towards target, but at insufficient rate.

Objective 1. Mainstream biodiversity into decision-making across all sectors

Target 1.2. Strengthened legislation in support of tackling biodiversity loss in Ireland

3.1.16 The principal national legislation underpinning biodiversity and nature conservation is the **Wildlife Act 1976.** The **Wildlife (Amendment) Act 2000** included several new measures including the extension of basic protection to the majority of species and the capacity to provide stronger protection of SACs and statutory protection for NHAs. Following reviews of the Act, amendments were passed in 2017 and 2018 on non-lethal control of certain species and the timing of vegetation clearance and hedgerow cutting.

3.1.17 The **transposition of the EU Habitats and Birds Directives** into Irish law has strengthened legislation in relation to biodiversity protection. There has been some progress in terms of providing **full designation** to proposed SACs (see 3.6.4). However, despite the provisions of the 2000 Amendment, habitats in the 630 pNHAs (65,000ha) have no legal protection from farm improvement unless a development is subject to planning permission.[26,27] SPAs for corncrake (*Crex crex*) have been notified publicly but an appeals process must be completed before the final boundaries are confirmed by Statutory Instrument. The process for selection and designation of Marine Protected Areas (MPAs) is at an early stage.

3.1.18 There is a concern that Government Departments and Agencies are not fulfilling national obligations under the **Aarhus Convention** in terms of making information widely available to the public and NGOs to permit third party input into policy and project design. Potentially this is undermining the environmental quality and proofing of state policies, measures and projects and their environmental monitoring.

3.1.19 The **EU Invasive Species Regulation** 1143/2014 came into force in 2016 and requires Member States to implement early warning and eradication strategies as well as controls of the importation and spread of IAS. Information is also available at the NBDC website. Implementation regulations at national level are due to be completed by mid-2019.

26 https://www.npws.ie/protected-sites/nha
27 http://www.antaisce.org/issues/threats-nature-conservation

3.1.20 The **Forestry Act** entered into law in 2014. It sets out the specific role for the Minister in safeguarding the environment and attaching conditions to new planting, includes overarching provisions for the protection of the environment, and integrates the requirements of the EU Habitats and Birds Directives.

3.1.21 Ireland is a signatory, but not yet a Party to the **Nagoya Protocol**. With a view to ratifying the Protocol in the near future, the Irish authorities are currently preparing national legislation that will implement the provisions of the EU ABS Regulation (no. 511/2014) in the Irish context. This national legislation will form the basis for a new policy and legislative framework governing ABS in Ireland. Once this framework is in place, the Irish authorities intend to move forward with the ratification process.

Rationale for the assessment of effectiveness

3.1.24 Some positive legislation has been implemented in relation to IAS and forestry, but more urgency is needed in providing full designation and protection to pSACs and pNHAs, in ensuring that Government Departments and Agencies adequately satisfy the Aarhus Convention, and in addressing the biodiversity impact of climate change. Legal changes in relation to the pruning of vegetation could affect hedgerow nesting by some farm species, but efforts are being made to reduce uncontrolled farm-led burning of heather and scrub.[28]

😐 **Progress towards target, but at an insufficient rate.**

Objective 2. Strengthen the knowledge base for conservation, management, and sustainable use of biodiversity

Target 2.1. Knowledge of biodiversity and ecosystem services has substantially advanced our ability to ensure conservation, effective management, and sustainable use by 2021.

3.2.1 The availability of up-to-date **scientific knowledge** is essential for informed assessment and decision on biodiversity. Monitoring and assessment under the EU Habitats and other Directives have provided important information to inform future management of protected sites and species. These datasets are also available for use by third parties at www.npws.ie/maps-and-data and are supported by the requirements for data accessibility, common standards and quality assurance set down in the INSPIRE Directive. This information has been complemented by the production of **Biodiversity Maps** and new **National Land Cover and Habitat Mapping** spatial datasets. Data standards have now been agreed and habitat maps produced covering 9,100km^2.[29] Other initiatives have included the mapping of 12,731 wetlands by Wetland Surveys Ireland and the commencement of integrated mapping of the marine environment. The latter INFOMAR project (see 2.2.6 & 2.5.2) is being spearheaded by the Marine Institute and will greatly assist in identifying the location of important ecosystems and protecting these from unsustainable fishing or new primary resource and energy developments.

28 Draft Article 17 (Habitats Directive) Report 2019.
29 Habitats Assets Register of MAES report

3.2.2 These types of data inform the Habitats Directive Article 17 report on the **Status of EU Protected Habitats and Species** which has identified habitats and species requiring particular attention. The last report was produced by NPWS in 2013 [8] with a new report due in 2019. Ireland reported under the EU Birds Directive in 2014. The wider status of biodiversity is reported in the EPA report *Ireland's Environment* [9] for which the last assessment is dated 2016. The data underpinning these assessments are available to inform avoidance, mitigation and monitoring strategies for plans or programmes subject to SEA or the impact assessment of infrastructure and built development.

3.2.3 The **DAFM-FS** actively supports research into forest ecology, ecosystem services and carbon accounting. Ten forestry research projects were funded by the DAFM between 2010-17 including studies of non-market value (including biodiversity), adaptation to climate change, hen harrier (*Circus cyaneus*) habitat, soil biodiversity and IAS. The National Botanic Gardens has also undertaken work on native forest genetic resources.

3.2.4 **Volunteer and citizen science** advice is available on the **NBDC website** (www.biodiversityireland.ie) and data on flora and fauna distributions are submitted to the same, supporting NBDC monitoring of butterfly and bee populations in particular. Since 2014, over 365,000 records have been submitted to the NBDC Citizen Science Portal in addition to 101,000 records from their citizen science-driven monitoring schemes. To date, the NBDC scientifically validated database holds 4.2 million records of 16,000 species. *National Biodiversity Indicator H.1.ii* reveals the number of species records held by the NBDC (Figure 3.5). This type of data is also submitted by the public via the BirdTrack portal of the British Trust for Ornithology (BTO) who compile the influential Bird Atlas for Great Britain and Ireland every ten years. Sightings and breeding bird data for Ireland are also counted at grid square level by members of Birdwatch Ireland. Cetacean records are collated and held by the Irish Whale and Dolphin Group.

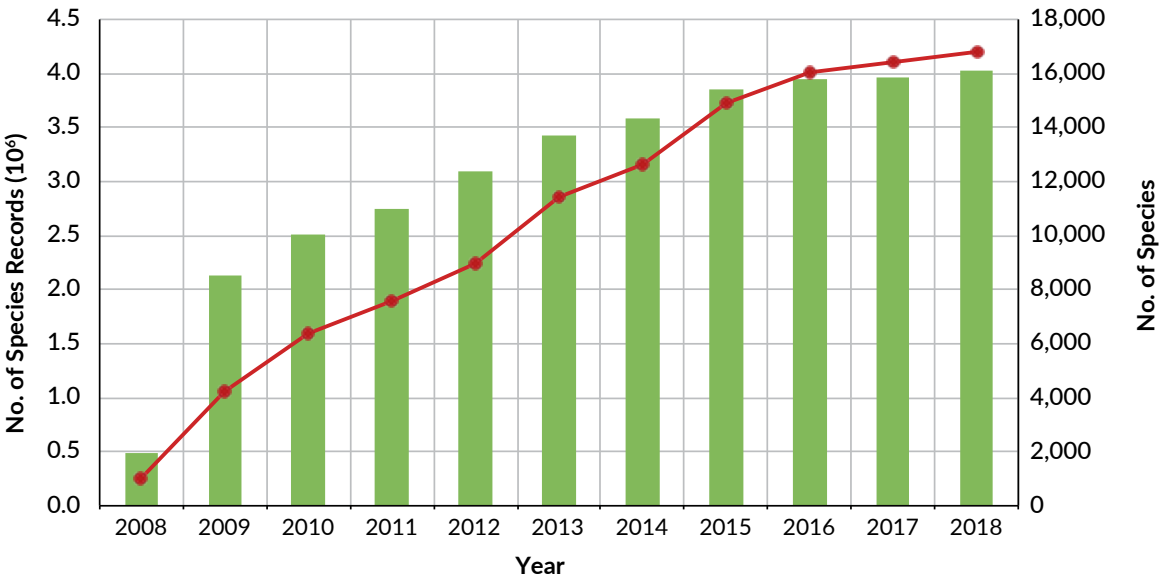


Figure 3.5: National Indicator H.1.ii. Number of biological records held by the NBDC

3.2.5 Individual economic and social valuations of ecosystem services have been produced in recent years for freshwater ecosystems, forests and native woodlands, peatlands, and marine ecosystems. Baseline mapping of ecosystem services has been undertaken by NPWS in line with the MAES objectives of the EU 2020 Biodiversity Strategy to which social and economic valuations can be attached in due course. The approach is currently being applied by Dun Laoghaire Rathdown County Council.

3.2.6 The **research** funded by the EPA and other national funding bodies described in Section II is contributing to improved land, water, coastal and marine management and is also underpinning strategic decisions and measures within individual Government Departments and Agencies in line with Objective 1. For example, research into the public good benefits of broadleaf planting has underpinned planting of these species by the **DAFM-FS** [10, 11]. Most recommendations from the Hydrofor project [12] have been adopted in relation to reducing nutrient flows and dissolved carbon by closed canopy conifers, although acid sensitive catchments have not been excluded from planting. As noted in Section II, output from the EPA-funded ESManage project will be available to inform **catchment management**, flood mitigation policy and water quality monitoring. The BOGLAND Project has informed the **National Peatland Strategy**. Simbiosys led to new **aquaculture** regulations on the use of sterile triploid oysters to protect native species. The EU FP7 funded OPERAs project has provided a template for an **Ecosystem Services Approach** to spatial planning [13]. The ObSERVE project on marine cetaceans and seabirds is expected to provide guidance on trawling methods and the siting of windfarms and hydrocarbon exploitation.

3.2.7 In terms of **climate change**, the EPA funded *Carbon Restore and NEROS* projects demonstrated the synergies that exist between biodiversity and climate change mitigation strategies for carbon sequestration and storage, particularly in relation to peatlands [14, 15]. The EPA *ADAPT* project presented options for strategic decision making in relation to adaptation, including its costs and benefits [16]. Data are available from the Climate Ireland web portal www.climateireland.ie and, for biodiversity specifically, from the European Climate Adaptation Platform https://climate-adapt.eea.europa.eu/, but more Irish work is needed for the prioritisation and protection of a range of habitat. A Climate Change Fund has been initiated by the DCCAE to support a wide range of projects providing socio-economic benefits, including biodiversity.

Rationale for the assessment of effectiveness

3.2.8 Wide stakeholder consultation has ensured that applied research projects funded by the EPA, Departmental and national funding institutions have been highly relevant to societal and policy needs. Although not an action of the NBAP, uptake of recommendations has been rather dependent on prevailing EPA responsibilities, as in the case of the BOGLAND project (peatlands) and HYDROFOR projects (forestry and water). Overall, however, knowledge has greatly improved, although more species assessments are still needed.

On track to achieve target.

Objective 3. Increase awareness and appreciation of biodiversity and ecosystems services

Target 3.1 Enhanced appreciation of the value of biodiversity and ecosystem services among policy makers, businesses, stakeholders, local communities, and the general public.

3.3.1 In terms of progress on **awareness** or **concern about loss** of biodiversity, Ireland typically scores average figures relative to other EU countries. National Indicator A2.i (**Figure 4.1** in Section IV) provides a summary of responses to the 2015 EC Eurobarometer survey on biodiversity awareness.[30] This reveals that 26% of people in Ireland understand the term "biodiversity". This compares with 30% for the EU28 (subsequent comparisons in parentheses). Just under one third (32%) of respondents felt "well informed" or "very well informed" of "loss of biodiversity". Respectively 61% and 32% believed that the loss of habitats is "very serious" and "fairly serious", while 56% and 33% believed that the loss of species is "very serious" or "fairly serious". Respectively, 59% and 34% believed that there is a risk of loss of ecosystem services (described as "benefits" in the survey). Ireland is identified as being amongst those countries where the proportion of respondents who regard loss of biodiversity at a national level as "serious" had risen most (in only Sweden and Slovakia was this increase greater).

3.3.2 However, people in Ireland were less inclined to believe that the loss of biodiversity was "very serious" or "fairly serious" in their local area at 17% and 27% respectively. To an extent this reflects the subtleness of much biodiversity loss which is often occurring through degradation rather than outright loss of habitat. However, there may also be a degree of dissonance and acceptance of the healthy green image often adopted by farm produce marketing bodies in Ireland.[31] The numbing effect of bad news on biodiversity loss or climate change at international level has been commented on before, but organisations in Ireland are helping to raise awareness of **local biodiversity** change and what can be done about this.

3.3.3 Irish respondents have consistently reported that they feel we have a responsibility to look after nature (97% agree), that our well-being and quality of life is based on nature and biodiversity (90%), and that biodiversity is indispensable for the production of food, fuel and medicine (86%) and is essential in tackling climate change (94%).

3.3.4 In terms of trends, however, between 2013 and 2015 there have been the marked declines in the number of respondents thinking that there is a serious decline and possible extinction of wildlife in Ireland (-17%), in the number having heard of the term biodiversity (-10%), stating that they would personally make an effort to protect biodiversity (-10%), thinking they will be personally affected by biodiversity loss (-8%) and feeling informed about biodiversity loss (-7%). The only positive change was the number of respondents who had heard of the Natura 2000 network, up 16% compared to 8% in 2013.

3.3.5 Raptor reintroductions have inspired awareness of wildlife issues. Red Kite (*Milvus milvus*), Golden Eagle (*Aquila chrysaetos*) and White-tailed Eagle (*Haliaeetus albicilla*) have all been re-introduced in the last 20 years. Although there have been instances of poisoning, farmer attitudes to raptors are becoming more positive, partly because raptors suppress the numbers of crows. An observation post for White-tailed eagles on Lough Derg attracted 17000 visitors in 2017.

30 http://ec.europa.eu/public_opinion/archives/flash_arch_en.htm
31 An often reported perception, see http://greennews.ie/47259-2/ or http://www.antaisce.org/articles/not-so-green-revealing-the-truth-behind-irelands-green-image

3.3.6 The **All-Ireland Pollinator Plan** is one example of an awareness raising initiative. While the term "ecosystem service" is understood largely by those working professionally within the natural environment sector, the importance of pollination is well-understood by the wider public. A total of 140 individual communities have now entered the special pollinator award. A survey in 2018 by the market research agency iReach found that 88% of people believe that more needs to be done to protect Ireland's bees and other pollinators.[32]

3.3.7 **Local authorities** (responsible for managing amenity areas and parks) have also engaged with the All-Ireland Pollinator Plan. Agenda 21 and LEADER funding has been used to promote biodiversity awareness and to fund neighbourhood projects as discussed under Target 1.1. Some authorities have been very proactive. For example, as discussed in 3.1.11, Fingal County Council is developing a major new amenity on the Rogerstown Estuary to include walks, hides, habitat creation and an environmental information centre.

3.3.8 The **national broadcaster**, RTE, funds or supports various wildlife or environment television series, such as the award winning *Ireland's Deep Atlantic*, *EcoEye* and *Living the Wildlife*. BBC wildlife series and programmes are regularly aired on Irish TV. The radio programme *Mooney Goes Wild* features many wildlife stories and is among the most listened to programmes on Irish radio. The Newstalk radio slot *Down to Earth* discusses a wider range of current environmental issues. However, this is not to imply that environmental issues, including climate change, feature frequently in normal broadcasts. The broadcasters' choice of topics and news coverage may reflect public concerns, but also has a tremendous influence on what the public perceives as being of concern. A recent review found that environmental issues were featured in less than 1% of the airtime of RTE's headline Morning Ireland current affairs programme.[33]

3.3.9 **Private sector** organisations have been encouraged by the IFNC to attend presentations on ecosystem services or natural capital accounting. Biodiversity awareness has also been encouraged through the organisation Business in the Community, the annual *Environment Ireland Conference*, and the business sector Green Awards, although sustainability, resource use and avoidance of pollution often attract greater attention than biodiversity at these events.

3.3.10 In addition, many **NGOs and local groups** organise nature walks and biodiversity days or make experts available to introduce local people and children to biodiversity. An Taisce Green Schools programme includes a biodiversity theme and has been successful in getting schools to install wildlife gardens as a first introduction to biodiversity. *Bioblitz* events are supported by the NBDC to engage people at a community level. The Community Wetland Forum has been especially active in encouraging people to engage with and protect their local wetland and several local community groups have been established for this purpose. However, a serious prevailing constraint on community and voluntary groups, has been a top-down Government requirement for groups to provide co-finance and complete restoration or other works before seeking bridging finance in advance of receipt of public funding from State Agencies. In some cases, this has been exacerbated by the reluctance of some agencies to provide expertise. As these groups are contributing to the public good and objectives shared by these agencies, greater flexibility is needed.

32 https://www.pollinators.ie/88-of-irish-people-believe-government-hasnt-done-enough-to-help-save-bees/

33 Gluaiseacht as reported by Green news Nov 16th, 2018. This included 3% of stories which were devoted to climate change at the time of the release of four IPCC reports (Morgan, 2017) EPA

3.3.11 National Indicator A2.vi (**Figure 3.6**) below provides a summary of searches for biodiversity, wildlife and nature on Google and shows a fairly constant seasonal pattern. **Figure 3.7** shows a growing number of school and community attendees visiting NPWS Education Centres up to 2013.

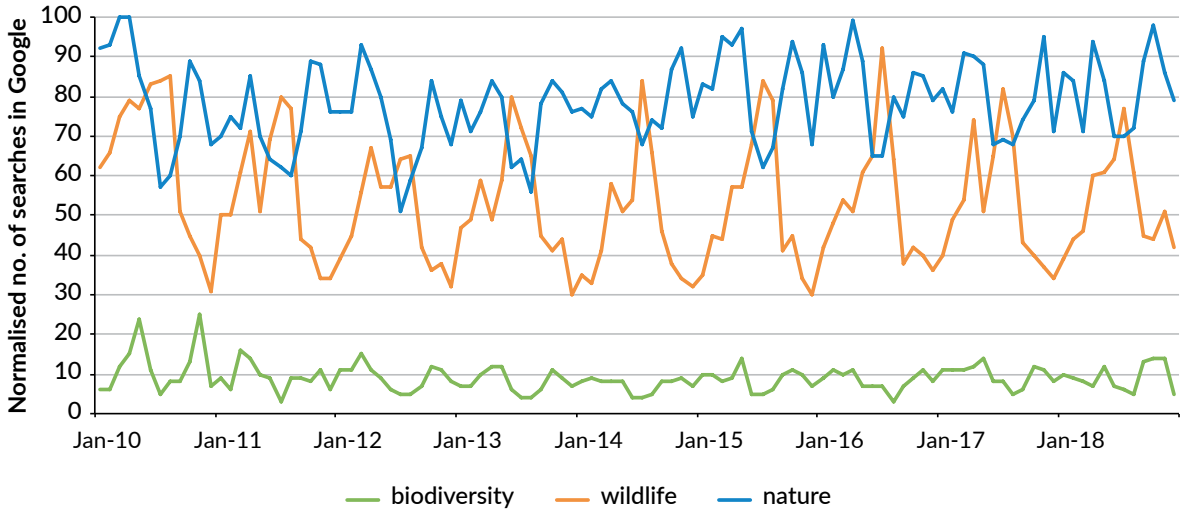


Figure 3.6: Number of Irish-based searches for biodiversity-related key works using Google [17]

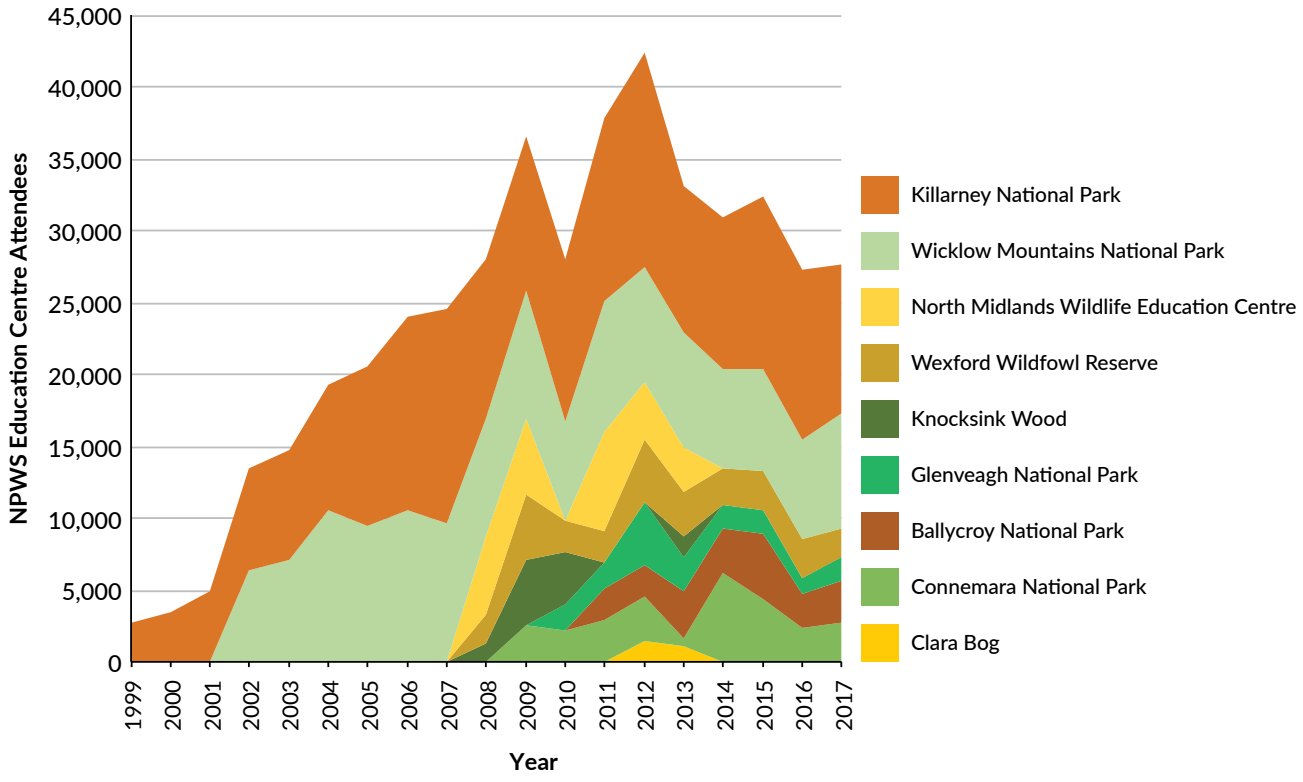


Figure 3.7 Number of school and communities visiting NPWS Education Centres.

Rationale for the assessment of effectiveness

3.3.12 Awareness of biodiversity, and threats to biodiversity, is at levels comparable to other EU States. The NBDC, NGOs and Local Authorities have spearheaded various initiatives and projects which have the benefit of raising awareness, which has been improving, if only gradually. There is a need to raise awareness to higher levels, including of biodiversity issues at national and local level. Greater news and other media coverage would help in this respect.

😐 **Progress towards target, but at insufficient rate**

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

3.4.1 Objective 4 of the NBAP addresses the need to conserve and restore biodiversity in the wider countryside. Most of the Irish countryside is owned or managed by private individuals, principally for farming. Around 64% of Ireland's land area is under agriculture, mostly pasture for beef and dairy, but with around 15% under tillage or other crops. Forestry accounts for a further 11%. The remainder is principally blanket or raised bog or urban land. Biodiversity in this wider landscape has been impacted in recent decades by trends to land use production intensification and a loss of mixed land uses. This has led to the deliberate removal of habitats, for example hedgerows and wetlands, or the degradation of others, including semi-natural habitats such as wet grazing or hay meadows. Water quality too has suffered from the use of nitrogen and phosphorous fertilisers as well as a lack of investment in urban wastewater treatment and an absence of regulation of domestic septic tanks. Nevertheless, Ireland still has a network of 300,000km of hedgerows and many areas of lower intensity uses such as rough grazing. Although these lands and habitats are privately owned, government policy, particularly agricultural or forestry grants and transfers, can have a considerable influence on how it is managed and what habitat, and the quality of the habitat that remains.

Target 4.1. Optimised opportunities under agriculture and rural development, and forest policy to benefit biodiversity

Agriculture

3.4.2 Changes in agricultural practice have been linked to declines in biodiversity, particularly populations of traditional farmland bird species and pollinator species [18]. As in many countries, Ireland faces pressures of **intensification** of agricultural production, the loss of semi-natural habitats and farmland wildlife species [8, 19, 20]. Less agriculturally advantaged areas often retain lower intensity farming practices and areas of semi-natural farm habitat. However, under-grazing and abandonment are also an issue in these 'areas of natural constraint' even though compensatory allowances are available to support farming [21]. Whereas overgrazing by sheep was a serious problem in Irish uplands prior to the decoupling of payments from stock numbers, undergrazing now is now a problem with woody vegetation presenting a risk of fires getting out of control when used for forage management. Semi-

natural habitats of all sorts now account for between 13%-15% of farmland [22, 23].

3.4.3 In common with findings across the EU, evaluations of **agri-environmental schemes (AES)** indicate improved environmental awareness and practice, but less progress towards a pro-active culture of biodiversity management. The focus on biodiversity within the former Rural Environmental Protection Scheme (REPS) increased towards its closure in 2010. Its successor, the Agri-Environmental Options Scheme (AEOS) was more targeted and included conservation and biodiversity as one of its three principal objectives. However, although these schemes helped to protect farm habitats, reduce pesticide use and support balanced nutrient management, there was little evidence of tangible beneficial outcomes for biodiversity prior to 2010 [24] and take-up was low in more intensively farmed areas. Nevertheless, environmental quality within AES landholdings is likely to have improved due, for example, to reduced over-grazing and leaching of nutrients [25, 26]. In common with some other EU national schemes, evaluations of the Rural Development Programme (RDP) indicate a need for more biodiversity training/advice, better targeting of measures, and a move away from an emphasis on quantitative outcomes (e.g. length of hedgerow) towards quality (e.g. numbers of species present) [27, 28].

3.4.4 In response to these evaluations, relevant stakeholders including DAFM, DCHG, Teagasc and the Heritage Council, are implementing new AES with the objective of achieving a quantitative gain for biodiversity. AES are becoming more targeted, particularly towards biodiversity. This has manifested itself in an increase in specific site and area management payments [2]. Applicants for the Green Low-carbon Agri-environmental Scheme (GLAS) are now scored on a tiering system based on the expected environmental benefit. Maximum scoring applies to the presence a "priority environmental asset", followed by a "vulnerable water area" and then other environmental criteria. Farmers who have more than one priority asset can receive additional payments (GLAS+). The scheme is orientated towards specific actions rather than the former approach adopted by REPS which was spatially untargeted and applied environmental considerations to the whole farm.

3.4.5 As of 2018, 796,879ha were covered by GLAS plans of which around 388,000ha were Natura sites and 199,000ha was commonage. A total of 48,866 farm contracts were supported. Recent analysis reveals that the most popular measures were maintenance of low-input permanent pasture, protection of watercourses from cattle, and traditional hay meadow. Most land in the scheme is under cattle or mixed livestock [29]. At this stage, there is not yet firm evidence of the extent of positive biodiversity outcomes, although early indications, based on a small sample of 30 farms, are that results may be more positive for biodiversity than former schemes [30]. In particular, the selected farms appear to have been well-targeted for protected species such as hen harrier (*Circus cyaneus*), chough (*Pyrrhocorax pyrrhocorax*) and wintering Greenland white-fronted geese (*Anser albifrons flavirostris)*. Indications are that almost all farms had implemented agreed measures. A baseline evaluation indicates that stock had been excluded from watercourse margins in 82% of cases, that vegetation was of the desired quality, meadow vegetation diversity was generally good, and undesirable vegetation on Natura sites was well controlled, although there have been instances of scrub encroachment [31]. Sward height for bird measures had been well implemented, but sites with hen harrier, breeding wader and corncrake either remain too improved (for agricultural output) or were lacking a sufficient area of relevant vegetation. Improvements in water quality, corresponding to reductions in nitrate and phosphorous, are estimated at 27% and 28% over the range of farm-types included in the scheme [29]. Soil, of course, is a major medium for biodiversity. Modelling suggests that soil loss is reduced by 9% on participating farms (equivalent to 2% for sediment loss for total agricultural area) [32]. Landholder

understanding of requirements appeared to be good with farmers generally being familiar with target bird species present on their land. The baseline evaluation commented that outputs should improve as GLAS becomes more established [31]. Further monitoring reports are due in early 2019 and 2021.

3.4.6 A long-standing criticism of much AES is that it has been prescription based. In some cases, this has led to perverse outcomes such as farmers being allowed to neglect established, floristically diverse hedgerows while being encouraged to plant, or even replace, these with new single species hedgerows. Another persistent issue has been the treatment of scrub which is rewarded under GLAS, but regarded as unproductive land for the BPS. By causing confusion, these outcomes are counter-productive to encouraging farmers to take a more environmentally-friendly approach to land management,[34] a situation not helped by a lack of on-farm environmental advice. By contrast, the EU pilot project **Results-Based Agri-environmental Payment Scheme (RBAPS)** has taken a less prescriptive approach and instead rewarded farmers for positive outcomes. Early indications are that the RBAPS approach is having clear benefits for biodiversity.[35] Manuals and best practice guidelines for the delivery of this approach are being prepared. New applications are being made under EU LIFE to replicate the results-based approach for other species and habitats.

3.4.7 Much of the information gathered from the pilot projects is already being used in the **22 European Innovation Partnerships (EIPs)** funded to date. This includes a freshwater pearl mussel (*Margaritifera margaritifera*) EIP which was launched in 2018 in eight priority catchments, and a hen harrier EIP launched in 2017 to which around 800 farmers are now signed up in six SPAs with the aim is to increase this to 12,000 over the five year programme.[36] These programmes provide top-ups to GLAS payments and are being used to road test new sustainability (RDP Stream B) strategies. A majority of the EIP projects awarded to date (15/20) focus on 'RDP Priority 4(a) 'restoring, preserving and enhancing biodiversity'. They are overcoming another limitation of existing AES by taking both the results-based approach and a more landscape level application that targets Operational Groups of farmers and other stakeholders in environmentally sensitive areas. They are also examples of Locally Led programmes that are focused on High Nature Value (HNV) farmland. To date, species which are dependent on larger areas of habitat or mosaics of favourable land cover and connecting habitat have not benefitted from the dispersed distribution of farms that have signed up to AES. The Locally Led programme could address this issue. Areas of HNV farmland have been categorised in three types as sought by **Target 4.1**, but a national definition of HNV farmland, or an estimate of its extent, is not yet available. It is, as yet, too early to identify outcomes from these schemes. BurrenLIFE can be thought of as an early example, and while it had the attraction of additional payments for capital works, it was able to demonstrate a consistent increase in habitat quality and biodiversity [33].

3.4.8 A more general criticism of policy is that many **non-designated sites** or landscape features of conservation merit are not adequately protected where the farmer is not in an AES [34, 35]. 'Greening' measures attached to the Basic Farm Payment have principally been focused on landscape features which are already protected on the majority of livestock farms under cross-compliance [36]. They omit other habitats and do not provide for the active maintenance of, for example, hedgerows [36].[37] Farmers can still be penalised for removing scrub in excess of 10% of the farm acreage even where this is located on less productive or less accessible parts of the farm [37].[38]

34 Expert comment
35 Expert comment
36 DAFM comment
37 Expert comment (CH).
38 Birdwatch Ireland Submission of the Department of Agriculture, Forestry and the Marine (August 2015) Public Consultation in response to Draft Environmental Analysis Report on Food Wise 2015.

3.4.9 Moreover, most AES farms are located in less productive parts of the north and west of Ireland. Intensive dairy and arable farms in the south and east have often chosen to remain outside AES so as to preserve their options to manage or intensity without restriction. At present, many habitats in these areas are vulnerable to removal or to the implications of the national policy objective of major increases in farm production, including from any positive comparative advantage that might arise for Ireland due to global climate change. Consequently, more needs to be done to support biodiversity measures on Ireland's more productive farms. There are some NPWS Farm Plan Schemes (FPS) operating on intensive lands aimed at wintering geese and swans. BRIDE (Biodiversity Regeneration in a Dairying Environment) is another example of an EIP project that is locally led and designed by farmers themselves to ensure the preservation of habitats such as field margins and hedgerows on more intensive dairy and tillage farms (www.thebrideproject.ie).

Rationale for the assessment of effectiveness

3.4.10 The design of AES schemes has been improving in that payments under GLAS have been more focused than for previous schemes and acceptance of applications more targeted to priority species or water quality issues. Long established limitations of AES persist in that these remain prescription-based and would improve through better targeting. As AES are voluntary, improvements are also spatially restricted to participating farms and fall short of the landscape approach needed for net environmental gains. New results-based and locally led approaches, including EIP funded projects, are being piloted and could overcome these criticisms. However, few AES have yet proven attractive to farmers in more intensive agricultural areas, a long-standing limitation that needs to be urgently addressed. Initiatives for these farms and stronger environmental criteria in relation to the BPS would help to arrest the continuing decline in farmland wildlife in the wider countryside.

😐 **Progress towards target, but at insufficient rate. (Based on partial evidence and monitoring).**

Forestry

3.4.11 **Target 4.1** looks for evidence of increases in the area of broadleaf afforestation and biodiversity improvements due to the Forestry Programme 2014-2020. The proportion of broad-leaf planting under the programme was 21% in 2017. This is below the NBAP target figure of 30%, although this level was exceeded in seven counties.[39] However, the area of forest that is comprised of native and mixed species has increased by 3% since 2012 and now amounts to 31.7% (DAFM, 2017 3rd NFI). The Forestry Programme contains targets to restore 2,000ha of existing native woodland and to create a 2,700ha of new native woodland. Around 35% of the estate is aged between 11-20 years and 55% is over 20 years [38]. National Indicator B.6.iii (Figure 3.6) shows the area of broad-leaf and native woodland based on the National Forestry Inventories between 1995 and 2017. The indicator demonstrates a gradual increase in area, but also a decrease in "other wooded land" such as scrub.

39 Forest Service: Forestry Facts and Figures Bulletin 17/10/18

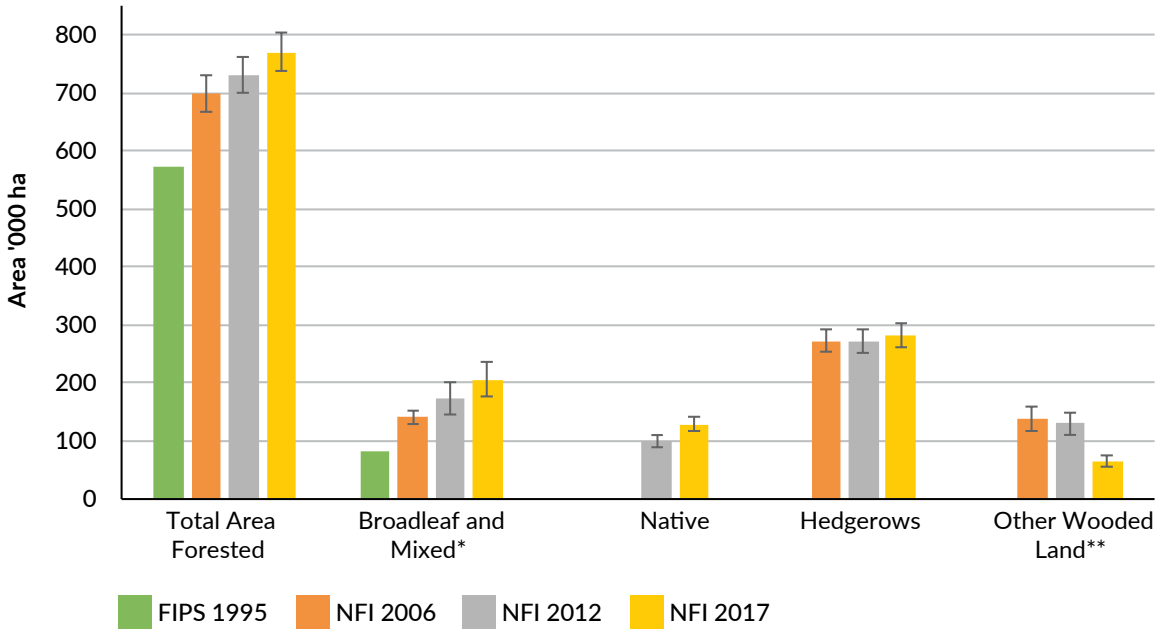


Figure 3.8: National indicator B.6.iii: Area of broadleaf and native woodland (* mixed (broadleaf/coniferous woodland can contain 20% broad-leaf or more. ** Other wooded land includes scrub).

3.4.12 The Land Types for Afforestation procedure (March 2016) sets a minimum productivity requirement for sites submitted under the Afforestation Scheme. This procedure identifies land unsuitable for afforestation, including peatlands, wet and dry heath. Sites which meet the minimum requirement must undergo a detailed assessment by DAFM, involving inspections, referrals (including to Forest Inspectorate Ecologist), public consultation, AA and EIA screening. If deemed suitable (with or without grant aid), the work must adhere to the Environmental Requirements for Afforestation, which set out a wide range of protective measures for biodiversity and water. DAFM-FS Circular 02 of 2018 specified a change in the Afforestation Scheme rules to increase the requirement for broadleaf from 10% to 15% in addition to the open space area requirement of 15% for water buffer setbacks, biodiversity and other environmental sensitivities. The Forestry Programme 2014-2020 offers higher levels of support for Grant and Premium Categories (GPC) involving broadleaves.

3.4.13 The **Native Woodland Scheme (NWS)** is focused primarily on promoting biodiversity, along with co-benefits such as the protection of water and aquatic ecosystems, habitat connectivity at a landscape level, sustainable wood and non-wood production. Funding of the scheme was impacted by Government financial constraints introduced during and after the 2007-2011 economic recession. Spending under the Establishment element is now recovering with the scheme having funded an increase in planting year-on-year amounting to 1140ha over the past six years. This has contributed to an increase in the area planted with native tree species to 179,000ha or 29% of the forest estate. The Conservation element of the NWS is being funded again and is improving the quality of existing woodland for biodiversity. Many woodlands were affected by poor silviculture with understories

dominated by invasive *rhododendron*, an IAS which suppresses all other ground flora while offering almost no benefits to biodiversity. While individual projects vary, common operations include deer fencing, the removal of rhododendron or laurel, and underplanting.

3.4.14 Substantial work is ongoing regarding **genetic biodiversity** in Irish forests. For example, there are controls to ensure that all material planted under the NWS comes from suitable native sources and that ancient oak woodland is registered for the purpose of seed collection for the nursery chain and for high-conservation value sites.

3.4.15 DAFM-FS is finalising the **Forest Environmental Enhancement Scheme**. This scheme will provide forest owners with support to improve the environmental 'footprint' of the forest during rotation, pre-empting the need to await clearfell and reforestation before introducing change. Activities will include the retro-fitting of environmental setbacks regarding water, biodiversity features and habitats, thereby preventing excessive shading and creating / increasing protective buffer zones long before clearfelling operations take place.

3.4.16 The **Woodland Environmental Fund** provides an additional €1000/ha to businesses to report on ecosystem services delivered, including biodiversity, water, carbon, etc., demonstrating corporate social responsibility and commitment to the SDGs. The process involves the input of a Natural Capital Facilitator, who matches up a potential projects with potential business contributors, based on size, location and the particular ecosystem 'profile' of the project.

3.4.17 The **Reconstitution of Woodland scheme** rehabilitates forests for production. The scheme can cover the removal of *Rhododendron* from forests ultimately intended for timber, but the main current focus has been ash woodlands affected by the disease *Chalara* (Ash Dieback). The disease is caused by the fungus *Hymenoscyphus fraxineus* which was accidently introduced to Ireland in 2012 and has since spread to 560 plantations.[40] The scheme supports the re-planting of commercial woodlands after removal of infected trees and leaf litter.

3.4.18 Having a greater area of **broadleafs** will inevitably benefit biodiversity, even though established mature native woodlands have a far higher biodiversity value due to their age and species diversity, ground flora and abundance of deadwood. Even forests of commercial conifers can have biodiversity value when not too dense or dominated by single species.[39] Previous deforestation, combined with Ireland's geographical separation, has meant that Ireland has rather few **woodland bird and animal species** compared with Britain and the European continent. The rapid natural spread of common buzzard (*Buteo buteo*) and great spotted woodpecker (*Dendrocopos major*) in Ireland (both absent until recently) is likely to have been encouraged by the presence of broadleaf woodlands, as is also the case for the reintroduced red kite (*Milvus milvus*). Native species such as red squirrel (*Sciurus vulgaris*) and pine marten (*Martes martes*) also appear to have benefitted, the former partly due to the predation of invasive grey squirrel (*Sciurus griseus*) by the latter. However, planted conifer forests in upland areas have been implicated in the poor breeding performance of red-listed species such as hen harrier and curlew due to loss of moorland habitat and by providing refuges for predators such as foxes. These species also require large territories and varied nesting sites that can be compromised when forest planting is not managed at a landscape scale.

40 Forest Service Circular 06, 2018.

3.4.19 In principle, new planting must now avoid areas of biodiversity value. For example, all afforestation applications undergo AA and EIA screening and referrals to the in-house Ecologist or the NPWS in respect of Annex 1 species. There has been no new planting within SPAs for several years, and applications within important non-SPA breeding areas frequently undergo additional assessment. New applications should include Appropriate Assessment if areas are in or beside protected habitats or used by protected species [40, 41].

3.4.20 Inappropriately sited forests and poorly managed forest operations can have a significant impact on **freshwater** and also the freshwater pearl mussel. The SEA Environmental Report [42] pays particular attention to measures to mitigate any impacts on the pearl mussel. The new DAFM plan for *Forests and Water* [43] under the second River Basin Management Plan 2018-2021 identifies that forestry is a pressure in 40% of high water quality catchments at risk of not maintaining their status. It reconfirms the measures that must be taken for forest siting, design and operations to minimise impacts on water quality using a source-pathway-receptor model, most especially through the use of 10+ metre set-backs from watercourses. The document *Woodland for Water* [44] further describes the potential role of native woodland in contributing to these objectives. The draft plan for Forests and Freshwater Pearl Mussels is now being implemented to ensure that planting is set back from watercourses and that controls are effective in reducing sediment loss during harvesting. These steps are being complemented by the DAFM Locally Led Freshwater Pearl Mussel EIP. The EPA is also funding research into the benefits of riparian woodland as a buffer to assimilate nutrient pollution from farmland. Although this study is yet to report, riparian woodland is known to have potential benefits for wildlife and fish so long as tunnelling of watercourses is avoided.

3.4.21 **Target 4.1** also included expectations in relation to the implementation of the **Deer Management Strategy**. Commercial forest plantations have contributed to the spread of the deer population which consists mostly of non-native species without wild predators. Deer are having significant negative implications both for commercial forestry and the natural regeneration of native woodland. A Deer Management Forum has been established and favours a multi-faceted approach involving fencing, tubing of saplings and hunting [45]. However, among both landowners and policy makers there is a reticence to pursue more culling. New measures have been included in the NWS and more training is being provided, but existing woodland in Nature Reserves, or woods of no commercial value, are at particular risk.

Rationale for the assessment of effectiveness

3.4.22 Overall, forestry policy is improving in terms of measures to protect biodiversity, although distinct outputs in terms of species recovery and water quality will take time to realise. The principal considerations are the suitability for planting of less intensively farmed areas of possible biodiversity value and the 73% of the estate which is comprised of non-native commercial conifers [46]. Planting of broadleaves has increased, but targets have not yet been achieved. The tree species composition restricts the potential for environmental gains in the short-term, although the required areas for broadleaves and for biodiversity enhancement are positive factors.

On track to achieve target. (Based on partial evidence and monitoring)

Other aspects of land management

3.4.23 Section II discussed the proposals of **Bord na Móna** (BnM) to stop harvesting peat by 2030. This intention has been reiterated and a baseline ecological survey of the company's cutaway (extracted) bogs has been undertaken to identify areas of greatest biodiversity value. The BnM Second Biodiversity Action Plan proposes to extend the 15% of the landholding that has been rehabilitated or restored to date, although the nature of rehabilitation on the 80,000ha landholding remains a unclear with options including full restoration, biomass production and wind energy. Peat extraction is still permitted on private commercial bogs, although the DHPLG Is developing a regulatory regime for these works that provides compliance with the Habitats Directive.

3.4.24 Several Actions of the **National Peatland Strategy** have been implemented, including recognition of peatlands within agricultural and forestry policy. In 2015, funding was announced for the Restoring Active Raised Bog LIFE Project that will engage communities in the vicinity 12 SAC bogs. Recent dry springs have contributed to fires possibly sparked by agricultural burning, arson and discarded glass. The new EPA funded project, QUBBES (Quantification of Blanket Bog Ecosystem Services to water), has been launched to quantify the economic benefit of regulating ecosystem services provided by relatively intact blanket bogs.

3.4.25 Burning is used by landowners to promote new vegetation growth for grazing. A code of best practice for controlled burning is being developed by DAFM and will benefit peatlands and other grassland. There has been a loss of grassland habitat due to farming intensification and forest planting, but abandonment has also been a factor in some areas [47].

😐 **Progress towards target, but at an insufficient rate. (Based on partial evidence and monitoring)**

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.2. Principal pollutant pressures on terrestrial and freshwater biodiversity substantially reduced by 2020.

3.4.26 Monitoring of the ecological status of water is continuing during the second cycle of the **EU Water Framework Directive (WFD) 2017-2021.** Protection measures are being implemented, but the enhancement of ecological status expected by Target 4.2 has been achieved only at a localised level, rather than nationally. High quality waters are important to the survival of species such as Atlantic salmon (*Salmon salar*) and freshwater pearl mussel. The NPWS [48] lists the status of six protected freshwater habitats, along with the category 'floating river vegetation', as being of between *inadequate* or *stable*, to *bad* and *declining*, due to such pressures as inappropriate grazing or diffuse pollution from agriculture, forestry or peat extraction. These habitats contain varied biodiversity and, while some are of naturally low diversity, they are often characterised by unusual flora or fauna. The status of some migratory species such as salmon is also being affected by climate change within, but also outside of Ireland. In response to a significant decline in the eel (*Anguilla anguilla)* population across Europe, the European Commission has directed member states to draw up management plans based on a target of 40% returns. Former eel fisheries in the Republic of Ireland remain closed.

3.4.27 Although Ireland has relatively good water quality compared with some other EU States, 1,460 of the 4,829 waterbodies (30%) are "at risk" of not meeting WFD status objectives. Of these, 124 of 356 rivers and lakes are at risk of not meeting their high ecological status objective. Preliminary results from the first River Basin Management cycle indicate a reduction in instances of extreme water pollution, but no improvement in the length of unpolluted channel. The pressures of economic and agricultural development have contributed to a reduction in the number of high quality sites to 21 compared with 82 between 2001-03 and as many as 575 between 1987-90. Around 27% of monitored lakes were of less than good quality status as of 2015 and there has also been a small increase of 3% in the number of lakes of moderate or lower quality compared with 2007-09 (EPA, 2016a). There are also legacy problems such as physical barriers to fish migration, the former dredging of rivers for flood mitigation, and the drainage of wetlands, principally peatlands.[49]

3.4.28 EPA monitoring finds that the level of hazardous substances in Irish freshwaters is low [9]. Rather, the principal threat is due to eutrophication caused by nitrate and phosphorus nutrients. This pollution arises mainly from agricultural run-off (53%), non-point pollution from domestic rural septic tanks (13%), or a lack of municipal treatment (34%). However, nitrate and phosphorus pollution from agriculture has fallen by 19% and 38% respectively due to improved nutrient management advice. [49] Watercourses have also been targeted by AES for the creation of riparian buffer strips. As instances of pollution originating in farmyards have reduced, attention is being refocused towards other parts of the farm as critical source areas for pollution. National Biodiversity indicator C.2.iii shows how Instances of fish kills from extreme pollution have fallen significantly since the early seventies.

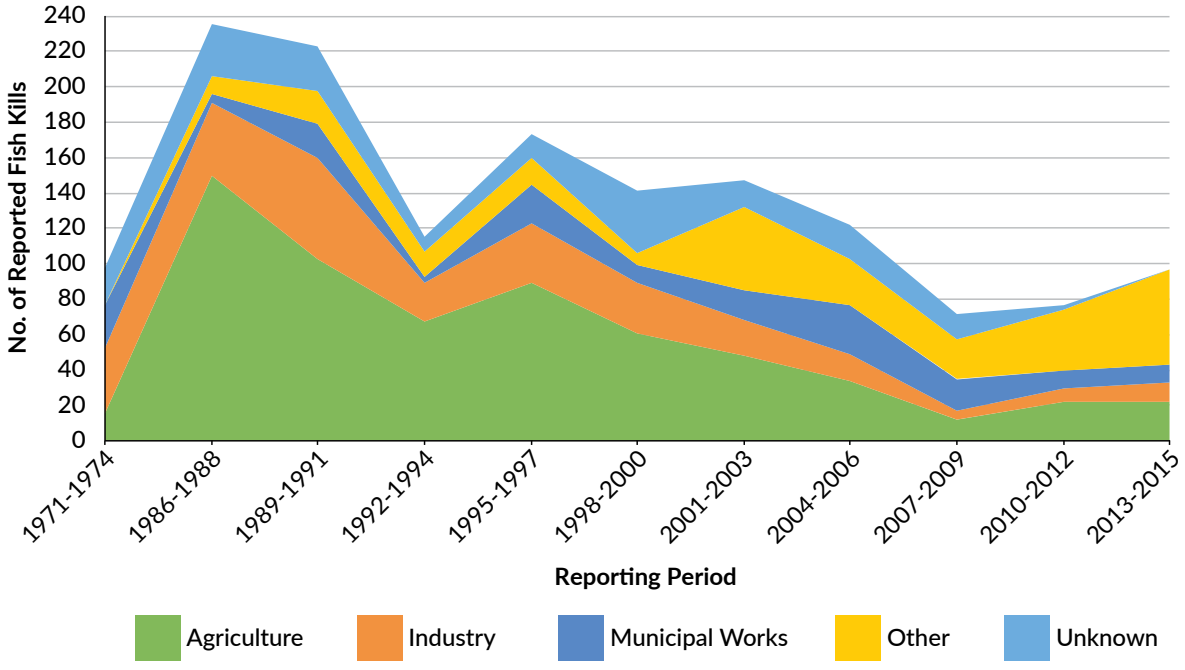


Figure 3.9: National Indicator C2.iii: Number of pollution-derived fish kills reported by Inland Fisheries Ireland

3.4.29 Compulsory registration of domestic septic tanks has also been introduced along with a national inspection plan and grants to lower income households for replacement of under-performing facilities. EU restrictions introduced in 2013 to reduce the use of phosphate in washing powders have contributed to reduced pressure on domestic waste water systems. In addition, new properties are required to have **modern wastewater facilities**. However, 49% of properties failed their inspection in 2016. Maintenance of septic tanks (old and new) is often sporadic and contributed to 29% of these failures while 25% failed simply due to not having been emptied of sludge. [50]

3.4.30 The Local Authority Waters Programme has been fostering **awareness of water quality** issues more generally and held 124 public consultation meetings between 2015-17 in relation to the new RBMP 2018-2021. The programme has assisted in the establishment of three River Trusts by local stakeholders keen to attract diverse public involvement and funding. Others are in the process of formation.

3.4.31 **Investment in water services** is making progress in reducing pressures on water quality, particularly point pollution from urban centres. However, 28 of 179 large urban areas failed to meet EU standards. These non-compliant towns represent over half of the wastewater load and include six locations without secondary treatment [51]. A wastewater infrastructure gap remains, but there is an expectation that the situation will improve due to increased capital investment and the transfer of responsibility for water treatment to a central utility undertaken in 2014. While human health in the paramount consideration in this investment, the WFD also emphasises the importance of biodiversity.

Rationale for the assessment of effectiveness

3.4.32 Continued pressures on freshwater habitats have prevented an overall improvement in water quality and consequently an improvement in the status of some key species. Policy in relation to catchment management could have a positive effect in future years, but will need political commitment and greater resourcing to achieve water quality objectives without which biodiversity safeguards will be compromised.[41] National plans for expansion of agricultural output, including a 50% increase in milk production, will place additional pressures on water quality in areas where nutrient levels are already elevated [52], as will higher temperatures and the prospect of more frequent extreme events such as drought due to climate change [53].

😐 **Progress towards target, but at an insufficient rate. (Based on comprehensive evidence and adequate monitoring).**

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.3. Optimised benefits for biodiversity in Flood Risk Management Planning and drainage schemes

41 *Pers comm*. EPA.

3.4.33 Catchment Flood Risk Assessment and Management (CFRAMS) is now the guiding principle of **flood management** and Flood Risk Management Plans have been prepared for all regions with the OPW as lead partner. Additional measures will be needed to address climate projections of more frequent or intense rainfall or storm events, but concern over imminent threats to public safety and property has tended to favour structural solutions. Some of the solutions adopted that have been heavily engineered, involving significant earthworking and use of rock armour. The lasting effect of this physical interference with habitats is heavily reliant on the implementation and maintenance of ecological mitigation measures proposed by EIA. By comparison, non-structural measures have, to date, been largely restricted to early warning systems and resilience under the Major Emergency Response Framework. The OPW is, though, working with the EPA and other authorities to identify natural water retention measures, including a new project (Slow Waters) which is looking at the value of forests for flood protection. This includes proposals that future assessment will address the loss of water retention by upriver wetlands and flood plains that were subjected to arterial and farm drainage prior to the 2000s. The RBMP 2018-21 includes a measure to develop a framework for promoting cross-sectoral promotion of integrated catchment management measures, but again this is at the early stage.

3.4.34 **Non-structural measures**, in the form of green infrastructure and sustainable urban drainage systems (SUDs), are also being adopted by an increasing number of Local Authorities, sometimes following the recommendations of SEA. These have the potential to reduce downstream pressures on rivers and, in some cases, provide new local habitats [54].

3.4.35 In terms of the **arterial drainage**, a shared service exists between IFI and OPW to enhance selected channel reaches to improve the ecology of previously dredged or realigned rivers through the Environmental Rivers Enhancement Programme (EREP). However, there has been little activity in the last two years due to liability and planning concerns and a shift in emphasis towards catchment management and restoration of river continuity through the removal of barriers to migrating fish.

3.4.36 In recent years there have been public demands for **coastal protection** in response to the damage caused by severe storms coupled with the vulnerability of much recent built development. However, there is a high cost to hard engineering solutions combined with the frequent need to respond with ad-hoc emergency works following storm damage [55]. Regional risk mapping, assessment and strategy formulation has been carried out by the OPW. These strategies consider only the current level of hazard, although the agency's guidelines on Coastal Erosion Risk Management potentially allow for assessment of a range of potential solutions including "hold-the-line", managed realignment and managed retreat as may be required in response to climate change. Acknowledging the inevitable negative impact that climate change is likely to have on coastal habitats, these responses could allow for some adaptation. Yet, while some very limited managed retreat has been accepted in the Rogerstown Estuary of County Fingal (see 3.1.11) and for County Sligo, there is as yet no definite climate change strategy or consideration of biodiversity outside of normal mitigation.

Rationale for the assessment of effectiveness

3.4.37 Catchment risk-based management has been introduced to reduce instances of flooding, but while increasing attention is being given to catchment planning, including interest in the ecosystem services that can be provided by peatlands and other wetlands from which biodiversity can benefit, most flood mitigation works have involved hard engineered solutions. At sub-catchment scale, though,

there is prospect of non-structural natural measures for smaller watercourses.[42] For fisheries, there is a continuing programme of rehabilitation of fish spawning areas and removal of river barriers, but the pace of this improvement is slow and has recently been held back by an insistence that angling clubs seek planning permission before works can commence.[43] There have been very few actions to implement soft engineering for coastal protection in response to climate change.

😐 **No significant change. (Based on limited evidence. No monitoring system in place).**

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.4. Harmful invasive alien species are controlled and there is reduced risk of introduction and/or spread of new species

3.4.38 Ireland has developed some measures to implement the EU **Invasive Alien Species** (IAS) Regulation and relevant sections of Ireland's EU (Birds and Natural Habitats) Regulations 2011, including of biosecurity plans by relevant state bodies, coordination and collation of invasive species surveillance and monitoring data; and work with Northern Ireland and UK authorities on invasive species of mutual concern. A Rapid Response Protocol for the island of Ireland has not yet been established.

3.4.39 In the wider countryside, there has been direct action to combat IAS. Within the last two years, Local Authorities have been active in identifying and controlling invasive plants spreading along roadsides. NPWS grants have contributed to these activities (see 2.4.41 to 2.4.48).

3.4.40 The NBDC hosts the **National Invasive Species Database** containing 11,160 records in addition to a comprehensive catalogue of Ireland's 1,277 non-native species, published in parallel through the Global Register of Introduced and invasive Species (GRIIS). This centralised hub of data exchange supports an Early Warning System for both local authorities and other EU Member States via the European Alien Species Information Network (EASIN).

3.4.41 Transport Infrastructure Ireland (TII) has produced guidelines of the management of noxious weeds and non-native invasive plant species on national roads. (2010). TII and the DTTS funded a €5.5 million national framework to tackle the spread of Japanese Knotweed with the initial pilot phase having already treated 10,000 m^2 of Japanese Knotweed along one major road alone.

3.4.42 Invasive understories of rhododendron and cherry laurel are a major problem in Ireland's forests, including native woodland. Large areas of rhododendron are present in a number of Ireland's National Parks with the NPWS spending between €300,000-700,000 per annum to try to combat this IAS. Opportunities for funding to control such species are available under the Forestry Programme 2014-2020 NWS Conservation Scheme (see 3.4.13).

3.4.43 The management of IAS in complex **water environments** is challenging. The invasive zebra mussel is continuing to populate many lakes in huge numbers, sometimes causing improvement in water quality, but with as yet uncertain or mixed consequences for native species. Other IAS, including some coarse fish species are having locally negative effects. To tackle these problems, the LIFE and

42 *Pers comm.* OPW 29/1/2019
43 *Pers comm.* Angling clubs in Boyne and Moy catchments.

NPWS funded CAISIE project on the management of IAS undertook wide stakeholder consultation and concluded in 2013 with recommendations for containment and eradication strategies. AfterLIFE have extended the benefits of these projects since 2014. Invasive aquatic species of plant, animal or fish are particularly problematic. IFI have initiated a publicity campaign to advice anglers on precautionary measures, principally by disinfecting tackle and clothes. The organisation has eradicated chub (*Leuciscus cephalus*) and yellow water primrose (*Ludwigia spp*), has substantially curtailed the growth of Lagarosiphon in Lough Corrib; and is working with local organisations to eradicate on a catchment basis other invasive plants which spread along watercourses. New legislation has been introduced to control the spread of North American crayfish which carry a mould disease that has now spread to five river systems (see 2.4.44).

Rationale for the assessment of effectiveness

3.4.44 It is evident that concerted action still needs to be pursued to develop a coordinated and centralised all-island approach to tackling IAS. To this end a national invasive species assessment is planned for completion by June 2019. New regulations have stimulated efforts by Local Authorities to manage IAS, but some damaging species such as rhododendron or zebra mussel, are ubiquitous and very costly (or impossible) to remove even from sites of high biodiversity value.

😐 **Progress towards target, but at an insufficient rate. Based on partial evidence and adequate monitoring).**

Objective 4. Conserve and restore biodiversity and ecosystem services in the wider countryside

Target 4.5. Improved enforcement of wildlife law

3.4.45 A of the end of 2018, there had been a total 20 **convictions** and 27 cases waiting to be heard from 2017/18 with the most recent cases relating to hare coursing and destruction of protected vegetation.[44] This compares with 31 for 2010 alone. Illegal shootings and poisoning of wildlife have also continued, but are harder to identify, and many are likely to have involved accidental poisoning of non-target species. A RAPTOR Protocol is in place to facilitate collection of data. In 2018, 6 birds of prey were short and 16 found poisoned, including 11 buzzards (*Buteo buteo*) (the species has re-colonised Ireland in the last 20 years) and 3 red kite (*Milvus milvus*) (recently reintroduced to Ireland) [56]. A poisoned white-tailed eagle (*Haliaeetus albicilla*) is believed to have fed on ducks killed with lead shot. By comparison, there were 33 poisonings in 2011, although there is no clear trend in illegal killings which appear to at levels comparable with other non-Mediterranean European countries [57, 58]. Previous years' reports of prosecutions include shootings, trapping, hunting, poisoning, and clearance of habitat.[45]

3.4.46 **Deer poaching** continues to be a significant problem (17 confirmed offences 2010-18), encouraged by venison value of up to €300 for a stag. This activity causes suffering as dogs are sometimes used or because animals are not shot cleanly. Badger baiting and hares coursing remain prevalent in parts of Ireland. These activities do not impact on biodiversity as such, but involve unacceptable cruelty.

44 NPWS data received 2010-18, Jan 2019.
45 http://www.wildlifecrime.ie/pages/Prosecutions.html

3.4.47 There continue to be instances of hedge and other **vegetation cutting** and burning at proscribed times of year (58 confirmed offences 2010-18) despite the impact this has on habitats and wildlife.

3.4.48 In fisheries, the situation is more positive, although spending on **anti-poaching** activity has reduced. In 2016, IFI undertook 22,000 inspections and confiscated 15km of illegal nets and initiated 103 prosecutions.[46] Most illegal activity has been directed at Atlantic salmon.

Rationale for the assessment of effectiveness

3.4.49 Shooting and poisoning continue to represent a threat to some species, particularly raptors, including recently reintroduced species. Fines are often quite low. There is no evidence of a lessening of the problem and more support is needed for regional wildlife officers to investigate and secure prosecutions. More coordinated actions are being taken to taken to address the problem. Although there is as yet no wildlife crime unit in An Garda Síochána, new training has been given and responsibilities allocated.

😐 **Progress towards target, but at an insufficient rate. (Based on limited evidence. Partial monitoring system in place.)**

Objective 5. Conserve and restore biodiversity and ecosystem services in the marine environment

Target 5.1. Progress made towards good ecological and environmental status of marine waters over the lifetime of this Plan

3.5.1 The main pressures facing the Ireland's marine biodiversity are selective **over-extraction of species,** abrasion of the seabed, smothering with silt around port areas, substrate loss and nutrient/organic enrichment due to fishing and aquaculture, along with the effects of marine shipping, extractive industries and land based activities [59]. The draft Marine Spatial Plan, prepared by the DHPLG for public consultation, provides for assessment and guidance on future development affecting the marine environment.

3.5.2 Bycatch, both in working nets or traps and discarded fishing gear, has impacted on birds, cetaceans and seals. The incidence is reported to be reducing in response to the increasing use of acoustic signalling and the new Landing Obligations (obligation to land all species caught) (MI, 2017). However, bycatch still presents a serious threat to some endangered bottom living or deep water species, including the Porbeagle Shark (*Lamna nasus*), Portuguese Dogfish (*Centroscymnus coelolepis*) and even the Common Skate (*Dipturus batis*), despite a ban on commercial catches of all three species [60].

3.5.3 Fishing is listed as the principal causes of over-extraction and abrasion of the sea bed. Nutrient/organic pollution within the aquaculture sector, is a significant problem and steps have been taken to improve the planning, location and licensing of fish farms, to protect habitats and wildlife, minimise the release of nutrients and to reduce the density of caged fish which have been implicated in the spread of disease and lice to migrating fish. A Coordinated Local Area Management Systems (CLAMS) has been introduced to oversee aquaculture development respective to the pressures present in single locations. This process has been complemented by an environmental management system

46 www.fisheriesireland.ie/extranet/annual-report-1/1524-annual-reprot-2016.html

(ECOPACT) which encourages producers to adhere to codes of best practice. In relation to the impact on wild salmon and sea trout, a Marine Institute report identifies only a constant and minor impact from sea lice relative to other effects such as degradation of river habitat and climate change [61] [52]. This result is contradicted by other research on sea trout [62].

3.5.4 A doubling of **aquaculture** production is proposed under the FoodWise policy targets. However, as much aquaculture invariably occurs in Protected Areas, this proposed expansion could place further pressure on biodiversity, including areas where remnant native oyster populations survive (*Ostrea edulis*). Although the status of the wild mussel population is unknown and not listed in the BIM Stock Book, dredging for mussel seed has continued. Despite these factors, existing measures have in practice involved limited invitation of third party submissions to policy with consultation on license applications restricted to local press. Monitoring of the environment and conformance with licensing conditions is also argued to have been inadequately resourced.[47] The DAFM has proposed measures to improve the transparency of procedures.[48]

3.5.5 Aquaculture and pollution from shipping and urban wastewater are the principal sources of **nutrient/ organic pollution** of which wastewater is the main cause, albeit restricted to inshore coastal and estuarine areas [63]. More transitional waters (14) had improved in trophic status as of 2017 relative to improvements (11) between 2010-2012. This was a reversal of the pattern of the previous year, although the combined number of eutrophic and potentially eutrophic is largely unchanged since 1995-1999. Most eutrophic waters are found in upper estuaries in the south-east and east [49, 63]. In 2016, 35% of designated shellfish waters had elevated levels of faecal contamination [52]. Toxic contaminants, e.g. PCBs, have been phased out. Nevertheless, while impacts are localised, these toxins persist in the environment and are often above levels that could cause reproductive failures in marine mammals such as orcas (*Orcinus orca*) and bottlenose dolphin (*Tursiops truncatus*).

3.5.6 The effect of **climate change** is apparent in a northward shift in warm water zooplankton species by 10° over the past 50 years [64]. These temperature changes are affecting the distribution of marine species, in particular migratory fish species and the breeding success of some fish, birds, and possibly cetaceans. Sea temperatures rose by around 0.8°C between 2001-2006, although the situation is complex with temperature recordings indicate a dip in recent years even as some warm water species, such as certain types of copepod, have spread northwards. Reductions in some breeding sea bird populations since the early 2000s could be an indicator of rising sea temperatures with effects on fish abundance. Equally, fishing practice, such as over-exploitation of sand eels, have been implicated in these declines.

3.5.7 **Invasive alien species** have been introduced to Irish waters through ship fouling and the disposal of ballast water. Legal introductions of commercial species, for example of the vigorous Gigas oyster (*Crassostrea gigas*) over 20 years ago, have also introduced pathogens and presented competition for native species.

3.5.8 Various measures are being undertaken to combat these pressures on biodiversity, although often induced by other considerations such as the economic sustainability or human health. However, although the herring population is just beginning to recover, mackerel has suffered recent over-fishing and there is still no TAC for sprat, a species are of particular importance to the diet of seabirds

47 Based on feedback from two eNGOs.
48 https://www.irishexaminer.com/business/big-plans-to-expand-aquaculture-453926.html

such as puffin (Fratercula arctica).[49] Ireland is now the process of developing measures to define good environmental status (GES) as required by the MSFD by 2020. The Directive also aims to eliminate over-fishing and discards by this time. In principle, harvesting in line with maximum sustainable yield (MSY) would deliver ecological benefits, but also the maximum economic benefit to the industry itself.

3.5.9 In relation to the protection of **marine benthic environments**, restrictions at the level of the EU Common Fisheries Policy (CFP) have been placed on bottom trawling methods. However, there is a continued, if reduced, allowance for deep sea species even though a sustainable level of catch has not been identified for almost all these species.[50] The INFOMAR project is currently mapping the sea bed to identify locations of ecological importance. Ireland has designated six new marine SACs since 2011 and legislation is now being advanced on Marine Protected Areas (see 2.6.11).

3.5.10 **Marine litter**, principally discarded fishing gear, fish farm materials and single use consumer plastics, is a continuing problem. This litter presents a mortality risk to wildlife through entanglement and ingestion. Indeed, OSPAR uses ingestion of plastic litter by fulmars (*Fulmaris glacialis*) as an indicator of the problem. Between 2000-2011, 95% of 796 sampled fulmar carcasses from all OSPAR seas contained plastic in their stomachs and 62% exceeded the 0.1 gram target. However, while beach counts of plastic litter (mostly small pieces) represent the largest component of marine litter at an average 161 items per survey site (31.5%) around the Celtic Sea, the overall trend is decreasing.[51] Specific measures have been promised in line with EU targets to ban some single-use items of plastic litter such as disposable cutlery and plastic straws which present a particular threat to wildlife. [52] The OSPAR/BIM pilot 'Fishing for Litter' project has been expanded into a Clean Oceans Initiative with the goal of including all fishing vessels.[53] An active programme of beach litter collection by over 500 community groups (involving 16,500 volunteers) is maintained by the An Taisce Clean Coasts programme.

3.5.11 **Wastewater discharges** to sensitive coastal waters have reduced in response to investment in new wastewater treatment plants in coastal locations. Compliance with EU standards has risen to 24% from 14%, although this level is still below the EU average [9]. Marine litter continues to be a problem with many consumer litter items washed into the sea from seaside beaches and rivers, the latter largely as result of urban wastewater network overflows.

Rationale for the assessment of effectiveness

Many coastal habitats are assessed as being of inadequate or bad status. Management of aquaculture has improved and bycatch is being addressed, but significant pressures continue from over-extraction. Marine plastic litter remains a persistent problem, although the incidence of littering around Ireland is diminishing due to improvements in waste management and awareness. Impacts on the marine environment and wildlife populations from various pressures are becoming more apparent. For example, the familiar Kittiwake (*Rissa tridactyla*) has now been added to IUCN Red List.

😐 **Progress towards target, but at an insufficient rate. (Based on partial evidence and partial monitoring).**

49 Review of Trawling Activity within the 6 Nautical Mile Zone: BirdWatch Ireland submission 2018
50 https://ec.europa.eu/fisheries/deep-sea-fishing-opportunities-2017-2018-unanimous-agreement-deep-sea-quotas-next-two-years_en
51 OSPAR (2017) Beach Litter: Abundance, Composition and Trends. https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/pressures-human-activities/marine-litter/beach-litter/
52 Green News.ie https://greennews.ie/single-use-plastic-ban-across-state-departments/ 5/10/2018
53 http://merrionstreet.ie/en/News-room/Releases 11/1/2019

Objective 5. Conserve and restore biodiversity and ecosystem services in the marine environment

Target 5.2. Fish stock levels maintained or restored to levels that can produce maximum sustainable yield, where possible, no later than 2020

3.5.12 **Landings of wild fish and shellfish** in 2016 were 275,632 tonnes of which 68,912 tonnes were by foreign vessels, including EU ships. Pelagic fish accounted for 63% of the total, demersal species for 24%, and shellfish for 13%. The total catch represents a reduction of 7.3% on 2015, but an improvement in value by 4%. The value of these landings has also been increasing and was €372m in 2016 [65]. In principle, this is a good development as it helps to maintain the viability of the Irish fishing sector while reducing the strength of argument for higher fishing quotas.

3.5.13 Of 26 fish species evaluated, 15 were below MSY in 2017, including cod (*Gadus morhua*), haddock (*Melenogrammus aeglefinus*), whiting (*Merlanguis merlandgus*), sole (*Solea solea*) and herring (*Clupea harengus*). Many species were subject to significant over-exploitation prior to the 1990s [66]. Cod stocks in the Celtic Seas west of Scotland and whiting in the Irish Sea are considered to have collapsed. Marine ecosystems are evolving to the absence of cod as a former key predator. Other species regarded as keystone foodweb species, such as herring, blue whiting and mackerel, have also endured fishing pressures. Rather little is known about deep water species, but several areas have been closed to bottom trawling.

3.5.14 Landings by Irish vessels have remained at over 200,000 tonnes since 2012, but fewer Irish vessels have been landing in foreign ports.[54] Overall, fishing effort has decreased since its peak in 1998 allowing the total biomass of fish to recover slightly. Good Ecological Status applies to 46% of commercial stocks in OSPAR Region III containing the Irish Sea. Around 22% of stock biomass is below MSY, although 43% is unknown [6]. Policy is improving and only 11% of landings were of species below MSY in 2017 (mostly mackerel and blue whiting)[66]. The latest Indicator C4.i (Figure 3.10), based on the Marine Institute Stock Book 2018, shows an increase in the proportion of stocks being fished sustainably. Stocks of pelagic and demersal fish are still both above the trigger point at which recovery would be impaired. The biomass of demersal species has also been increasing since the late 2000s.

54 Central Statistics Office, Fish Landings, 8/3/2016

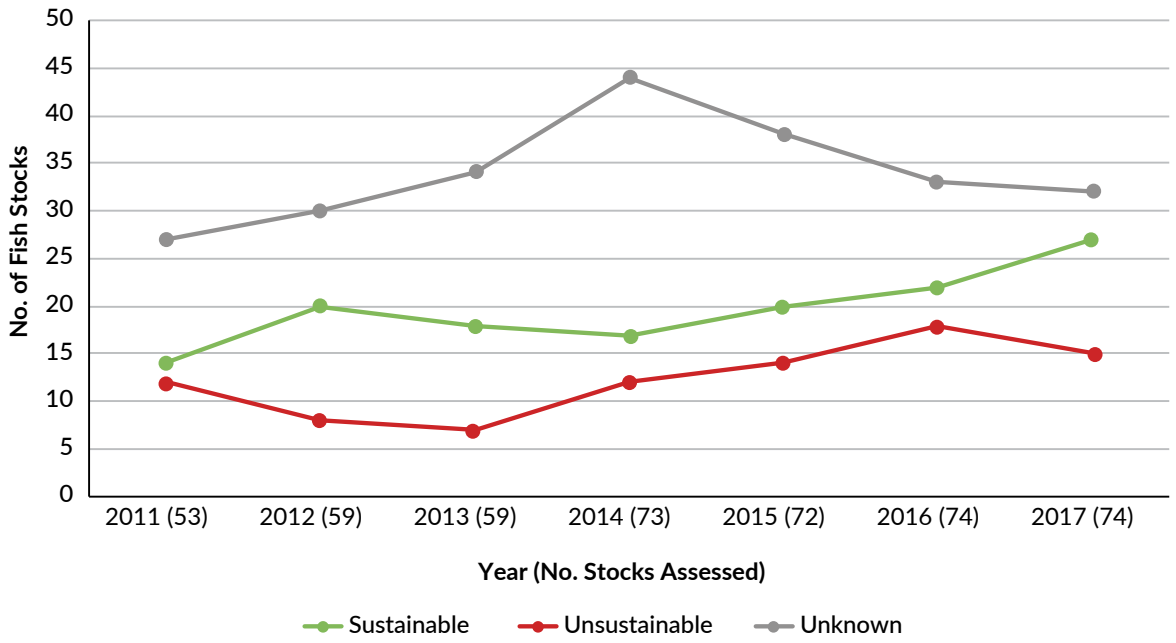


Figure 3.10: National Indicator C4.i: Number of fish stocks in Irish Waters being fished sustainably (*source Marine Institute Stock Book*)

3.5.15 Abrasion pressure from bottom gear has been significant on shelf areas off north-east and south-east of Ireland, presenting a serious risk to benthal habitats and species. However, this problem is thought to have reduced by 35% between 2003-2012 along with reduced frequency of trawls. In addition, to protect deep water corals, an EU deep sea trawling ban applies below 800m for rolling gears [68].

3.5.16 The sustainability of **inshore fishing** has improved due to the adoption of quality-based initiatives by fishermen and, more recently, the upcoming ban of large trawlers from inshore waters.[55] The situation with regard to shellfish is more difficult to determine given natural annual variations in numbers, but also variation in catches and reporting. This is exacerbated by the absence of reporting requirement for vessels of less than 10 metres [68]. Most (but not all) shellfish harvesting is subject to licensing, but not Total Allowable Catch (TAC) controls as most populations occur within inshore waters. There have been issues with imbalance between actual and relative allowable catches of different species [69].

Rationale for the assessment of effectiveness

3.5.17 Very gradually, EU fishing policy has been moving towards a situation of sustainable yields and improved management, but the trend remains vulnerable. Past over-exploitation means that 22% of stock biomass is below MSY [6]. This has stimulated changes in the marine ecosystem along with unknown damage to deep water and benthic environments which act as nurseries or feeding areas for many species. In 2017, a first Red List of cartilaginous fish (sharks, skates, rays and chimaeras), showing risk of extinction, was published for Irish waters. Of the 58 species assessed, six (10.3%)

55 https://www.irishexaminer.com/breakingnews/ireland/large-trawlers-to-be-banned-from-waters-within-6-miles-of-irish-coast-893629.html

were reported to be Critically Endangered, including Portuguese dogfish, Common Skate and Porbeagle Shark, as well as flapper skate (*Dipturus flossada*), white skate (Rostroraja alba) and angel shark (*Squatina spp*). A further five species (8.6%) were assessed as endangered, including the basking shark (*Cetorhinus maximus*). Cumulative impacts are also being realised from climate change with implications for all marine species.

😐 **Progress towards target, but at an insufficient rate. (Based on partial evidence and monitoring).**

Objective 6. Expand and improve management of protected areas and species

Target 6.1. Natura 2000 network designated and under effective conservation management by 2020.

3.6.1 As outlined in Section II, a range of actions have been taken to further expand, protect and improve Ireland's **Natura 2000 network**. The effectiveness of these actions is outlined below in relation to the extent, degree of formal protection, management and condition of the Natura 2000 network.

3.6.2 National Biodiversity Indicator 15 (see Section IV) tracks the number and extent of international Protected Areas. Since 2010, there has been a slight increase (3.8%) in the number of SAC sites through the addition of 7 new marine and 9 new raised bog SACs which were transmitted to the EC in 2012 and 2015. Although the exact area of designated sites remains subject to change prior to formal designation, these 16 new SACs represent a 25% increase in the area designated as SAC in Ireland (an additional 340,632ha) which now extends over 1,695,284 ha. Since 2010, the number of sites designated as SPAs has been increased through the addition of 11 new sites, equating to a gain of 7.7%. These new sites represent a 1.5% increase (86,162 ha) in the area covered by SPA designation, which now extends to over 589,427 ha. Combined, these additional sites represent an increase of 4.7% in the number of sites, and an 18% increase in the area covered by the Natura 2000 network.

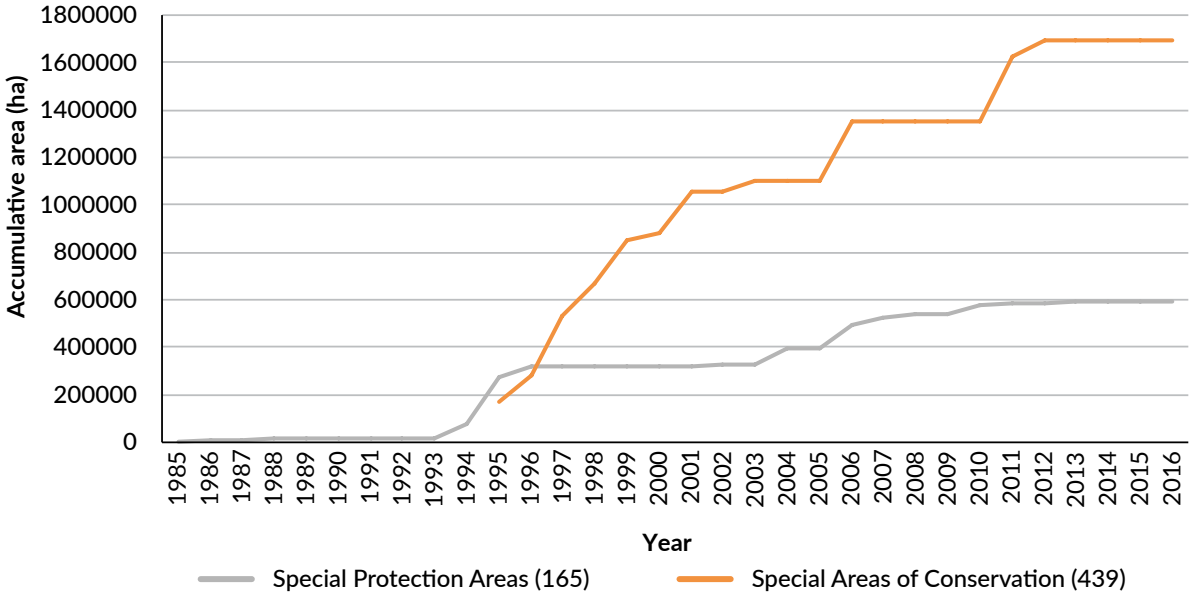


Figure 3.11. National Biodiversity Indicator 15 (D.1.i) Combined Extent of the Natural 2000 Network (SPAs and SACs) in Ireland [17]

3.6.3 Alongside the Natura 2000 network, Ireland's nationally designated sites are tracked under *National Biodiversity Indicator 15* (D.1.i). Designated **Natural Heritage Areas** (NHAs) protect an additional 60,326 ha, largely consisting of raised and blanket bogs. In addition, there are another 1,089 proposed NHAs covering a far larger areas of 845,223 ha on a non-statutory basis. However, the degree of protection afforded to NHAs is less than that of European SPAs and SACs. The area protected through NHAs has recently come under scrutiny. A review of Ireland's network of NHA Raised bog network in 2014 concluded that a major reconfiguration was required (DCHG 2014), resulting in a number of sites being recommended for de-designation and a complement of new sites recommended for designation. By comparison, Ireland's National Parks and Statutory Nature Reserves extend over 65,477 ha and 18,816 ha respectively. Most of these are subject to Natura 2000 designation.

3.6.4 The network of SPAs and SACs are considered legally protected from the date of their public notification, although their **formal designation** requires the preparation of a Statutory Instrument (SI) for each site. In April 2016, the EC called on Ireland to accelerate its efforts to formally designate SACs and to establish conservation objectives and measures for all of these. National Biodiversity Indicator 19 (D.5.V) measures the number of biodiversity relevant primary and secondary legislative instruments introduced to protect biodiversity each year and which includes the SIs for Natura 2000 sites. SIs are now in place for 61% of Natura 2000 sites in Ireland. This represents a 37% increase since the last report in 2013, when only 24% of Natura 2000 sites had SIs in place. Notably, the formal designation process is almost complete for SPAs with SIs in place for 148 sites, accounting for 96% of sites. Although a large number of SIs have been completed for SACs (221) this only accounts for 48% of SACs

3.6.5 *National Biodiversity Indicator 16* (D.2) assesses the number of SAC and SPA sites with **site-specific conservation objectives** (SSCOs). As of 2018, 65% of SAC sites have SSCOs in place, a 55% increase since the last report to the CBD in 2013. Alongside SSCOs, 43 sites-specific management plans (SSMPs) have been complied and published by the NPWS for SACs. Less progress has been made on the completion of SSCOs for SPAs. Only 24% of the 154 SPAs have SSCOs in place, a 9% increase since the last report to the CBD in 2013. Generic conservation objectives are in place for those sites which remain without SSCOs. Less progress has been made outside of internationally designated sites, with just two management plans in place in Ireland's six National Parks. Since 2011, there has been a particular focus on responding to the historic cutting and poor condition of raised bog SACs through the publication of 53 site specific raised bog plans for SAC sites and the development of restoration works on 20 raised bog SAC sites [70].

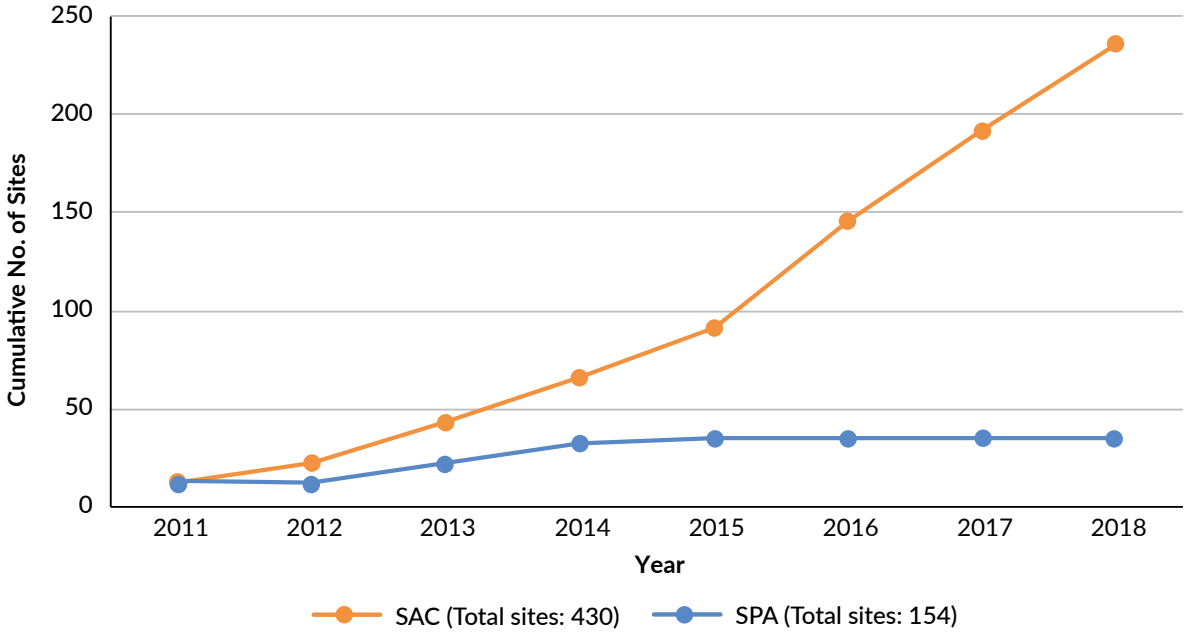


Figure 3.12. National Biodiversity Indicator 16 (D.2) Number of SAC or SPA Sites with Site Specific Conservation Objectives (SSCOs) [17]

3.6.6 SAC sites are designated under the EU Habitats Directive to contribute towards the achievement and maintenance of the FCS for those habitats and species identified to be of European significance. The **conservation status** of habitats listed under the Directive is assessed by EU member states every six years. Part of this assessment includes trends of Area of Habitat in Good Condition and trends in Population of Species within the SAC networks. The conservation status of habitats listed in the Habitats Directive was last assessed in Ireland in 2013 and provides the data for National Biodiversity Indicator 10 (B.7.i) Trends in the status of listed Habitats (Figure 3.12).

3.6.7 Reporting under the Habitats Directive in 2013 (Figure 3.13) assessed the **conservation status of 58 protected habitats**. The assessment revealed that the vast majority (91%) of habitats listed under the Habitats Directive are considered to be in unfavourable conservation status, i.e. inadequate (29) or bad (24), and only 9% in favourable status (5). Habitat groups with the highest percentage of habitats in bad conservation status included peatlands (86%), heaths (100%), grasslands (83%) and

Forests (75%), while marine habitats had the highest percentage in FCS at 33%. The 2013 report also assessed changes in status between 2007 and 2013. After taking into account changes in assessment methodology and knowledge, this suggested that 16% of habitats demonstrated a genuine improving trend compared to 31% with a genuine declining trend, whilst 48% were stable, and the trend of another 5% unknown. Four parameters (range, area, structure/functions, and future prospects) are used to determine status and an unfavourable result for any one will lead to an unfavourable overall rating. However, early indications from the NPWS (pers comm) for the forthcoming 2019 Habitats Directive assessment suggest that the conservation status of many habitats has remained the same with an increase in the proportion of habitats with declining trends. The main threats and pressures listed for these habitats include: agricultural change, pollution, invasive and problematic species, and natural system modification, human intrusion and disturbances [72].

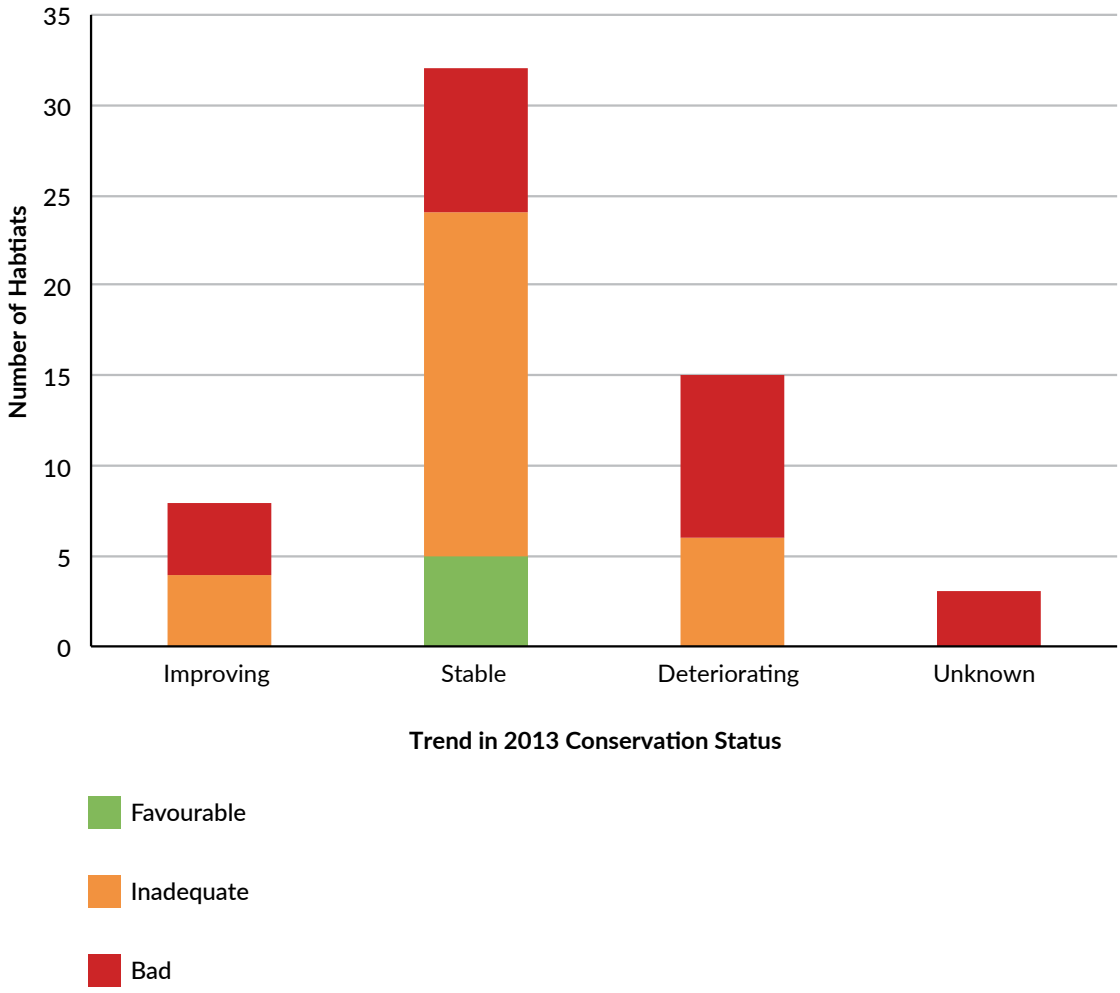


Figure 3.13: National Biodiversity Indicator 10 (B.7.i) The Conservation Status of Listed Habitats [72]

3.6.8 The extent and status of Ireland's Natura 2000 network is tracked through the National Biodiversity Indicators. Since 2010 these indicators show a slight increase in the number of sites within the Natura 2000 network, but amounting to a significant expansion in the area of marine territory protected by Natura 2000. Although SPA and SAC sites are considered to be legally protected from the date of their public notification, their formal designation has been an ongoing project for the NPWS. Since the last report to the CBD the NPWS has significantly increased the percentage of sites in Ireland's Natura 2000 network that are formally protected through Statutory Instrument (SI), although just over 40% of SACs remain without an SI.

Rationale for assessment of effectiveness

3.6.9 There has been an increase in the number and area of Protected Area SACs and SPAs. There has also been progress on the formal designation of these sites through the implementation of SIs. Resources have been directed particularly at the preparation of conservation or restoration plans for raised bog SACs, many of which needed urgent protection from past drainage and peat extraction.

Overall, however, the conservation status of the majority (91%) of protected habitats listed under the Habitats Directive is judged to be in unfavourable status. Around 16% of habitats demonstrate an improving trend compared to 31% with a declining trend, whilst 48% were stable, and the trend of another 5% unknown.

☹ **Moving away from target. (Based on comprehensive evidence and adequate monitoring for most habitats).**

Objective 6. Expand and improve management of protected areas and species

6.2: Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020

3.6.10 The Natura 2000 network was set up to ensure the survival of Europe's most valuable species and habitats, with sites selected on a scientific basis for animal and plant species as well as for target habitats listed under the EU Birds and Habitats Directives. Ensuring that Ireland's Natura 2000 network covers the habitats listed in the Habitats Directive Annex 1 is crucial to the effectiveness of the network in meeting European priorities. National Biodiversity Indicator 15 (D.1.iv) measures the ecological representativeness of the Irish Natura 2000 network by assessing the percentage area of habitat groups (representing 56 habitats) listed under the Habitats Directive designated within SAC, and the percentage area within SACs listed as a Qualifying Habitat.

3.6.11 Despite efforts to expand and manage the Natura 2000 network the vast majority of habitats within Ireland's SAC were assessed to be in unfavourable condition in 2013. An estimate of the area of designated habitats within the Natural 2000 network shows over 50% of the national extent of most habitat groups lying within a SAC. However, overall, for protected grassland habitats there has been significant degradation and physical losses of more than 28% for calcareous grassland, Molinea grassland and hay meadow between 2007-12 and 2017 [47].

3.6.12 Since 2013, when the data for this indicator was compiled, there has been an increase in the area of SAC sites for marine habitats with the additional designation of seven new marine sites extending the marine component of the network by over 340,000ha. The Commonwealth Scientific and Industrial Research Organisation Protected Areas Representativeness Index [73] estimates the extent to which terrestrial ecological uniqueness is represented within protected areas,[56] Ireland has an index score of 0.15 which suggests a relatively low representation of ecological uniqueness within the Protected Area network.

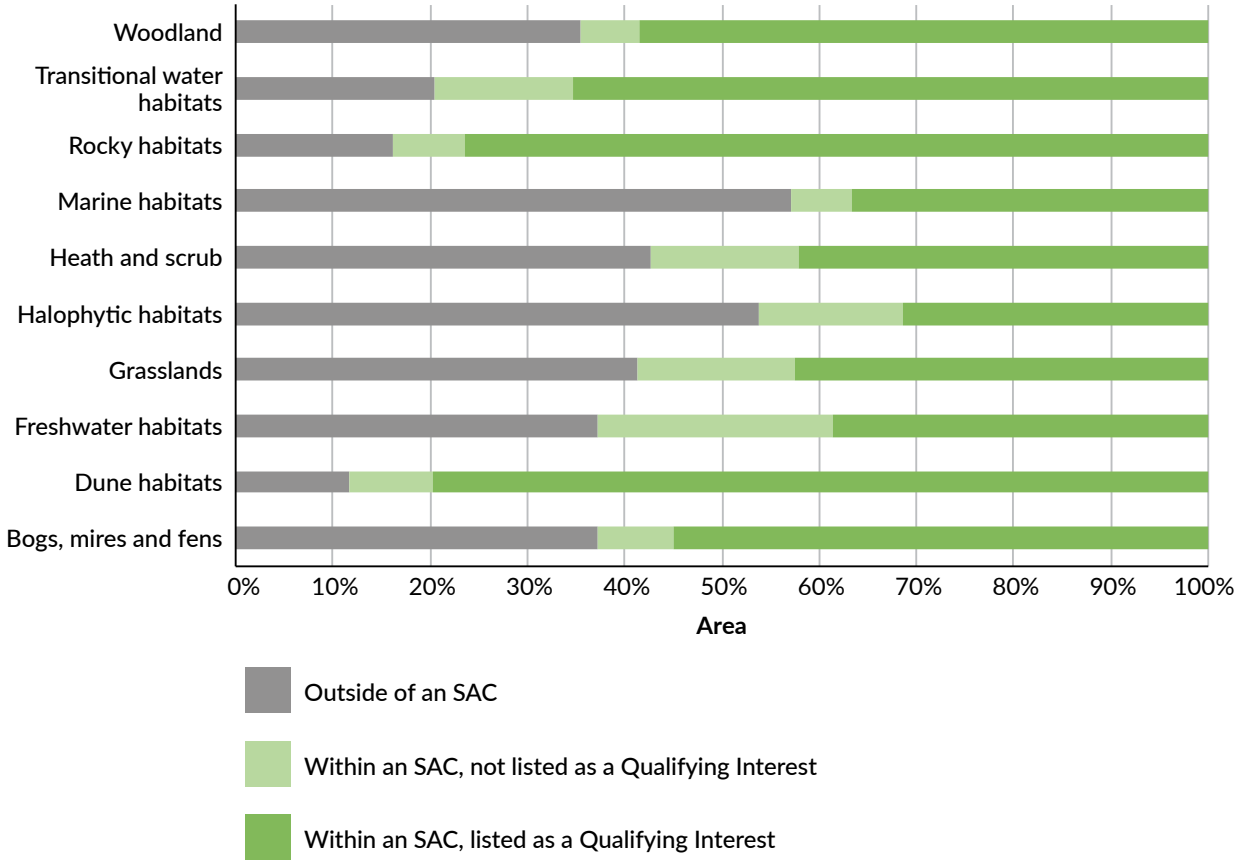


Figure 3.14: National Biodiversity Indicator 15.D.1.iv: Area (ha) of habitat groups representing 56* habitats listed under the EU Habitats Directive designated within SAC, and the area within SACs listed as a Qualifying Interest.
***Excludes reefs and sea caves**

56 Under this indicator protected-area boundaries were used from the World Database on Protected Areas.

3.6.13 Favourable Conservation Status (FCS) is assessed using a common protocol to determine whether habitats have sufficient area and quality to ensure their survival, and favourable future prospects in the face of pressures and threats. SSCOs specify the target conservation conditions for a particular habitat or species to maintain or reach FCS. This is translated into actions through SSMPs

3.6.14 **Ecological connectivity** facilities large scale ecological and evolution processes, migration and species-range shifts in response to climatic and environmental change, and is vital to sustaining biodiversity [74]. Connectivity preserves healthy ecosystems within Protected Areas along with high species richness and genetic diversity. At present, there is no nationally or globally endorsed single indicator for estimating the connectedness of Protected Areas and, instead, a range of metrics must be used. Two global indicators and one regional indicator have been selected to provide a picture of the connectedness of Protected Areas to the surrounding landscape.

3.6.15 The Protected Area Connectedness Index [73, 75] shows the changes in connectivity among terrestrial Protected Areas and areas containing primary vegetation (habitat) in the surrounding non-protected landscape. This index is calculated based on the integration of information from remotely-sensed forest change and land cover change datasets combined with a global protected area database. The index provides national values ranging from 0-1, with values closer to 0 indicating that land is less connected to Protected Areas. In 2012, Ireland's Protected Area Connectedness Index was 0.1365, with +0.9% positive rate of annual change between 2000 and 2012 suggesting a slight increase in connectedness since 2000. Compared to 41 other European states, Ireland has the 5th lowest connectedness Index score, and is in the bottom 15% of European countries (see Figure 3.15).

3.6.16 The EU Digital Observatory for Protected Areas (DOPA) provides another measure of **Protected Area Connectedness** through the ProtConn indicator.[57] ProtConn quantifies the percentage of a region covered by protected connected land by assessing different categories of land (unprotected, protected or transboundary) through which movement between protected locations may occur at the 1km2 scale [74]. By this measure, 8.81% of Ireland is classed as Protected Connected Areas compared with the CBD target to reach 17%.

3.6.17 **Fragmentation of habitat** is related to connectivity and occurs due to the physical disintegration of continuous ecosystems, habitats or landscape units.. A metric is provided by the EEA on 'Landscape fragmentation pressure from urban and transport infrastructure expansion'.[58] The EEA assesses landscape fragmentation in terms of the area which is accessible without encountering man-made barriers such as urban and transport expansion, or more simply, the degree to which movements between different parts of the landscape are possible. It is not currently possible to compare changes over time using this indicator. However, the percentage area of fragmentation in Ireland can be compared with other EU Member States (see Figure 3.16). 'High' and 'Very High' fragmentations classes account for 34.5% of Ireland's area, 'Medium Fragmentation' pressure accounts for 41.6%, and just 24% is classed as 'Low' or 'Very Low' fragmentation. Ireland ranks 8th highest out of the 38 countries based on percentage area covered by high fragmentation pressure class and 13th highest when combined values for high and very high fragmentation. Although connectivity in Ireland is aided by 300,000km of hedgerow, most natural woodland was cleared centuries ago, while wetlands have suffered from drainage and exploitation in more recent decades. Active fragmentation may have lessened, but the degradation of isolated habitats has in many cases continued. Improved mapping data (see 2.2.4 to 2.2.7.) will better inform these measures in the future.

57 https://ec.europa.eu/jrc/en/scientific-tool/digital-observatory-protected-areas
58 https://www.eea.europa.eu/data-and-maps/indicators/mobility-and-urbanisation-pressure-on-ecosystems/assessment

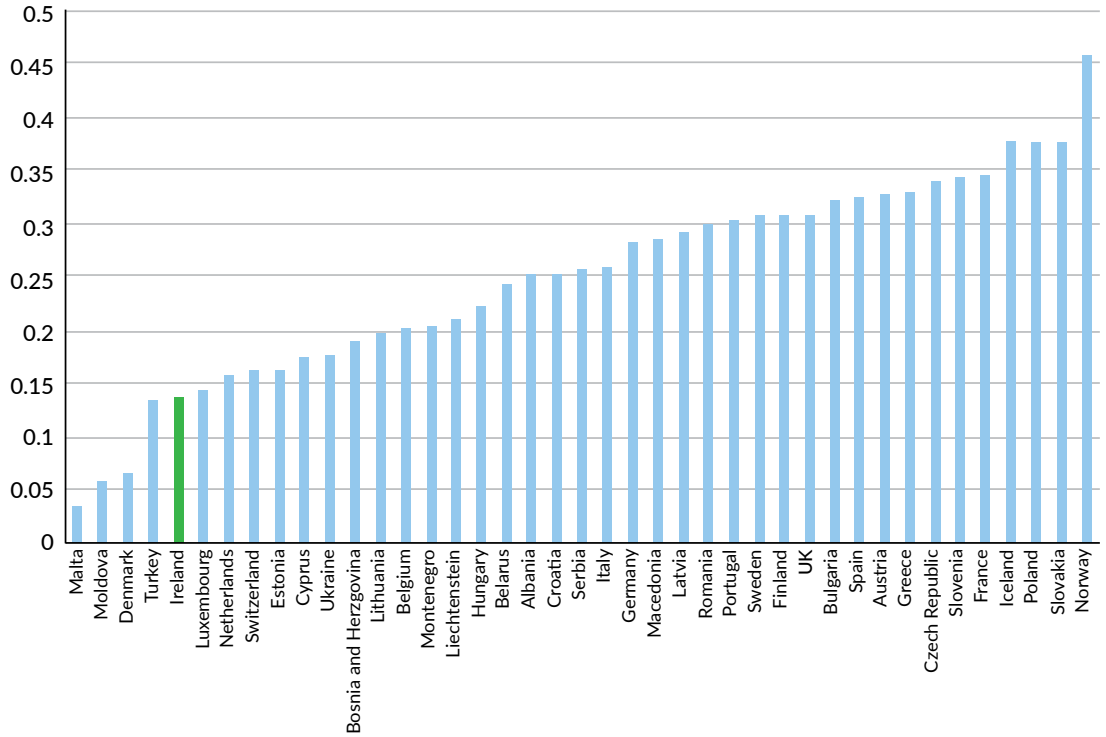


Figure 3.15: Protected Area Connectedness Index (2012) (Biodiversity Indicators Partnership 2018)

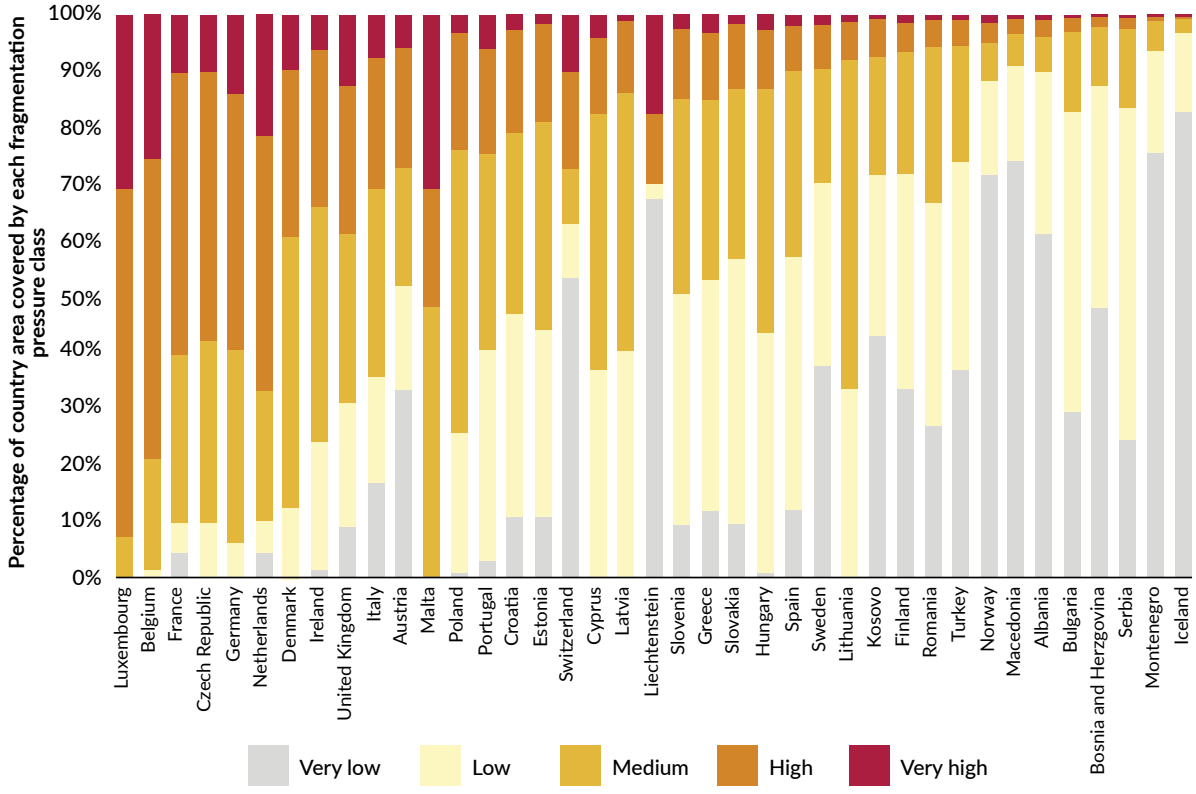


Figure 3.16: Fragmentation pressure classes of EEA member Countries (percentage of the country area) [76]

Rationale for assessment of effectiveness

3.6.18 The adequacy of the Natura 2000 network for protecting a representative mix of habitats could be higher if more freshwater and marine areas were protected by SACs or SPAs. The connectivity or habitats is poor compared with other EU Member States due to fragmentation, although much of this is historical.

😐 **No significant change. (Based on partial evidence and monitoring).**

Objective 6. Expand and improve management of protected areas and species

Target 6.3: No protected species in worsening status by 2020; majority species in, or moving towards, favourable status by 2020

3.6.19 Ireland hosts more than 31,000 different species, including internationally threatened, vulnerable or rare species. The **conservation status** of the 61 species of mammals, reptiles, fish, crustaceans, insects, molluscs, bivalves and plants protected through the EU Habitats Directive is also reported every six years. Some 196 species of bird, listed as being of European importance under the EU Birds Directive, visit or breed in Ireland, the population status of these species is reported every six years. A standard classification is used to grade the conservation status of protected species based on best available information on the range, population size, area of suitable habitat, threats and management of the species and its habitat. The number of Habitats Directive species with favourable, inadequate or bad status forms National Biodiversity Indicator 8 (B.5.ii) 'Trends in the status of threatened species'. Alongside these formal assessments, there are published lists of threatened and rare species, including the National IUCN Red List, Birds of Conservation Concern in Ireland [77] and the Plant Red Data book [78, 79].

3.6.20 The outlook for species under the 2013 Habitats Directive report shows that just over half (52%) of **species protected under the Habitats Directive** were assessed as in favourable conservation status, compared to 20% as inadequate and 12% as Bad [7]. The status of 16% was unknown due to insufficient data. The changes in status between the 2007 and 2013 report shows that 10% of species protected under the Habitats Directive had a declining trend while only 6% have demonstrated genuine improvement. However, 82% of species were assessed to be in stable condition, and 2% unknown, suggesting that many species have remained in favourable status between the 2010 and 2013 reports. Due to improved knowledge of cetaceans, there are less unknowns than reported in 2007 resulting in a decrease in the number of unknowns and an increase in favourable status in 2013.

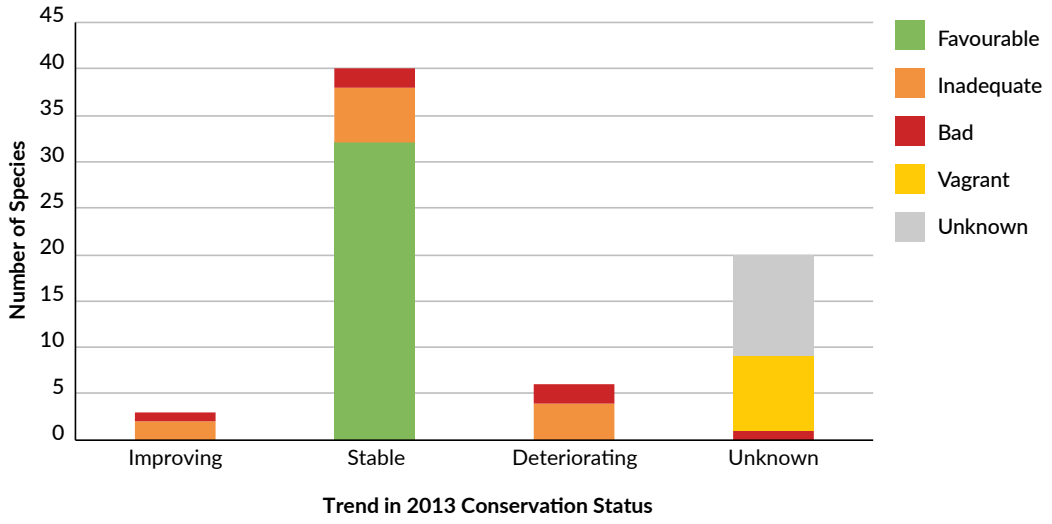


Figure 3.17: National Biodiversity Indicator 8.B.5.ii The number of species listed under the EU Habitats Directive Assess in 2013 as favourable inadequate, bad, vagrant or unknown [17]

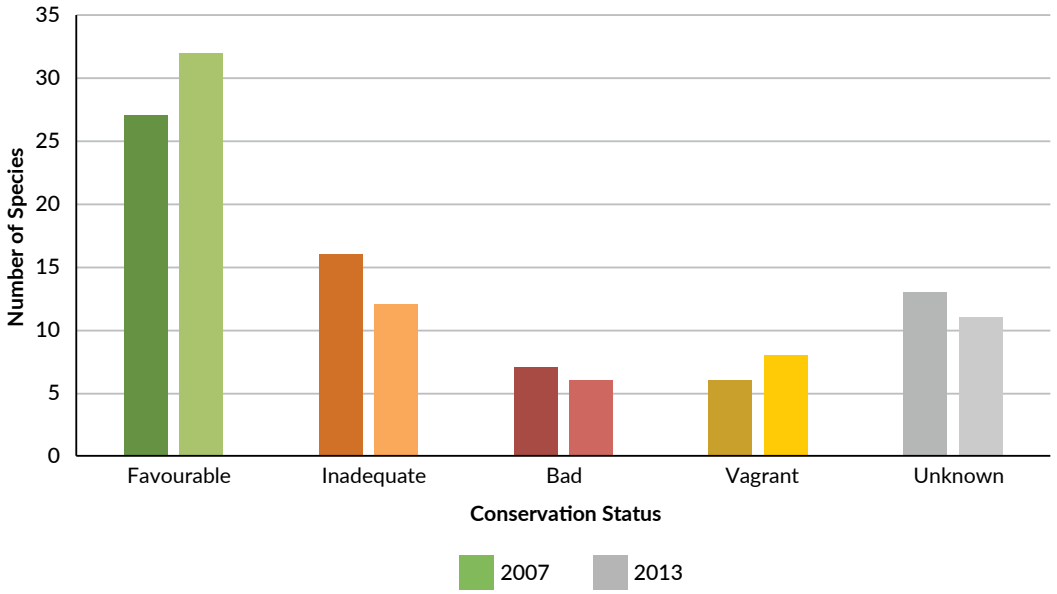


Figure 3.18. National Biodiversity Indicator 8.B.5.ii The number of species listed under the EU Habitats Directive Assess in 2013 as favourable inadequate, bad, vagrant or unknown compared for 2007 and 2013 assessments [17]

3.6.21 The conservation status of different species groups indicates that many aquatic protected species are faring worst with 50% of Amphibians, 57% of Fish, 100% of Arthropods, 83% of Molluscs, and 63% of Non-Vascular plants assessed as having inadequate or bad status (NPWS 2013). Freshwater Pearl Mussel (*Margaritifera margaritifera*), and all Vertigo species are in bad status and experiencing on going declines despite improved forest and catchment management and the contribution of projects such

as Duhallow LIFE. Sea Lamprey (*Petromyzon marinus*), Twaite Shad (*Alosa fallax*), Pollan (*Coregonus pollan*), Marsh Fritillary (*Euphydryas aurinia*) and the Natterjack Toad (*Epidalea calamita*) were graded as in bad conservation status. There is, however, some evidence of positive improvements. Natterjack toad (*Epidalea calamita*), a species assessed as 'bad' in 2007 was classed as 'bad but improving' by 2013. This improvement corresponds with concerted NPWS efforts to improve the species' habitat through the Farm Plan Scheme (FPS). Desmoulin's whorl snail (*Vertigo moulinsiana*) has also moved up from bad to inadequate. On the whole, Mammals and Vascular plants are thought to be faring better. A total of 69% of mammals (including most species of bat, dolphin and whale) were in found to be in FCS, along with 67% of vascular plants. However, the status of many species remains unknown.

3.6.22 Trends in status of vulnerable and threatened species in Ireland are also assessed through the IUCN **threatened 'red' species list**, the most comprehensive global recognised approach for evaluating the conservation status of plants and animal species. The proportion of species assessed under different Red List categories informs National Biodiversity Indicator 8 (B.5.i) 'Trends in the status of threatened species'. As of 2016, the conservation status of 10% of Ireland's species has been assessed under this process (IUCN 2003), an increase of 4.9% in the proportion of total species assessed since the 2013 assessment. Since 2010, Ireland has published Red List assessments for the following species groups: Macro Moths (2016), Vascular Plants (2016), Cartilaginous Sharks (2016), Mayfly (2010), Bryophytes (2012), Amphibians, Reptiles and Freshwater Fish (2011), Damsels and Dragonfly (2011) and Butterfly (2010).

3.6.23 A total of 24% of the species assessed under the IUCN red lists are classed as threatened (14.8% critically endangered, endangered or vulnerable and 9.2% near threatened), another 2.7% are classed as regionally extinct. The Red List assessment suggests that the species groups of most concern, i.e. threatened or near threatened status, include non-marine molluscs (34%), bees (43%), Amphibia, Reptiles and Freshwater Fish (40%), Butterflies (34%) and Mosses, Liverworts, Hornworts (30%). As reported in 2013, three species groups, Amphibia, Reptiles and Freshwater Fish, Bees and Non-Marine Molluscs, are of particular concern as they have been assessed as having over 30% of their species assessed as threatened.

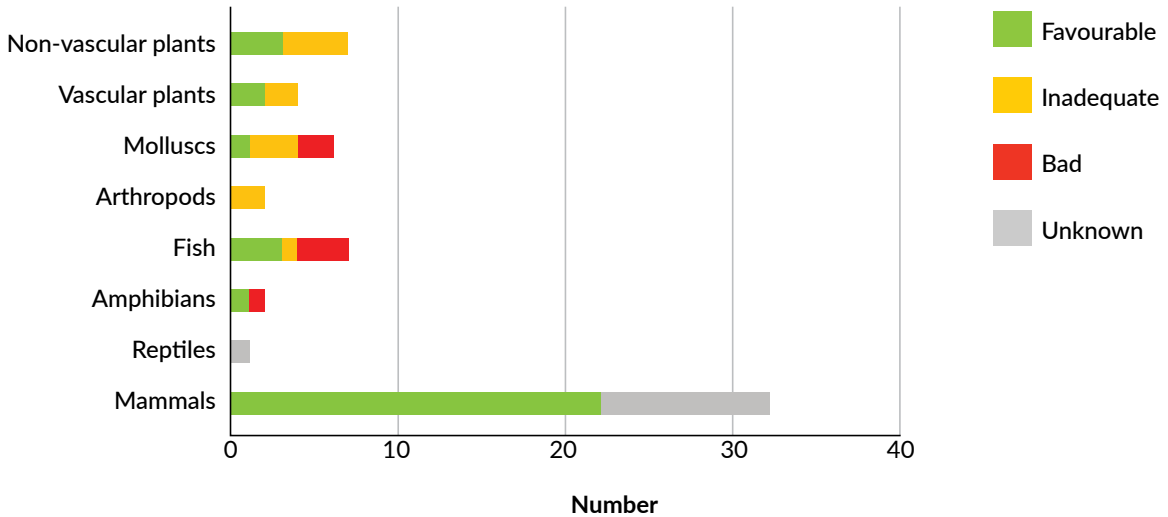


Figure 3.19 National Biodiversity Indicator 8: Trends in the status of EU listed species [17]

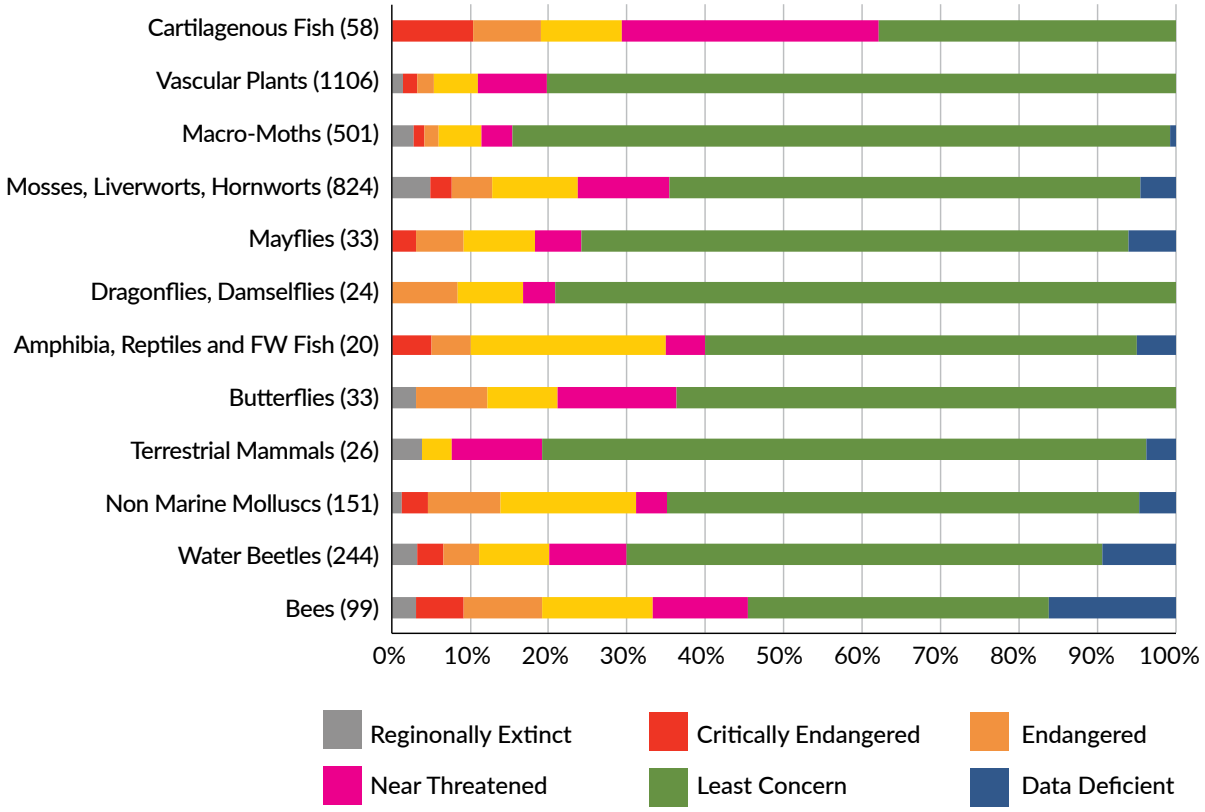


Figure 3.20: National Biodiversity Indicator: Proportion of total species assessed under various IUCN Red List threat categories [17]

3.6.24 **Bird populations** are considered to be good general indicators of the broad state of wildlife and the countryside. Trends in the status of bird species informs National Biodiversity Indicator 4 (B.1.i) Under the EU Birds Directive, 193 species of birds which visit or breed are listed as being of European importance in Ireland, in addition there are 9 globally threatened species and 131 Important Bird and Biodiversity Areas (481 thousand ha) [80]. Ireland last reported on the proportion of breeding and wintering taxa listed under the Birds Directive in 2014 (Figure 3.21) Out of the 193 species, long term data was lacking for over half of the species assessments, and therefore data used here indicates trends and not a conclusive assessment of conservation status.

3.6.25 Reporting on the EU Birds directive showed that 27% of breeding species have shown short-term population declines and 18% long term declines, compared with 28% showing short term increases and 19% showing long term increases. Wintering taxa have fared similarly in terms of long-term trends with 24% reported as undergoing population declines, of which 16% were long term population declines, compared to 25% with increasing population trends in the short term and 19% population increase in the long-term. Notably, the long term population trend is unknown for 56% of breeding taxa and 61% of wintering taxa, this lack of data needs to be reflected on in relation to the significant and large-scale declines in bird population across European during and prior to the 1980s [81, 82]

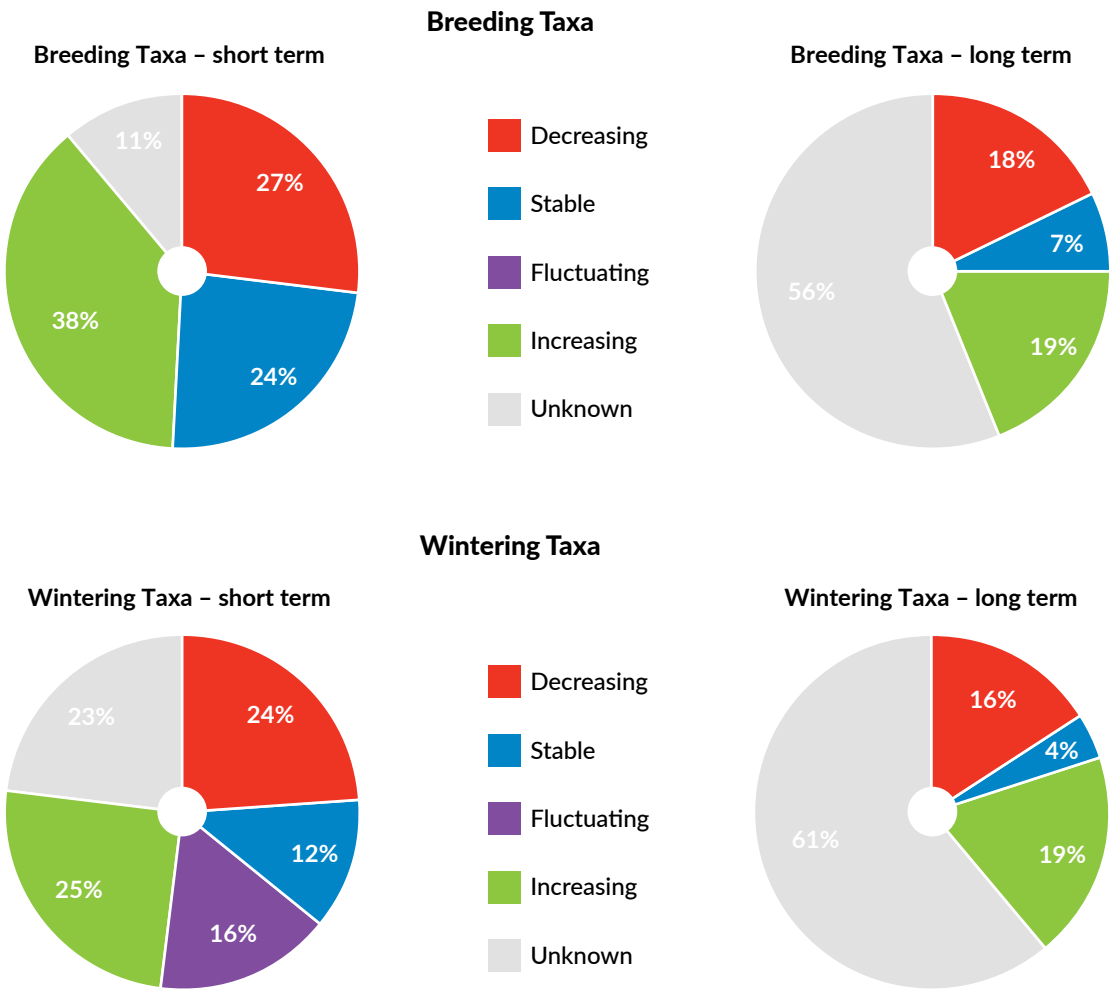


Figure 3.21: The proportion of taxa reported as having decreasing, stable, fluctuating, increasing or unknown for short- and long-term population trends, and both breeding and wintering taxa [18]

3.6.26 The 5th National report to the CBD highlighted a number of bird species experiencing population increases including Raven (*Corvux corax*), Collared Dove (*Streptopelia decaocto*), Buzzard (*Buteo buteo*) and Blackcap (*Sylvia atricapilla*), alongside species undergoing significant declines in their long term breeding distribution, including Corncrake (*Crex crex*), Curlew (*Numenius arquata*), Whinchat (*Saxicola rubetra*), Grey Partridge (*Perdix perdix*), Woodcock (*Scoloplax rusticola*), Lapwing (*Vanellus vanellus*), Red Grouse (*Lagopus lagopus scoticus*) and Redshank (*Tringa tetanus*). Of particular concern since the last National Report, is the status of the Corncrake and Curlew. A recent national survey (2015-2016) showed a 96% decline in the breeding population of Curlew since the 1980s with just 130 breeding birds recorded in Ireland in 2016 [83]. In the absence of action, Curlews are considered likely to go extinct as a breeding species within 5-10 years. In 2017, 140 Corncrakes were recorded in Ireland, representing a 17% decline since 2016 and the third year in a row that the national population has declined [84]. The last report to the CBD also highlighted declines in Hen Harrier (*Circus cyaneus*).

The most recent national survey of Hen Harrier in 2015 suggested an 8.7% decline since the previous survey in 2010 [85].

3.6.27 The state of threatened and vulnerable birds in Ireland can be further put in context by looking at the number of Red Listed 'Birds of Conservation Concern in Ireland', which has seen a 48% increase in between 2008 and 2014 [77]. A total of 37 species are now Birds of Conservation Concern alongside another 91 amber listed species of medium conservation concern. New species now listed as of high conservation concern include: Meadow Pipit (*Anthus pratensis*), Leach's Petrel (*Oceanodroma leucorhoa*), Goldeneye (*Bucephala Clangula*), Long tailed Duck (*Aegithlos Caudatus*), Pochard (*Aythya farina)*, Wigeon (*Anas Penelope*), Velvet Scoter (*Melanitta fusca*), and Dunlin (*Calidris Alpina*). Of the 37 species on the Red List of Birds of Conservation Concern, over half are dependent on farmland habitats at some point during the year. Although the FPS, GLAS and LIFE projects are targeting some species at risk, The Birdwatch Ireland Farmland Bird Index suggests that the prospects for farmland dependent species are currently poor with a -8% decline in the index since 2005 and a 6% decline recorded between 2010 and 2014 [17].

Rationale for assessment of effectiveness

3.6.28 The impact of measures in the NBAP on species has been mixed. Generally, more species are in favourable conservation status than is the case for habitats, but there is of course a dependence of these same species on quality habitats. The continuing loss of higher quality rivers and wetlands has clearly had an impact on the status of some aquatic species, noting also that freshwater habitats are under-represented amongst Protected Areas. There is also a continuing loss of species with a degree of dependence on farmland, despite the improving targeting of AES measures.

😐 **No significant change (i.e. mixed). (Based on partial evidence and monitoring).**

Objective 7. Strengthen international governance for biodiversity and ecosystem services

Target 7.1: Strengthen support for biodiversity and ecosystem services in external assistance

3.7.1 Although **Irish Aid** activities with a primary biodiversity objective represent a small proportion of expenditure, this is increasing (see Figure 3.22). Irish Aid is particularly active in the area of climate change adaptation in developing countries and has prepared a detailed dataset to the DCCAE on its climate financing, including biodiversity as one of four Rio markers.

3.7.4 **Cooperation Across Borders for Biodiversity (CABB)** (2017-2022) is a major new cross-country initiative by Birdwatch Ireland (BWI). CABB is funded by INTERREG VA and brings together the UK Royal Society for the Protection of Birds (RSPB), BWI, Moor for the Future, Butterfly Conservation and Northern Ireland Water, to work in partnership with farmers, landowners, statutory agencies, to improve the condition of SACs and SPAs. The programme aims to produce Conservation Action Plans for eight SACs/SPAs in Northern Ireland, the Republic of Ireland and Scotland and to improve habitats for breeding wading birds such as curlew (*Numenius arquata*), lapwing (*Vanellus vanellus*), redshank (*Tringa tetanus*), snipe (*Gallinago gallinago*), hen harrier (*Circus cyaneus*) and marsh fritillary butterfly (*Euphydryas aurinia*).

3.7.5 **Collaborative Action for the Natura Network (CANN)** is another cross-border EU Interreg project with Northern Ireland and Scotland involving researchers, local authorities, NGOs and community groups working to save peatlands and other wetlands supporting threatened species such as curlew and hen harrier, for example in County Monaghan.

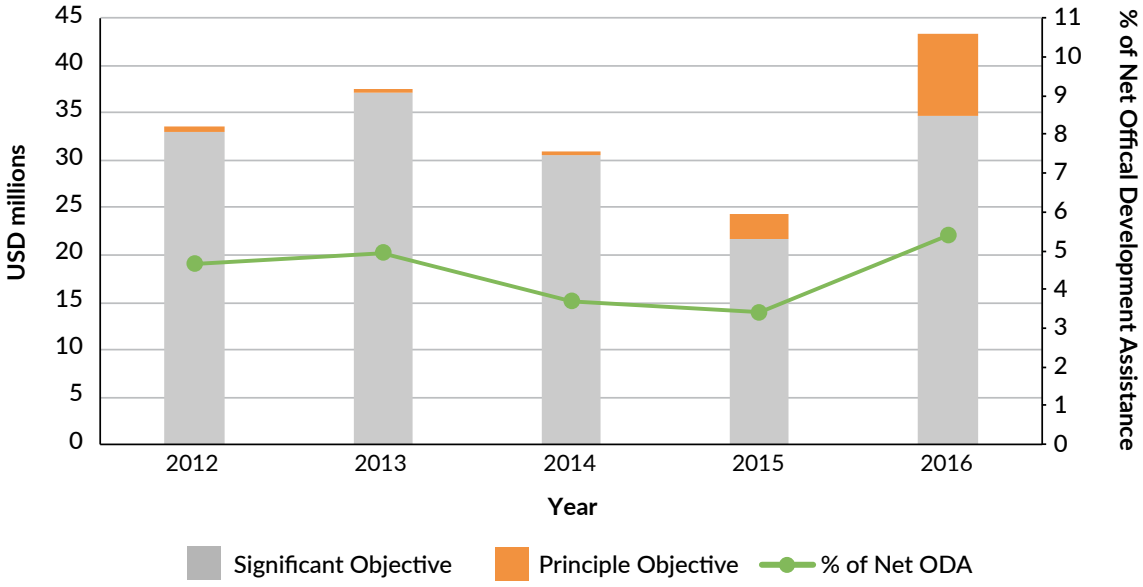


Figure 3.22: National Biodiversity Indicator: Trends in bilateral biodiversity-related aid (in USD millions, constant prices 2015) contributed by Ireland to support CBD objectives.

Principal objectives are those identified which would not have been funded but for the biodiversity objective. Significant objectives have other primary objectives, but have been formulate or adjusted to help meet biodiversity objectives.

Rationale for assessment of effectiveness

3.7.6 Irish Aid has been active in support rural livelihood and climate change initiatives in developing countries, a modest element of which has included secondary biodiversity objectives. In addition, an increasing number of cross-border biodiversity activities are being developed.

😐 **Progress towards target, but at insufficient rate**

SECTION IV

Assessment of progress towards each Aichi target

Target 1: Awareness increased

By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

What is the current level of biodiversity awareness?

4.1.1 In Ireland, social, sports and community issues/causes tend to receive higher attention than biodiversity, both in terms of media coverage and funding. However, many local communities pride themselves on the quality of their local environment as evidenced, for example, by the popularity of National Tidy Towns competition. Biodiversity, specifically, has received rather less attention, but this situation is improving, particularly at local level through local projects.

What awareness raising activities have been undertaken?

4.1.2 The first *National Biodiversity Conference*, was held at Dublin Castle on the 20th/21st February 2019 and brought together over 500 delegates from the public, private, NGO and academic sectors to discuss multi-sectoral engagement for biodiversity, how we manage biodiversity in a the context of climate change, rising populations and agricultural targets, and how we can use the natural capital approach to reveal nature's hidden values. The Conference was oversubscribed. The event was organised by the IFNC and the NPWS, with over 1300 viewers around the world watching via the livestream. Alongside the official presentations, NGOs also showcased their activities, and winners of the Together for Biodiversity Awards for communities and business were announced. The conference social media channels resulted in 1126 Twitter followers, almost 800 Facebook followers and 826 people on the mailing list. The build-up to the conference saw 358,000 tweet impressions and it trended #1 in Ireland over the two days of the conference. It drew considerable media attention, particularly from the National radio and television broadcaster and national print media.

4.1.3 In schools, biodiversity awareness and awards are being promoted by An Taisce, NGOs, the Marine Institute and the Irish Peatland Conservation Council. Biodiversity awareness is being promoted amongst communities through the Green Communities initiative of An Taisce (the Irish National Trust), award criteria in the Tidy Towns competition and small grants made available by the private sector and NGOs. Many local authorities are in receipt of funding from DCHG, EU LEADER and Agenda 21 for specific local projects and run education and engagement projects on the environment, including biodiversity. Most local authorities have Heritage Officers and a few also have dedicated Biodiversity Officers (see 2.1.19). The Local Authority Waters Programme (LAWP) has actively encouraged community engagement with the River Basin Management Plan which draw the link between good water quality, public health and environment quality, including biodiversity.

4.1.4 At the level of information to the general public, the National Biodiversity Data Centre (NBDC) website includes much accessible information on biodiversity and encourages citizen science, e.g. sightings of birds, mammals and butterflies. The organisation also runs an annual BioBlitz week. The website includes information on the All-Ireland Pollinator Plan in which numerous schools, communities, gardeners and farmers participate. The private sector has also been engaged through the organisation Business in the Community and outreach by the Irish Forum for Natural Capital.

4.1.5 eNGOs are often very active in this area and have made an important contribution to spreading awareness of biodiversity through activists and enthusiasts to the wider community in relation to natural environments such as wetlands and woodlands, as well as birds, bats, whales and dolphins. A total of 26 eNGOs are represented by the Environment Pillar which inputs into sustainability policy.

How effective have awareness raising activities been?

4.1.6 National Indicator A2.1 lists responses from the 2015 Eurobarometer, a summary of which is given in Figure 4.1 below. Almost one third (32%) of people surveyed by the 2015 Eurobarometer feel either "well informed" or "very well informed" of "loss of biodiversity", although the results indicate a perception of slightly less concern about biodiversity in people's local area (see 3.3.1). The evidence suggests a rather unchanged situation from previous year, but one not dissimilar to that for the rest of the EU. The figures do indicate the need for further awareness campaigns given that two-thirds of people *do not* feel well-informed. Furthermore, a similar survey by the Heritage Council found that while a majority of people do believe biodiversity loss to be a problem, only a minority think that it will impact on them personally. The profile of biodiversity in Irish media, and of related issues such as climate change or the natural environment in general, could be much higher.

Indicators:

Figure 4.1: National Indicator A2.i: Responses to a subset of questions from the EC Flash Eurobarometer survey conducted on 1,000 people in Ireland in 2007, 2010 and 2013.

4.1.7 **Other indicators:**

- National Biodiversity Indicator A.2.vi: Number of Irish-based searches for biodiversity-related key words using Google. See Figure 3.6
- National Biodiversity Indicator A.2.vii: Number of school and communities visiting NPWS Education Centres. See Figure 3.7
- Cumulative number of schools awarded a Biodiversity Flag in the An Taisce Green Schools programme: 2011 = 10, 2012 = 150, 2013 = 285, 2014 = 445, 2015 = 600.
- 140 communities have entered the NBDC Special Pollinator Award.
- 67 companies have signed up to make their premises or products more pollinator friendly.
- Frequency of use of biodiversity-related key words in print media. Number of articles 2010 = 2550, 2011 = 2010, 2012 = 2,700, 2013 = 2,600, 2014 = 2,200.
- Awareness spending as a proportion of total biodiversity expenditure = 4.6% [3].

Global impact

4.1.8 Awareness programmes are nationally focused. However, the Irish RTE television series Ireland's Deep Atlantic, produced by Sea Fever productions, and the Secret Life of the Shannon, produced by Crossing the Line, have won various awards and been sold to numerous countries, raising awareness of this unique aspect of Irish natural heritage.

Sustainable Development Goals

4.1.9 Specifically Goal 4: Quality Education (environment education in schools, e.g. An Taisce programmes), but also for all other SDGs including Goal 11: Sustainable Cities and Communities (community environmental programmes), Goal 12: Responsible production and consumption (awareness of implications of consumption patterns). There are links with other national Government and NGO campaigns and media, e.g. food health, climate change, recycling.

Verdict

4.1.10 Some progress, but much work to be done.

Target 2: Biodiversity values integrated

By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems

To what extent has your country integrated biodiversity and ecosystem service values into sectoral and development policies strategies and planning processes?

4.2.0 A Biodiversity Working Group, consisting of representatives from Government Departments and Agencies, has been established to improve consideration of biodiversity within sectoral policy. Sectoral policies do consider sustainability and often include measures to support biodiversity. However, it would not yet be true to say that biodiversity has been adequately integrated into development strategies and measures to support biodiversity typically remain peripheral to core Departmental policies in most cases. Recognition of ecosystem services remains poor even in those sectors with a high dependence and biodiversity measures generally involve mitigation of mainstream activities, often in response to EU Directives. The situation in spatial planning is somewhat better as County Development Plans include an environment chapter with varying consideration given to biodiversity. However, rather few Local Authorities possess a Biodiversity Officer.

How many sectoral plans have you developed that explicitly include biodiversity considerations?

4.2.1 Sectoral plans are typically subject to SEA and generally include sustainability considerations. Overt consideration of biodiversity is most apparent in the natural resource sectors, for example forestry, and also agriculture, marine and water, although measures here are often supporting other objectives rather than being directed at the protection of ecosystem services. Programme or large-scale project design is subject to consultation, but has often been confined to Statutory Consultees, potentially excluding critical, but also constructive, impact from NGOs.[59] The European Common Fisheries Policy (CFP) and Marine Strategy Framework Directive (MSFD) have adopted an ecosystem approach, although currently more focused on fish population dynamics than fundamental ecosystem processes. Planning around green infrastructure is receiving serious attention among some, if not all, Local Authorities. In some sectors, for example, climate change adaptation and flood management, there is a need for more tangible consideration of biodiversity and investment in ecosystem services (see Sections II and III).

Does your country have a system of environmental-economic accounting or a framework for integrating statistics on the environment and its relationship with the economy?

4.2.3 Ireland's Central Statistics Office (CSO) has recently developed a first set of environmental and natural capital accounts and is working towards a System of Environmental Economic Accounting (SEEA) in line with EU objectives (see 3.1.2).

59 *Pers comm:* various eNGOs consulted.

Is biodiversity integrated into environmental assessment, SEA policy and application?

4.2.4 Appropriate Assessment is a requirement where Natura habitats are potentially impacted. More widely, biodiversity assessment has been integrated into environmental assessment and application. SEA practice is improving. It is recognised that consideration of alternatives, and the monitoring of environmental indices and mitigation outcomes could improve, but this is true of other EU States too [4-6]. More attention also needs to be given to how negative biodiversity trends can be reversed rather than impacts mitigated. Potential impacts on biodiversity are routinely considered within project scale EIA where projects qualify under the type or size for EIA.

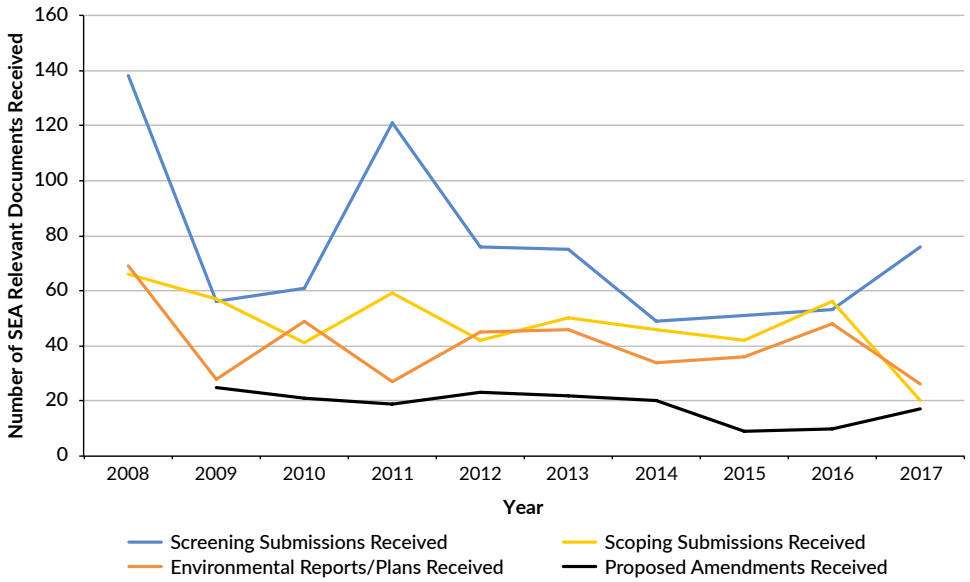


Figure 4.2: National Indicator E1.viii: Responses to consultation in Strategic Environmental Assessment

What valuation studies have been undertaken relevant to biodiversity and ecosystem services?

4.2.5 A National Biodiversity Expenditure Review was undertaken by NPWS and IRC in 2017 using the BIOFIN method. Within the last ten years economic valuation studies relevant to biodiversity and ecosystem services have been undertaken of the following natural environments: freshwater, forests, peatlands and cold water marine reefs. These studies have helped to inform decision making. BOGLAND (UCD) informed the National Peatland Strategy on peatland's public good value. The studies of forest values (UCD, UCC) have confirmed the public good value of afforestation including the relative value of biodiversity measures and species mix, while studies of native woodland values have been used for advocacy of greater native species planting, including for ecosystem service benefit. Studies of water values (NUIG) have also provided public good values for Good Environmental Status as required by the EU Water Framework Directive (WFD). Studies of angler preferences (ESRI, NUIG, UCD) have informed IFI strategy and catchment management. The EU OPERAs study has provided guidance on a methodology for the Ecosystem Service Approach to inform spatial planning (see Section II).

To what extent has your country spatialized data on biodiversity and biodiversity values been relevant to national development plans?

4.2.6 Valuation studies, such as those above, have informed the initial stage of the Mapping and Valuation of Ecosystem Services (MAES) in Ireland as required by the EU Biodiversity Strategy. They have also informed Irish input to IPBES guidelines on diverse values of biodiversity.

4.2.7 ### Other indicators:

- National Indicator E.1.viii: Sectoral breakdown of SEAs undertaken 2008-19. See Section III 3.1.8
- National Indicator E.1.viii: Sectoral breakdown of SEAs undertaken 2008-2019. See 3.1.9
- Number of Biodiversity Officers in Local Authorities = 4. Heritage Officer with biodiversity responsibility = 28, Officer with another role including biodiversity = 3. Total LAs = 31
- Integration spending as a proportion of total biodiversity expenditure = 0.2%. [3]

Global impact

4.2.8 Biodiversity is included as one of four Rio markers in the evaluation of Irish aid spending and has been a particular feature of actions on climate change mitigation and adaptation.

Sustainable Development Goals

4.2.9 Particular contributions to Goal 3: Sustainable health and well-being, Goal 6: Clean Water and sanitation, Goal 11: Sustainable cities and communities, Goal 13: Climate action, and Goal 16: Peace, justice and strong institutions.

Verdict:

4.2.10 Increasing consideration being given to biodiversity, but this is often peripheral to principal Departmental policies and falls short of integration, including for ecosystem services.

Target 3: Elimination, phasing out, or reform of incentives, including subsidies, harmful to biodiversity

By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions

Is there a general recognition by government officials and/or industry of the need to remove subsidies that are harmful to biodiversity?

4.3.1 There is a recognition of the need to remove incentives that are contrary to sustainability and, by extension, biodiversity. Much of the impetus for this objective is founded on the need to conform

with EU Policy and Directives, particularly in relation to greenhouse gas emissions (GHG). Total state transfers in 2016 were €772m with most subsidies now paid to renewable energy (€267m) and wastewater management (€210m), much of which is protecting the environment, including biodiversity, from adverse impacts. Direct protection of biodiversity and landscape itself received a transfer or €142m. Due to the increasing spend on renewable energy, the relative size of 'resource management transfers' has increased to a point that is now almost equal to 'environmental protection transfers' [7].

What harmful incentives, including subsidies, are eliminated or being eliminated, or will be phased out or reformed?

4.3.2 Table 4.1 shows how incentives which have an overt negative impact on biodiversity have greatly diminished. The main remaining subsidies are domestic energy allowances. By comparison, although agricultural subsidies still represent a significant proportion of the EU budget, these have been decoupled from production since 2005 and subsidies for activities such as land clearance and reclamation phased out. In 2016, direct payments accounted for an average of 75% of farm income [8] with the principal subsidy being the Basic Payment Scheme to which all farmers are entitled. The BPS is calculated on the basis of farm area and includes a requirement to keep the holding in 'Good Agricultural and Environment Condition', although there continue to be instances of loss of hedgerows and clearance of scrub habitat, the latter sometimes to avoid any loss of area eligible for forage payments.[60] The scale of the BPS transfer provides an opportunity to do more to ensure no net loss of biodiversity. Forest grant payments are still available, but environmental criteria have been tightened. Subsidies in the fishing sector were once available for purchases of trawlers, but were subsequently largely replaced with payments for decommissioning. Most transfers from the European Maritime Fisheries Fund are now directed at support services such as fish quality, hygiene, safety, etc. Significant transfers are being made to aquaculture which moderate the cost of capital investment, but issues have arisen with environmental compliance.

4.3.3 A subsidy (currently €118m [9]) to ensure that milled peat is competitive with other fuel uses is paid for purposes of security of supply.[61] This peat is produced by existing worked bogs whose biodiversity value has already been compromised. The semi-state peat company, Bord na Mona, has recently reiterated its intention to move out of peat production by 2030 and to rehabilitate its worked bogs [10, 11]. In the transport and industrial sectors, fuel and energy tax rebates are still available, providing social and economic benefits, but potentially encouraging excess use with implications for greenhouse gas emissions and consequently for climate change and biodiversity.

The greater issue now is the failure to capture the full social cost of the impact on biodiversity of sectoral activities. This represents a de-facto subsidisation. Hence, the social cost of clearance of local habitats for development is not realised by the building sector. The social cost of water pollution is not fully realised by the agricultural sector. The social cost of biodiversity loss and greenhouse emissions is not realised by the peat cutting sector (businesses and private individuals).

What positive incentives for biodiversity are being developed and implemented?

4.3.4 The principal examples of payments for ecosystem services to date are those paid out under the GLAS and other recently trialled agri-environmental schemes (AES). Otherwise, positive incentives are mainly represented by grants or other payments to encourage environmental management of

60 Reference: Position statement Birdwatch Ireland February 2014.
61 Public Service Obligation subsidy.

Natura sites (NPWS), woodland restoration (DAFM-FS) or responsible fishing (DAFM).

4.3.5 **Indicators**: Trends in environmentally damaging subsidies

Expenditure demonstrates a gradual reduction in most subsidies over time. There have been rises in cattle and peat subsidies where returns to producers are dependent on relative market price, including the price of alternative fossil fuels in the case of peat.

Programme	2000	2010	2011	2012	2013	2014	2015	2016
Agri production subsidies: cattle	632,700	31,641	30,794	28,524	9,350	28,820	43,217	55,900
Agri production subsidies: sheep	133,600	–	–	–	–	–	–	–
Agri production subsidies: cereals	99,700	194	241	13	–	–	–	–
Agri product subsidies: other	9,900	–	–	–	–	–	700	–
PSO: elec generation from peat	–	78,200	41,597	94,178	94,800	119,000	121,900	115,400
PSO: security of electricity supply	–	14,000	20,739	42,191	61,000	104,700	47,300	–
Fuel allowance (consumers)	66,450	222,062	261,615	211,394	228,141	217,731	214,222	230,921
Electricity allowance (consumers)	47,036	171,589	179,251	176,733	161,048	154,551	149,572	150,729
Gas allowance (consumers)	2,182	19,982	20,716	20,615	16,299	21,815	18,752	19,193
Other supplements (inc heat, diet)	5,323	6,701	6,383	5,624	–	4,062	3,690	3,347
Coal allowance (consumers)	–	6,601	4,224	–	–	–	–	–
Fishing Fleet Investment	8,797	–	–	–	–	–	–	–
Petroleum Infrastructure support	378	5,227	1,105	1,105	70	280	4,297	191
Haulier's diesel rebate	–	–	–	–	700	21,100	13,100	1,300
Marine diesel tax relief	–	–	–	100	200	100	–	–

Table 4.1: Potentially environmentally damaging subsidies 2000-2016, €'000s (source: CSO, 2018)

Global impact

4.3.6 Subsidies to livestock producers and fossil fuels contribute to greenhouse gas emissions and so make an adverse contribution to climate change and indirectly on global biodiversity. However, this should be compared with annual transfers of around €370m to alternative energies and €100m to energy saving (see Figure 3.2).

Sustainable Development Goals

4.3.7 Contribution to Goal 12: Responsible production and consumption.

Verdict

4.3.8 Good progress on removal of incentives that are harmful to production, but more limited progress of payments for ecosystem services outside of agriculture.

Target 4: Sustainable production and consumption

By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits

What actions have been taken to reduce the impact of production sectors on biodiversity?

4.4.1 Actions have been taken to reduce the impact of agriculture, aquaculture, forestry and fishing on biodiversity as discussed below under Target 4 and 6. These have, for example, reduced the impact of agriculture on specific habitats, but have struggled to mitigate the impact on biodiversity of broader trends towards continued intensification of production. Past poor environmental practice in aquaculture and forestry has been replaced by improved environmental management. Adverse impacts on the marine environment due to fishing have been reduced. Sensitive areas are being mapped and prospective Marine Protection Areas identified. However, this follows a long period or over-exploitation of fisheries and environmental damage with the marine environment remaining vulnerable due to the limited knowledge that we have of marine habitats and species vulnerability and movement.

4.4.2 Large scale plans and programmes are subjected to biodiversity assessment within SEA and projects to EIA. Sustainability is improving waste management with incentives now in effect to minimise waste and increase recycling, although single-use plastic products are ubiquitous and the recycling of plastics (which have a biodiversity impact through marine litter) is below that of other products.[12] Measures are being taken to reduce or compost food waste, but this remains excessive. Car dependency is high given dispersed settlement. Rural household energy use is high by European standards and largely oil-based due to the nature of the housing stock. The total share of renewable energy was only 9% in 2015 and below the 16% target of the EU Renewable Energy Directive, but in electricity it was 24% and increasing [13]. However, planning permissions for wind turbines have become more difficult to obtain in advance of new legislation. Bird sensitivity mapping has been provided by Birdwatch Ireland and is informing site selection, although this information is not routinely used for other land uses such as forestry.[62]

To what extent has Ireland operationalized the concept of safe ecological limits and applied this concept to ensure that sustainable harvest levels are met for forestry, fisheries, agriculture and grazing sectors?

4.4.3 Marine fisheries are now being managed using an Ecological Approach and with consideration of maximum sustainable yield (MSY), although 22% of commercial stocks remain below MSY, though below recovery thresholds. Ireland's largely grass-based farming system produces the lowest greenhouse gas emissions for dairy and the fifth lowest for beef in the EU. However, there are proposals to increase agricultural output, including a 50% increase in dairy (see Section II). It is acknowledged that, in this context, nutrient and livestock management are unlikely to deliver emission reductions and pressures on water quality and possibly habitat are likely [14]. In all economic sectors, production objectives and pressures which have a potentially negative impact on biodiversity mean that biodiversity-related measures are often relegated to mitigation.

62 https://www.birdwatchireland.ie/portals/0/POLICY/Guidance_document.pdf

To what extent are biodiversity and ecosystem service values incorporated into organizational accounting and reporting in your country?

4.4.4 The Government through the Central Statistics Office (CSO) is developing new environmental accounts in line with EU objectives and natural capital and ecosystem services mapping and assessment has also been initiated by DHCG. Corporate natural capital accounting is only beginning to be used in Ireland, for example by Coillte, but the business sector is becoming aware of these accounting formats through the IFNC. Many businesses do have corporate sustainability plans, including semi-state companies, manufacturers and retailers. Sustainability is promoted by Bord Bia, the food marketing agency, and Failte Ireland, the tourism authority, among other State Agencies.

Global impact

4.4.5 Improvements in the management and supports available to sea fisheries are contributing positively to the sustainability of Atlantic fish stocks compared with poor past performance. Improvements in waste management, wastewater treatment and initiatives in the fishing sector, have the potential to increase plastic recycling and reduce the incidence of marine litter.

Sustainable Development Goals

4.4.6 Contribution to Goal 12: Responsible production and consumption, Goal 14: Life below water and , and Goal 15 Life on land.

Verdict:

4.4.7 Progress is being made on moves to sustainable production and consumption, but more needs to be done to ensure that sustainability is adopted in practice within consumer behaviour and by Government Departments.

Target 5: Reduce loss of natural habitats

By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

What is the current rate of habitat loss and fragmentation

4.5.1 National monitoring of semi-natural terrestrial habitat area is focussed on habitats listed on the Habitats Directive. Wider land cover statistics suggest a loss in semi-natural areas and peatland, and an increase in agricultural areas and forestry between 1990 and 2012. Of particular concern are the loss of semi-natural grasslands In Ireland turbary and mechanical cutting have resulted in a 47% loss of peatland habitats. Ireland has a rather low level of habitat connectedness and a correspondingly high level of habitat fragmentation based on international indexes (see 3.6.15 & 3.6.16), although one indicator does suggest some slight recent improvement in connectedness.

What actions have to be taken to reduce habitat degradation and fragmentation?

4.5.2 There has been an 18% increase in the area protected under the Natura 2000 Network since 2010. There has also been an increase in the proportion of SACs with site-specific conservation objectives (SSCOs) and an acceleration in the number of Protected Areas subject to SIs, although this number still only accounts for 48% of SACs. Some habitats are well represented (see Section 3.6.12) and others less so, including many freshwater and marine habitats. To an extent, the condition of freshwater habitats is addressed by the objectives of the EU WFD. Steps are underway to extend the area of MPAs as required by the MSFD [15]. However, more action needs to be made to protected marine and freshwater habitats from degradation.

4.5.3 The Forest Service (DAFM-FS) has worked closely with Woodlands of Ireland, NPWS, the Heritage Council, IFIs and other stakeholders in implementing the Native Woodland Scheme. Recent policy documents have also demonstrated an official recognition of the value of native and riparian woodland for protecting water quality and for catchment management. However, there remain only 100,000ha of true native woodland and small pockets of ancient woodland [16]. Many of these woodlands are being impacted by invasive understory species and browsing by deer. While some actions are being taken to address these pressures, they can be intractable outside of well-managed commercial woodlands. See 3.4.11 for National indicator B.6.iii: Area of broadleaf and native woodland. The CTCSS scheme, in combination with projects such as the EU Raised Bog LIFE (1 and 2) and the Living Bog LIFE project, are working to protected and restore Raised Bog habitats across Ireland. The IPCC has a long standing programme of bog restoration and protection to try to reverse trends in peatland degradation and fragmentation.

Global impact

4.5.4 Habitats in Ireland have a significant contribution to the well-being of species, particularly for species which winter in Ireland such as geese from Arctic breeding grounds under pressure from climate change, and for marine species, for which Ireland possesses important breeding colonies.

Sustainable Development Goals

4.5.5 Principal contribution to Goal 14: Life below water, and Goal 15: Life on land.

Verdict:

4.5.6 Good progress in terms of improving the coverage of Protected Areas, but the status of protected habitats has worsened. Positive policy direction in relation to native woodlands, but area is small and significant pressures remain.

Target 6: Sustainable management of marine living resources

By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Does Ireland have regulations or policies to protect vulnerable marine habitats?

4.6.1 The marine environment has been effected by a range of impacts, in particular the selective extraction of species which have an important niche in the ecosystem, damage to the sea bed by fishing gear, and marine litter. Acoustic survey work could be having an, as yet, undefined impact on marine mammals. Climate change appears to be affecting the distribution and breeding of some fish, e.g. whiting (Micromesistius poutassou) and mackerel (*Scomber scombrus*), birds, e.g. puffin (*Fratercula arctica*), and possibly cetaceans [17]. Abrasion and smothering by fishing vessels is known to have impacted on reefs and maërl beds [18].

4.6.2 The Habitats Directive lists 7 marine habitats and 4 species for which marine site protection in required. Six new marine SACs have been designated since 2011. The EU Marine Strategy Framework Directive includes protection and conservation of marine biodiversity as one its main goals. A large-scale mapping project is currently underway that will provide information on vulnerable habitats and inform the siting of new off-shore developments. This is complemented by recent on on-going survey work on cetaceans, marine birdlife and specific habitats such as cold water coral reefs (see Objective 5, Sections II and III). Ireland has committed to the establishment of Marine Protected Areas (MPAs) under the MSFD.

Does Ireland have regulations or policies to protect threatened fish species?

4.6.3 The EU Common Fisheries Policy has aimed to adhere to the principles of MSY since 2017 by setting an appropriate Total Allowable Catch (TAC). Fisheries are managed using an Ecosystems Approach that aims to keep stocks within safe biological limits. Past over-fishing means that some species remain below safe-biological limits and require long-term recovery strategies. Around 22% of stocks are below MSY, although the total biomass of commercial fish and shellfish in the Celtic Sea has been recovering since the period of highest fishing pressure in 1998 and are now above the trigger point at which recovery would be impaired. Inshore fishing, including for crustaceans and shellfish, is not subject to TAC, but species are subject to national limits. Inshore Fisheries Forums are being promoted to engage stakeholders.

Does Ireland have regulations or policies to protect threatened non-target species?

4.6.4 By-catch remains a problem, but is being minimised by new landing obligations for some stocks to ensure that all fish caught are counted against quota. Technology is being used to reduce by-catch complimented by recent trials of gear selectivity and acoustic deterrents, e.g. for Albacore tuna. Several species on the OSPAR list of threatened or declining species remain vulnerable to by-catch, in particular spurdog (*Squallus acanthias*), skate (*Dipturus spp.*) and deep water sharks.

How sustainable are the fishing techniques used?

4.6.5 Equipment is subject to an Environmental Management System (EMS) and Responsibly Sourced Standards. Landings and gear are inspected by the Sea Fisheries Protection Authority (SFPA). Landing Obligations are reducing the incentive to catch excess or non-target species. Abrasion of the sea bed is thought to have reduced by 35% between 2003-2012. In addition, to protect deep water corals, an EU deep sea trawling ban applies below 800m for rolling gears [19]. The establishment of MPAs will remove bottom trawling from these waters too. This trawling has already been banned in some nearby European waters fished by Irish vessels.

4.6.6 **Indicators**:

Marine litter: Reducing trend based on beach surveys, but with increased representation of non-degradable plastics.

Fishing: 15 out of 26 commercial species are below MSY.

Global impact

4.6.7 Improvements in the management and supports available to sea fisheries are contributing positively to the sustainability of Atlantic fish stocks.

Sustainable Development Goals

4.6.8 Contribution to Goal 12: Responsible production and consumption, and Goal 14: Life below water.

Verdict:

4.6.9 Improving situation for marine knowledge, but from a low base. Improving situation for marine fisheries, but significant actions remain to improve the status of many fish stocks. Generally positive status for marine mammals, but a decline in some sea bird species and future threats to biodiversity including from climate change.

Target 7: Sustainable agriculture, aquaculture and forestry

By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity

a) Agriculture

To what extent have unsustainable practices in agriculture been responsible for substantial environmental degradation, including biodiversity loss?

4.7.1 Agriculture accounts for 63% of land use in Ireland or 4.3m ha. Over the past 30 years agriculture has been transformed with significant changes in the intensity and specialisation of production which have been accompanied by losses of habitats such as small wetlands, species-rich grassland and hedgerows. These changes have had a major impact on species dependent on lower intensity or mixed farming such as corncrake (*Crex crex*), corn bunting (*Emberiza calandra*) and grey partridge

(*Perdix perdix*) which are now very localised or lost from Ireland [20]. There have also been significant local losses of insects, including bees and butterflies.

To what extent is the area classified as agriculture managed sustainably, ensuring conservation of biodiversity. Is there spatial data to support this assessment?

4.7.2 A large number of farmers have voluntary entered into the GLAS agri-environment scheme (AES) since its launch in 2015. AES represents the best example of Payment for Ecosystem Services (PES) in Ireland, although it also has social objectives in supporting the incomes of farmers on more marginal lands. There is reason to believe that GLAS is having a positive environmental impact, although this has still to be confirmed by monitoring. However, landholdings not in GLAS account for 79% of the farm area and are subject to rather mild environmental constraints and greening measures. Data on land use at the level of individual landholdings exists, but is not freely available for environmental evaluation.

What measures, including changes to land use and resource management policies, are in place to ensure the sustainability of agriculture?

4.7.3 GLAS is more targeted than previous AES and so should be having a more positive impact on biodiversity. In addition, new Results-based AES and Locally-Led programmes are being trialled and are expected to have distinct positive impacts. At present, only a small proportion of landholdings are enlisted in the latter schemes. There remain only a handful of schemes to attract dairy or tillage farmers in more productive parts of the country where biodiversity clings onto remnant habitats, but has the potential to be enhanced. Approximately 7% of this farm area is made up exclusively of wildlife habitat [21].

How effective are these measures?

4.7.4 The design and targeting of AES are improving and positive biodiversity impacts should result over time. Wider trends towards excessive fertiliser application and the loss of meadows, scrub and hedgerows has been moderated (but not eliminated) for farms outside of AES. The drainage of wetlands has reduced, but existing arterial drains continue to be maintained. There is still a continuing loss of bird and insect species associated with less intensive agriculture, including pollinators (decline in bees of 14.2% 2012-1763) and once common birds such as curlew (*Numenius arquata*) and lapwing (*Vanellus vanellus*). Policy initiatives for more intensive farms and stronger environmental criteria in relation to the Basic Farm Payment could address the continuing decline in wildlife in the wider countryside.

Where are the most important opportunities for promoting sustainable management of agriculture?

4.7.5 Some prescriptive measures included in AES could be improved. There are inconsistences between what qualifies eligible farm area and AES payments for areas covered by scrub, hedgerows or trees.[64] An extended roll-out of results-based and locally-led schemes should provide biodiversity dividends. This includes a move away from measures directed at individual farms to landscape scale schemes that can support species with large territories or provide resilience against climate change. A positive move would involve agri-environmental policy going beyond simple conservation or supports for less

63 http://www.biodiversityireland.ie/press-release-as-world-bee-day-may-20th-approaches-new-research-shows-irish-bumblebee-populations-are-still-in-decline/

64 Pers. Comm: various sources.

intensive production, to measures that improve habitat quality, enhance or even create new habitat. There is also a need to develop schemes to attract more intensive farms, particularly noting higher policy objectives to greatly increase agricultural output.

4.7.6 **Indicators**

Reduction in range or population decline of 50% in 25 years for Red-listed species associated with a dependence on particular farmland habitats, i.e. yellowhammer (*Emberiza citinella*) (*cereal farming*), twite (*Carduelis flavirostris*) (upland mixed farming), barn owl (*Tyto alba*) (mixed farming), corncrake (*Crex crex*) (hay meadows, nettle patches), grey partridge (*Perdix perdix*) (mixed farming), lapwing (*Vanellus vanellus*) (damp meadows), curlew (*Numenius arguata arquata*) (lightly grazed uplands). Significant losses of calcareous grassland, Molinea grassland and hay meadows of over 27% since 2007-2012 [22].

4.7.7 **Verdict**

Improving situation, but much more needs to be done to improve coherence of agricultural and agri-environmental policy, and to extend results-based schemes, to halt continuing biodiversity losses.

b) Forestry

To what extent have unsustainable practices in forestry been responsible for substantial environmental degradation, including biodiversity loss?

4.7.8 Just over half of the forest estate was planted before 2000 and at least 30% is single species monoculture, typically non-native Sitka spruce. These areas were planted at a time when more limited environmental criteria applied and are of low biodiversity value. Grant-aided planting also occurred on raised or blanket bog that was itself of biodiversity value, even though the plantations had poor productivity. Upland planting is likely to have contributed to losses of bird species such as hen harrier (*Circus cyaneus*) and curlew (*Numenius arquata*). Planting on protected habitat is no longer supported, but most forestry is replacing low intensity grassland which could have an ecological value, especially at a landscape level.

To what extent is the area classified as forestry managed sustainably, ensuring conservation of biodiversity. Is there spatial data to support this assessment?

4.7.9 Spatial data is available from the National Forest Inventory. Almost 11% of Ireland is now under forestry. Grant-aided forestry, since the 1990s, has been subject to more sustainable criteria and management. Over time, younger plantings, representing 44% of the forest estate, will replace older areas and the level of sustainability will improve. New plantings are subject to more detailed environmental assessment and harvesting requirements and have included a higher proportion of broadleaf or native species. The Felling and Reforestation Policy, introduced in 2017, and new Reforestation Objectives, provide the basis for forest harvest and restructuring post-clearfell, to incorporate protective buffers and open spaces.

What measures, including changes to land use and resource management policies, are in place to ensure the sustainability of forestry?

4.7.10 Planting is being supported by policies which are providing for more sustainable forestry. These include measures to ensure that planting cannot take place within Natura sites unless agreed by NPWS. To increase the biodiversity value, there is a requirement that new planting consists of 15% by area of broadleaf species, including commercial plantations dominated by other species. The principal Afforestation Scheme offers higher grants and premiums for broadleaves and agroforestry. While the grants themselves reflect the higher cost of establishing broadleaves, they also provide a real incentive to plant broad-leaves relative to conifers. In addition, there are measures to rehabilitate existing native woodlands, to promote 'close-to-nature' silviculture, improved thinning to benefit ground flora, and to enhance local woodlands for leisure use. Other measures set aside areas for biodiversity enhancement, provide buffer zones to protect watercourses, protect against the spread of IAS, and ensure that forestry does not compromise protected habitats or species, including hen harrier and freshwater pearl mussel. Activities such as forest road works, tree felling and aerial fertilisation are regulated to provide for more sustainable forest management.

4.7.11 Most trees planted commercially are non-native softwoods. These species tend to be of lower, if not zero biodiversity value. Commercial conifer plantations are subject to the same environmental requirements as discussed above. Furthermore, permanent forest removal is being permitted in some areas where planted land is returned to blanket or raised bog with the support of EU LIFE funding. Native tree species now comprise 27% of the forest estate and have higher biodiversity value and 16% of the forest area can be described as native woodland (>80% native species){37]. Only 20,000ha is considered to be ancient woodland of the highest biodiversity value. Around 15% of the estate managed by the state forestry company Coillte is managed specifically for biodiversity. NPWS also has a woodland restoration programme in its National parks and Nature Reserves, some of which contain the best examples of native and ancient woodland in Ireland.

How effective are these measures?

4.7.12 Inappropriately located forestry was identified as a significant pressure for peatlands in the Habitats Directive Article 17 report [1] and on water quality, soils and biodiversity in the EPA State of Environment Report [23]. Forestry is listed as a significant pressure on at-risk waterbodies under Ireland's RBMP, and as the main pressure within 'at risk' high status waterbodies. Over time, more sustainable management requirements should reduce these adverse effects and provide a larger area of native species or habitat. Furthermore, recent requirements rule out afforestation on more sensitive habitats and landscapes. Although the amount of broadleaf planting is increasing, native oak and alluvial woodlands are of bad status and the majority of the planted area is likely to remain under non-native conifers. This should have a neutral biodiversity impact given that planting is subject to restrictions in Natura sites or other areas of value to Annex I species. However, given the level of ecological assessment prior to planting, it is unclear whether some forestry is continuing to replace areas of potential biodiversity value. Loss of semi-natural habitat is an issue given the corresponding agricultural intensification of more productive land.

4.7.13 Moves to sustainability are challenged by problems that need to tackled, in some cases more vigorously. The spread of the disease Chalara, or ash dieback, is a major concern given the dominance of ash as a native tree of the Irish landscape. The spread of invasive rhododendron is continuing to have a significant impact on woodland biodiversity and regeneration. The impact of deer on tree

regeneration is a serious concern even though steps have been taken to manage deer numbers. Fire is a growing threat in upland habitats and could become worse due to climate change.

Where are the most important opportunities for promoting sustainable management of forestry?

4.7.14 Although the requirement that 15% of forest plantations should consist of broadleaves is a positive, this still means that 85% is comprised on tree species which make a low contribution to biodiversity. Requirements in relation to buffer strips and area of biodiversity enhancement do, however, enhance this position, as does thinning of conifers as they begin to mature. Strategically, there is the question of whether reliance on monocultures of a fast-growing, low value crop meets social and environmental needs, although most planting now comprises replanting of existing areas. An opportunity now being taken up, in cooperation with other state bodies, is to plant new areas and manage forests in line with catchment management for ecosystem service benefits such as water quality and flood mitigation. The FS-DAFM cannot compel landowners where to plant, but increasingly, areas suitable for forestry are being identified at a landscape or county level. Related to this is have been actions to promote more pro-active expansion of the existing engagement via groups of landholders who are willing to plant an appropriate species mix in areas that are of potential value for biodiversity, amenity and adaptation to climate change, and water management.

Indicators

4.7.15 Increase in planting of native tree species to 27%.

Verdict

4.7.16 An improving situation, but one which needs to be supported by the strategic identification of areas or landscapes most suitable for planting.

c) Aquaculture

To what extent is the area of aquaculture managed sustainably, ensuring conservation of biodiversity?

4.7.17 Although there are some fish farms across the country rearing trout, aquaculture in Ireland is predominantly coastal. Over 47,000 tonnes of produce was produced in 2017. Farmed aquaculture products include mainly salmon, mussels and oysters, although there are on-going efforts to develop other fin fish too. Aquaculture has been implicated in various adverse environmental impacts. For example, the original importation of the Pacific Gigas oyster (*Crassostrea gigas*), which was thought to be unable to spawn in cold Irish waters, has resulted in feral populations that, along with associated pathogens, has placed pressure on the native oyster population (*Ostrea edulis*). In addition, aquaculture presents a risk of eutrophication of transitional waters, escapes of farmed salmon and lice infection of wild salmon (*Salmo salar*). However, management of aquaculture has improved.

What measures are resulting in positive changes?

4.7.18 Aquaculture is subject to licensing and EIA which, in principle, must address cumulative impacts in Protected Areas or areas with low tidal influence. The Coordinated Local Aquaculture Management System (CLAMS) seeks to ensure that stakeholders are represented in a single bay management system.

This process has been complemented by an environmental management system (ECOPACT) which encourages producers to adhere to codes of best practice. The European Maritime and Fisheries Fund (EMFF) Biodiversity Scheme (2014-2020) provides support for fisheries and aquaculture compliance with the Habitats Directive. In addition, the uptake of organic farm certification has been high. However, Ireland still has no quarantine facility and there is insufficient evidence of the follow-up monitoring of aquaculture applications.

What challenges remain?

4.7.19 The principal pressure facing biodiversity in areas subject to aquaculture comes from government targets to double output. Many farms are located in or beside coastal Protected Areas. In principle, EU and State funding provides major leverage to ensure good environmental management. However, notification of license applications or of forthcoming EIA or AA is often limited to the geographical area in which a development is to occur and resources for monitoring are limited. The facilitation of third party submissions into sectoral policy and licensing applications has often been inadequate. The draft Marine Spatial Plan represents a positive development, but arguably Ireland could be doing more to promote biodiversity protection given the natural marketing advantage offered by its Atlantic seaboard.

Verdict: Aquaculture

4.7.20 Situation would appear to have improved, but greater transparency and more evidence is needed.

Overall Target 7 Global impact

4.7.21 Positive developments in agriculture and forestry will support birds that breed or winter outside of Ireland. Aquaculture impacts are predominantly national, but has capacity to affect some migratory species such as salmon. All sectors have influence on standards set internationally.

Overall Target 7 Sustainable Development Goals

4.7.22 Influence on Goal 6: Clean water and sanitation and on Goal 14: Life below water. Contribution to Goal 12: Responsible production and consumption, and Goal 15: Life on land.

Target 8: Pollution Reduced

By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity

Which pollutants are concerns in Ireland?

4.8.1 Probably the most pressing impact on the natural environment in Ireland is the eutrophication of river, lake and estuarine waterbodies due to nutrient pollution from nitrogen and phosphorous loads. Significant sea pollution is mainly limited to occasional incidents. Marine litter is a problem with plastic consumer and fishing waste being the principal items, although the problem is less severe than for other seas such as the North Sea [24]. Given Ireland's geographical location, air pollution is

a less serious issue outside of urban centres and has a more localised impact on biodiversity, mainly invertebrates and flora.

What are the important point and non-point sources for pollution, including nutrients, and what are the most important opportunities for minimising their impacts?

4.8.2 The principal source of this pollution is diffuse from agriculture (53%), mainly due to more intensive activities such as tillage, dairy and pig and poultry. Pig farming has been implicated in pollution incidents, but is localised in its distribution. A high proportion of Ireland's rural population lives in single rural properties and non-point pollution from non-performing domestic septic tanks are a significant contributor of pollution (13%). Point pollution occurs from urban areas with no/limited wastewater treatment or poor capacity to deal with storm water (34%).

4.8.3 Agricultural pollution is being addressed by environmental cross-compliance measures included in the Basic Farm Payments, through good farmyard management, agri-environmental measures (AES), riparian buffer strips and nutrient management restrictions in nitrate sensitive zones. Septic tank maintenance is being addressed through recently introduced licensing and enforcement supported by grant payments to lower income households for investment in modern facilities. Urban pollution is being addressed gradually through investment in wastewater treatment facilities by the state water utility Irish Water and the number of priority locations for investment has fallen to 132 from 148. [25]. See Sections 3.4.25 and 3.4.27.

To what extent is pollution, including that from excess nutrients, being brought to levels that are not detrimental to ecosystem function and biodiversity?

4.8.4 There have been reductions in the excess application of nitrogen due to improvements in farm and farmyard management, improved nutrient management and AES as described in Sections II and III. Early evidence for the GLAS AES indicates reductions in nutrient run-off. AES has included some protection of streams by fencing and buffer strips, but consideration of riparian vegetation in Ireland is still at the stage of on-going research. Inspection of intensive farm enterprises has improved. A registration programme for domestic septic tanks was also introduced in 2012 and is being backed by sample inspections.

4.8.5 These measures have curtailed the decline in water quality, but a significant improvement has not yet occurred. Around 30% of waterbodies are at risk of not achieving WFD status objectives, including 35% of high ecological status rivers and lakes (see Section III). There has been a reduction in the number of rivers of bad status, but at the other end of the scale, a continuing decline in the number of high quality sites to just 21 compared with as many as 575 in the 1980s.

4.8.6 Local catchment assessment has been introduced to replace a one-size-fits-all approach with a focus on problem areas. This process has identified 190 Priority Areas needing improvement. Public awareness of water management is being promoted by the Local Authority Water Programme. Scientific Catchment Assessment Teams were recruited in 2018 and will work closely with Agricultural Sustainability Advisors. Community stakeholders are being encouraged to establish river trusts.

How are pollutant and nutrient loads in the country's ecosystems changing and why?

4.8.7 Nutrient loads from urban point sources are likely to decline over time, although this will be gradual in response to significant investment in wastewater collection and treatment. Improvements to domestic waste water treatment systems should continue. Applications for single rural housing have resumed following the 2008-12 recession, but the siting of new housing in poor percolation areas is subject to tighter controls. Phosphate pollution has reduced due to better nutrient management, but sustained nutrient pollution will depend on firm implementation of environmental criteria in agricultural policy coupled with progress on catchment management. Positive trends could be challenged by national objectives for the significant increase in agricultural production proposed in Food Wise 2025 [23].

Summary

4.8.8 The catchment-based approach being adopted by the 2nd River Basin Management Plan has much potential to improve water quality in the longer term. However, climate change could lead to more instances of low flow and higher water temperatures affecting migrating fish in particular. New strategies will be needed to address water quality and biodiversity in areas of intensive agriculture. More imaginative measures are needed to secure co-benefits between improvements in water quality and biodiversity/ecosystem services. The EU Circular Economy strategy could reduce plastic marine pollution in long term.

4.8.9 ## Indicators:

Indicator-1: National indicator C.2.i reports that, in 2013, 41 of 53 habitats listed in the Habitats Directive were affected by pollution. This included 20% of surface water habitats (mainly naturally oligotrophic and mesotrophic waters), and 6% of groundwater habitats, were affected by pollution. Ten percent of habitats (mainly heaths and bogs) were affected by air pollution and 9% by soil pollution

Indicator-2: National indicator C.2.ii reports that, in 2013, 15% of species were affected by freshwater pollution. Eleven percent of marine species were affected. Light, noise and seismic surveys (e.g. underwater oil exploration) were affecting 24% of species.

Indicator-3: 197 rivers improved in quality in 2017, but a 269 deteriorated since the previous full assessment in 2013-2015. An overall decline of 3%. [26] [27]

Indicator-4: A long term decline in high quality sites is continuing with a 0.6% decline since 2015. However, only two water bodies were seriously polluted compared with 5 in 2013-2015 and 91 in the late 1980s.[26]

Indicator-5: See 3.4.24 for National Indicator C2.iii (see Figure 3.9): Number of pollution-derived fish kills reported by Inland Fisheries Ireland. Pollution derived fish kills have fallen markedly to 14 in 2017 compared with 31 in 2016 and 235 in the period 1986-88. [26] The relative share contributed by agriculture, industry and municipal works has remained much the same, but the share attributed to "other" has increased and includes oil spillages, high water temperatures or low flow.

Indicator-6: The number of beaches meeting the international Blue Flag criteria has increased to 85 in 2016 from a starting point of 19 in 1988. A Green Coast award was presented to 56 beaches in 2016 by An Taisce to reward unspoilt rural beaches.

Global impact

4.8.10 As an EU member Ireland is a signatory to the Water Framework Directive. In developing countries, the Rural Livelihood component of Irish Aid's current strategy has supported reforestation in water catchments.

Sustainable Development Goals

4.8.11 Through improvements to reductions in pollution and improvements in aquatic ecosystem services, there is potential to contribute to Goal 6: Clean water and sanitation, Goal 14: Life below water and Goal 15 Life on land.

Verdict

4.8.12 Water quality improvement has stalled, but there are prospect of an improving situation subject to challenges from policies supporting expansion of agricultural production and from climate change.

Target 9: Invasive species

By 2020, IAS and pathways are identified and prioritised, priority species are controlled or iradicated, and measures are in place to manage pathways to prevent their introduction

What has been the imapct of IAS and how has the number of IAS in Ireland changed?

4.9.1 An upward trend in IAS introductions has continued, affecting all environments, but especially the aquatic environment (21%) and the marine (12%) [28]. The greatest number of high impact invasive species is found in the freshwater environment where management of IAS is especially challenging. The invasive zebra mussel (*Dreissena polymorpha*) is continuing to spread and populate lakes across Ireland in huge numbers, sometimes causing improvement in water quality, but with as yet uncertain or mixed consequences for native species. However, Inland Fisheries Ireland (IFI) has succeeded in eradicating chub (*Leuciscus cephalus*) and yellow water primrose (*Ludwigia spp*), and is working with local organisations on a catchment basis to eradicate other invasive plants which spread along watercourses. Fungal spores from the introduction of the North American red-clawed signal crayfish (*Pacifastacus leniusculus*) from Continental Europe are currently having a dramatic impact on native crayfish in five Irish rivers where the mortality has been close to 100%.

4.9.2 The majority of invasive species to date have been plants, but vertebrates represent around one quarter along with invertebrates. The principal pathways have been the horticultural and nursery trade, the pet and aquaria trade, live food imports, and careless introductions due to agriculture, forestry, hull fouling and anglers or boat-owners failing to disinfect equipment. Some plant diseases may also have arrived by natural means following the spread of IAS in Britain and continental Europe. Figure 4.3 shows the increase in IAS since 1901 and indicates a recent rise in the number of 'high risk' species based on a 2014 assessment categorising species as high risk (48 species), medium risk (79) and low risk (250) [28, 29].

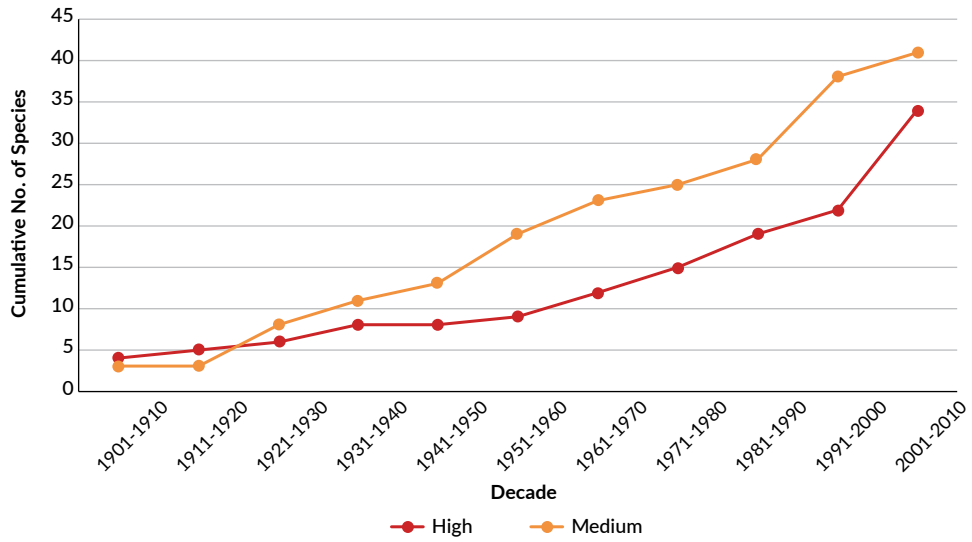


Figure 4.3: Cumulative trend in IAS [30]

What actions have been taken to eradicate or control IAS?

4.9.3 Awareness of IAS is being promoted through the website of the NBDC. The Centre is coordinating action by Government Departments and Agencies to implement the EU invasive Species Regulation (2015), including biosecurity plans. Efforts to identify and control IAS have been stepped up in at risk environments or habitats such as cutaway bogs, forests, arterial drainage channels, rivers and lakes. Direct actions to combat IAS in National Parks and Protected Areas have been pursued through two EU LIFE Projects. Transport agencies have been encouraged to source native species for landscaping works (see Target 4.1 & 4.4). Local Authorities have received funding to combat IAS, particularly along roadsides and on public lands (see Target 3.1).

What border controls or quarantine measures have been put in place?

4.9.4 Cooperation has been advanced with the pet trade and horticulture businesses. Cross border initiatives have been put in place with Northern Ireland to control invasive aquatic species. A new Rapid Response Protocol applies to the whole of Ireland. Management and licensing measures in the forestry and aquaculture sectors have been intensified.

Years	High risk	Medium risk	Years	High risk	Medium risk
1951-1960	9	19	1981-1990	19	28
1961-1970	12	23	1991-2000	22	38
1971-1980	15	25	2001-2010	34	41

Table 4.2: Indicator: Number of high and medium risk introduced IAS

Global impact

4.9.5 Ireland has engaged with other the UK and other EU countries to reduce the risk of IAS dispersal.

Sustainable Development Goals

4.9.6 Contribution to Goal 3: Good health and well-being, Goal 6: Clean water and sanitation, Goal 14 Life below water, and Goal 15 Life on land.

Verdict

4.9.7 Firmer efforts have been taken to address IAS at both EU and national level. Some IAS are having a serious effect on the environmental quality, native species and forest regeneration, but are now well-established and can at best be managed locally.

Target 10: By 2015, multiple anthropogenic pressures on vulnerable ecosystems impacted by climate change or ocean acidification to be minimised

What ecosystems in Ireland are at most risk of climate change?

4.10.1 The storage and sequestration of carbon by peatlands provides an important ecosystem service in mitigating climate change. However, in addition to the pressures they face from exploitation for peat and the associated drainage, raised and blanket peat bogs are vulnerable to the drier summers that have been predicted for Ireland due to climate change. Upland habitats in general together with much of their flora and fauna, are inevitably vulnerable due to the limits on upward movement. Ireland is an important migration and wintering destination for many birds, but tidal mudflats, wetlands and saltmarsh are vulnerable to coastal squeeze as sea levels rise, but agriculture, built land and infrastructure is defended.

4.10.2 Some species are already demonstrating the effects of climate change [31, 32]. Phenological changes are already apparent for plants and birds, introducing species to the isolated frosts or storms, or a mismatch with, for instance, pollination or food. Climate change may have contributed to declines in upland bird species such as ring ouzel (*Turdus torquatas*) [33] and red grouse (*Lagopus lagopus scoticus*), or marine species such as common scoter (*Melanitta nigra*) and puffin (*Fratercula arctica*) [34]. The foraging and migration routes of marine birds and mammals could be impacted, and the distribution of some fish species may already be responding to changes in sea temperatures. Terrestrial habitats such as woodlands and wetlands have become fragmented due to changes in land use and this will affect the capacity of some species to move in response to any degradation of habitat. As an island, the opportunity to fill these niches with other species is more limited for Ireland than for continental countries.

How have pressures been reduced?

4.10.3 The recent National Climate Change Adaptation Framework identifies potential impacts on biodiversity and recommends actions to increase habitat permeability within the landscape, but fails to discuss protection of biodiversity as a strategy for resilience or for nature based solutions, for example by using the ecosystem services provided by dunes or wetlands. Climate change is also addressed by only two actions in the NBAP, i.e. strengthening the resilience of the protected areas and consideration within forestry policy. However, a new sectoral adaptation strategy for biodiversity

has been drafted and will be published in late 2019. Habitats and species research and assessment, and land cover and ecosystem service mapping, are providing valuable information to understand how to adapt to climate change.

4.10.4 The protection of vulnerable ecosystems from degradation due to non-climate factors is a first step in adaptation. The interest shown by some Local Authorities in green infrastructure interventions and the recent acceptance of catchment-based measures to protect water quality or manage surface flooding, represent a positive direction for policy. The same is true of heightened efforts to control IAS, fisheries measures to improve conditions for migratory fish or AES to protect winter geese grazing. These are positive steps, even though their primary objectives have not been to strengthen resilience against climate change.

What actions have been taken to protect vulnerable ecosystems?

4.10.5 EPA reports [35] have recommended various measures including heightened focus on species at risk, landscape connectivity, habitat restoration, assisted translocation of species and a more dynamic approach to protected area designation that takes account of the future prospects of the habitat to adapt to climate change or to act as refuges. The NPWS is currently compiling a report on responses to address the impact of climate change. Recent efforts to protect pollinators through the All Ireland Pollinator Plan or to commence the rehabilitation of protected peatland, are only a first step. To date, there has been no tangible adoption of nature-based solutions to address flood management [36]. The opening up of coastal defences behind Rogerstown Estuary to inundation by the sea represents an acceptance by Fingal County Council of the prospect of rising sea levels and has created new habitat. However, it is a single example and not part of any national strategy of coastal realignment.

Global impact

4.10.6 Principal global issue is related to policy in relation to emissions where is generally accepted that more needs to be done to ensure that Ireland approaches its emissions targets. The Irish Aid programme has been active in supporting adaptation to climate change in developing countries.

Sustainable Development Goals

4.10.7 Principal contribution to Goal 13: Climate action and Goal 12: Responsible production and consumption, with particular implications for Goal 6: clean water and sanitation, Goal 14: Life below water, and Goal 15: Life on land.

Verdict:

4.10.8 Inadequate action to date in terms of biodiversity and ecosystem services protection, but national adaptation strategy for biodiversity is due late 2019.

Target 11: Areas of importance for biodiversity and ecosystem services effectively managed

By 2020, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative, and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

What is the current extent of Protected Areas on land and in marine areas? Is there at least 17% of terrestrial and inland water and 10% of coastal and marine areas conserved?

4.11.1 Ireland's Protected Areas extend to over 20,072km^2 [30]. At 16.8%, Ireland is close to the 17% target for the protection of terrestrial areas and inland waters. However, only 1.32% of Ireland's marine and coastal areas are protected, indicating that considerable progress still needs to be made to reach the target of 10%. The extent of Protected Areas has increased by 18% since the introduction of the Aichi targets in 2010 (Section 3.1.66), through the designation of 16 new SACs, 11 SPAs and the expansion of two National Parks through land purchase or land transfer to the NPWS.

What areas of importance for biodiversity and ecosystem services are not currently protected? What areas are under-represented?

4.11.2 Ireland has 131 Key Biodiversity Areas (KBAs) according to Birdlife international which contribute significantly to global biodiversity, and 17 Important Bird and Biodiversity Areas (IBAs), a subset of KBAs. The vast majority, 98%, of KBAs have been conserved through SPAs and SAC designations [37]. Alongside KBAs, there are 630 proposed Natural Heritage Areas (pNHAs), an area of around 65,000 ha. The continued lack of statutory designation of these pNHAs means that many nationally significant sites for biodiversity have limited legal protection.

4.11.3 Ireland has an extensive marine territory (more than 10 times the size of its terrestrial land mass) which is under-represented in terms of overage by Protected Areas (see Section 3.1.113). With under 30% of the national extent protected by SACs, freshwater habitats are underrepresented in protected areas, although some receive protection under the EU WFD.

4.11.4 The underrepresentation of the marine has been recognised by the NPWS who have designated seven additional Marine Protected Areas since 2010, extending the protected area by 340,000 ha.

How effective are existing Protected Areas? How has their management effectiveness changed?

4.11.5 Monitoring under the Habitats Directive found that the majority of habitats (91%) are in 'unfavourable conservation status'[1].[65] Of these habitats, 31% demonstrated a declining trend between 2007 and 2013 compared to just 16% showing an improving trend. Habitat groups with the highest percentage area in bad conservation status include peatlands (86%), heaths (100%), grasslands (83%) and forests (75%).

65 Although these assessments reflect the status of the national resource, the status is similar in the Protected Area network, even though the trends are less negative.

4.11.6 Ireland is due to report under the Habitats Directive in 2019. Initial evidence from the forthcoming assessment suggests that the status of many habitats has not improved, with many remaining in the same condition or having worsened slightly. Reports of the unfavourable conservation status of many Protected Areas were reinforced by Birdlife International who found that 65% of Important Bird Areas, a subset of globally important KBAs, have a very high level of threat to their qualifying species or a species population in very unfavourable or unfavourable condition.

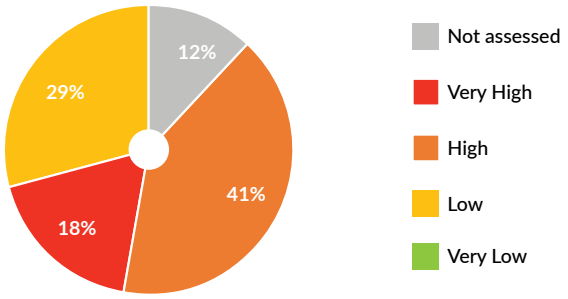


Figure 4.4: Pressure on IBAs: Percentage of sites with different levels of threats to population of the species for which each site qualifies [2]

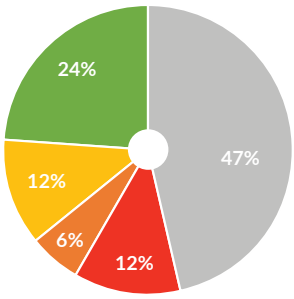


Figure 4.5: State of IBAs: percentage of sites for the condition of populations of the species for which each site qualifies as an IBA [2]

4.11.7 These findings suggest that Protected Areas status has not been sufficient to reverse the decline of many of Ireland's most important habitats. Since 2013, the NPWS has taken action to try to reverse this trend and maximise the contribution that EU protected sites make to the conservation of target habitats and species through the production and publication of Site Species Conservation Objectives (SSCOs) and Management Plans (SSMPs) (see Objective 6, Section III).

4.11.8 The NPWS has particularly focused on improving the condition of raised bog SACs and NHAs, publishing SSCOs for all 53 raised bog SACs [38], extending a programme cessation of turf cutting compensation to include raised bog NHAs, and commissioned 53 site specific restoration plans for raised bog SAC sites (see Objective 6, Section III). Improving and enhancing the conservation status of Protected Areas has also been pursued through a range of large scale EU LIFE programmes (see Objective 6, Section II).

Which other groups or stakeholders are involved in the management of Protected Areas?

4.11.9 Partnership-working is essential to the management of Protected Areas across Ireland. Since the last report to the CBD, the NPWS has continued to work with the Department for Agriculture, Food and Marine (DAFM) to develop AES for farmed protected areas in the Natura Network, most recently the GLAS (2015-2020).

4.11.10 To help restore freshwater Protected Areas, the NPWS has partnered with the OPW, on the restoration of SAC fen sites, and with the IFI, on the re-naturalisation of rivers. Coillte and the Forest Service have continued to be key partners in the restoration of raised bog SACs through EU LIFE projects, and this

partnership will extend to the restoration of 12 raised bog SACs in 2019. The EU is crucial partner in management and restoration of Protected Areas through the LIFE programme. Projects, such as BurrenLIFE, KerryLIFE and AranLIFE, have been a joint effort between organisations such as DAFM, NPWS, Local Authorities, landowners, Teagasc, the Heritage Council and Failte Ireland.

4.11.11 A cross-departmental group was developed in 2017 to monitor the implementation of the National Peatland Strategy [38], which sets out a comprehensive list of actions for the conservation of raised bog SACs and NHAs. The implementation group brings together the Department of Housing, Planning and Local Government (DHPLG); Department of Agriculture, Food and the Marine (DAFM); Department of Communications, Climate Action and Environment (DCCAE); and Department of Culture, Heritage and the Gaeltacht (DCHG); and the OPW, EPA, Bord Na Móna, and Coillte.

4.11.12 The Co-operation Across Borders for Biodiversity (CABB) project, launched in 2017, is a partnership between Birdwatch Ireland, the RSPB Northern Ireland, RSPB Scotland, Butterfly Conservation, Moors for the Future, and Northern Ireland Water, to improve the habitats in SACs and SPAs through working with farmers, landowners and statutory agencies. Many other environmental NGOs, across Ireland have also been vital partners in the conservation, management and monitoring of Protected Areas and species.

What actions have been taken to integrate Protected Areas into the wider landscape and seascape?

4.11.13 In the marine sphere, the MSPF has provided an opportunity to think more comprehensively about the sufficiency and coherence of Ireland's marine Protected Areas (DCHG, 2019). The DCHG published the National Landscape Strategy in 2015-2020 (DCHG, 2015) which provides a platform for more coherence and connectivity of Protected Areas within our landscapes. At the local scale, a number of Local Authorities have developed green infrastructure plans to enhance the connectivity of existing green spaces and Protected Areas.

Indicators

4.11.14 ***National Biodiversity Indicator 15*** tracks the number and extent of internationally (SAC and SPAs) and nationally Protected Areas (NHAs). Since 2010, there has been an overall increase of 4.7% in the number of internationally designated sites, equating to an 18% increase in the area covered by the Natura 2000 network. As of 2018 the Natura network now covers over 2.2 million ha of Irish territory, combined with spatially non-overlapping nationally Protected Areas, this covers 16.8% of terrestrial and inland water areas but just 1.32% of Ireland's extensive marine and coastal areas

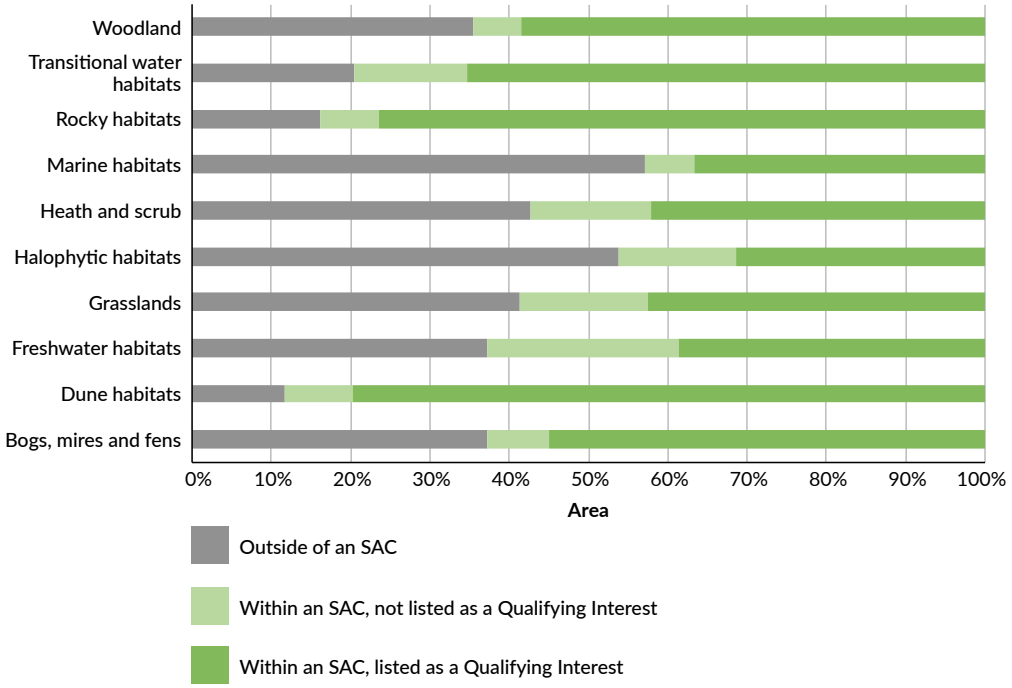


Figure 4.6. National Biodiversity Indicator 15.D.1.iv: Percentage of Listed Habitats under the EU habitats directive Annex 1 covered by an SAC site designation [30]. *Two habitats excluded, reefs and sea caves.

National Biodiversity Indicator 10: Trends in the status of priority habitats. The majority (91%) of Ireland's listed habitats under the Habitats Directive are considered to be in unfavourable conservation status, i.e. inadequate (29) or bad (24), and only 9% in FCS (5).

National Biodiversity Indicator 16 D.2: Level of habitat conservation plans. Statutory instruments (SI) are now in place for 61% of Natura 2000 sites in Ireland. This represents a 37% increase since the last report in 2013 when only 24% of Natura 2000 sites had SIs (more than double the number of sites with SIs since 2013). Notably, the formal designation process is almost complete for SPAs with SIs for 148 sites, accounting for 96% of sites. Although a large number of SIs have been completed for SAC sites (221), this only accounts for 48% of SAC sites.

Global impact

4.11.15 Ireland has international responsibilities to protect habitats for which it has a significant proportion of the global total (e.g. blanket bog) and habitats that support species, particularly migratory and marine species.

Sustainable Development Goals

4.11.16 Principal contribution to Goal 14: Life below water and Goal 15: Life on land.

Verdict

4.11.17 Ireland is close to achieving the 17% target for terrestrial and inland water protection, but significant progress still needs to be made to reach the goal to protect 10% of coastal and marine areas. A variety of restoration programmes have also been initiated since 2013. Despite these efforts, 91% of habitats that have a substantial area within the SAC network were assessed to be in 'unfavourable status' in 2013, and just 9% considered to be in a favourable status. This situation suggests that much more need to be done to ensure that Protected Areas are effectively managed and integrated into wider landscapes and seascapes.

Target 12: Reducing risk of extinction

By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

How has the conservation status of species been changing?

4.12.1 In 2013, 52% of Ireland's protected species were assessed as being in 'favourable conservation status' (FCS), compared to only 20% assessed as inadequate and 12% as bad [1]. There was insufficient data to assess the status of the remaining 16% of species designated under the Habitats Directive. Between 2007 and 2013, the majority (82%) of listed species remained stable, however 10% demonstrated a declining trend whilst only 6% demonstrating genuine improvements. Protected aquatic species were found to be faring the worst, namely fish, arthropods and molluscs. On the whole, mammals and vascular plants are thought to be faring better, with 69% and 67% respectively in favourable conservation status.

4.12.2 Reporting on the EU Birds Directive in 2014 showed a less positive picture. Although 19% of Birds species assessed were found to be increasing, 18% of breeding species and 16% of wintering taxa showed long-term decline. The long-term population trends are unknown for 56% of breeding taxa and 61% of wintering.

4.12.3 A number of species have been highlighted as of particular concern since the 2013 report to the CBD, notably Curlew (*Numenius arquata*), Corncrake (*Crex crex*), Jack Snipe (*Lymnocryptes minimus*) and Hen Harrier (*Circus cyaneus*) (see Target 6.3, Section III) [39]. Some positive results have been recorded with expansions noted for Otter (*Lutra lutra*) and Pine Marten (*Martes martes*).

What is the percentage of species that are threatened in your country?

4.12.4 The conservation status of 10% of Ireland's species have been assessed under the IUCN Red List process. Of those species, 24% are classed as threatened, including 9.2% near threatened, 14.8% critically endangered, endangered or vulnerable, and another 2.7% are classed as regionally extinct. The Red List assessments suggest that the species groups of most concern, i.e. threatened or near threatened status, include Non-Marine Molluscs (34%), Bees (43%), Amphibia, Reptiles and Freshwater Fish (40%), Butterflies (34%) and Mosses, Liverworts and Hornworts (30%). As reported in 2013, three species groups, Amphibia, Reptiles and Freshwater Fish, Bees, and Non-Marine Molluscs are of particularly concern as over 30% of their species are assessed as threatened.

4.12.5 In 2016, the NPWS published a Red Data list for 58 species of cartilaginous fish (sharks, skates, rays and chimaeras), regularly occurring in Irish waters. Of these 29% are threatened, and 32% near threatened, leaving only 38% of all species assessed as least concern. This finding is reinforced by the European Red List of Marine Fishes which assessed a total of 1,220 fish species and found that 24 of threatened species regularly occur in Irish waters. Some species are assessed at a global level and these include certain marine invertebrates, such as the Common Spiny Lobster (vulnerable), or estuarine fish which are now extinct from Irish waters, such as the Sturgeon (critically endangered).

What actions have been taken to address this?

4.12.6 The NPWS have initiated and developed a range of species-based conservation programmes since

the last report to the CBD, with a particularly focus on threatened bird species and species protected under the Habitats Directive.

4.12.7 The NPWS Farm Plan Scheme [40] has continued to provide bespoke support to assist farmers to go undertake positive actions for species. This scheme, although now operating at reduced scale, has enabled the NPWS to address important High Nature Value farmland areas of Ireland, and provide a testing ground for bespoke species conservation measures which have been rolled out through national AES under the Rural Development Programme (RDP) 2007-2013 and 2014-2020.

4.12.8 EU LIFE projects have made a key contribution to the conservation, management and restoration of habitats to support threatened species (see Target 6.3, Section II). Two species focused projects were completed in Ireland between 2010 and 2018, Mulkear LIFE (2009-2013) and Duhallow Samok (2010-2015). At present there are two active LIFE projects Raptor LIFE (2013) and Kerry LIFE (2013).

4.12.9 Progress made by LIFE programmes have been complemented by a number of NPWS initiatives for Freshwater Pearl Mussel (*Margaritifera margaritifera*), Curlew (*Numenius arquata*), Corncrake (*Crex crex*), and Roseate Tern (*Sterna dougallii*) (see Target 6.3, Section II). Species reintroduction and breeding programmes have continued to be supported by the NPWS and NGOs. The NPWS are also working on a threat-response plan for Hen Harrier (*Circus cyaneus*). Notably there remain rather few conservation actions directed at marine species.

4.12.10 Cross border initiatives have also been a key part of the species conservation initiatives. Roseate Tern LIFE (2015-2020) is a partnership between Birdwatch Ireland and the North Wales Wildlife Trust to boost roseate tern population in several coastal sites in the British Isles. The recently completed Mammals in Sustainable Environments (MISE) focused on the conservation and monitoring of red squirrel, stoat, weasels, harvest mice, dormice, pine marten, otter and bats in Ireland and Wales [41]. Although there has been some focus on conservation of coastal birds, there has been a notable lack of large or national scale conservation actions for marine mammals, cartilaginous fish, marine molluscs and non-cartilaginous fish.

Indicators

4.12.11 In addition to monitoring under the Birds and Habitats Directive, the conservation status of Irelands species is assessed by the NBDC. This monitoring provides indicators of the broader state of wildlife.

- ***National Biodiversity Indicator C4.i:*** Number of fish stocks in Irish Waters being fished sustainably. See 3.5.15
- ***National Biodiversity Indicator 4: Trends in the status of Birds.*** The **Countryside Bird Survey**, Irelands national monitoring scheme for common and widespread species, shows that out of the 55 species assessed 2.4% experienced a decrease in population size between 2013-2014, a 2.6% decrease from 2010-2014 and 3.8% decrease between 2005-2014. Farmland and peatland birds are faring the worst with a 8% decrease between 2005-2014.
- ***National Biodiversity Indicator 5: Trends in the status of Insects.*** Seven, out of twenty, species of bumblebee are under threat of extinction [42]. A recent All Ireland Bumblebee Monitoring Scheme shows that the overall trend since 2012 is a year-on year decline of 3.7 % leading to a total loss of 14.2 % by 2017.

- ***National Biodiversity Indicator 5: Trends in the status of Insects.*** Data from 17 species between 1990s and 2016 suggests that **butterfly** population have declined by 20% [43], with a long-term trend is of moderate decline (-2.6 ± 1.2% p.a.).

Global impact

4.12.12 Ireland has international responsibilities to protect species for which it has a significant proportion of the global population, particularly migratory and marine species.

Sustainable Development Goals

4.12.13 Principal contributions to Goal 14: Life below water and Goal 15: Life on land.

Verdict

4.12.14 Although the conservation status of most protected species has remained stable, with 52% of species in FCS, between 2007 and 2013, a higher percentage of these species were in a declining rather than an improving trend. The status of a number of species groups and species remains of concern, particularly fish and arthropods and molluscs and non-vascular plants. There is also particular concern for populations of farmland and upland birds such as the once familiar Curlew which is forecast to go extinct as a breeding bird within the next 5 to 10 years at current rates of decline. There are similar concerns for Corncrake. Many pollinators are also in decline.

4.12.15 Conservation programmes have had some success, but have largely remained small in scale since 2013. To reverse trends there is a clear need to upscale efforts. One example is the upscaling of the NPWS Hen Harrier Farm Plan Scheme into a national scale AES managed by DAFM with over €5m of funding.

Target 13: Safeguarding genetic diversity

By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

What actions have been taken to safeguard the genetic diversity of species of cultivated plants and farmed and domesticated animals, their wild relatives and socio-economically or culturally valuable species? Are species being maintained in situ or ex situ?

4.13.1 The genetic diversity of Irish flora and fauna is safeguarded by public-sector bodies, NGOs, and breed societies across Ireland. A number of ex-situ and in-situ conservation programmes are in place, with a number of successful live and back up genebanks. DAFM maintains Ireland's national inventory of animal genetic resources (see http://www.efabis.ie) and assesses the global risk status of breeds registered in Ireland. The management and conservation of farm animal genetic resources has

primarily been undertaken by breed societies, a list of which is maintained on a dedicated website by the DAFM (http://www.agriculture.gov.ie/farmingsectors/animalbreeding/).

4.13.2 DAFM also maintains the designated National Cereal Genebank. The Genebank holds an important ex-situ collection of Crop Wild Relative (CWR) seeds of species that are genetically related to domesticated crops. The Genebank is currently being upgraded and expanded to broaden the variety of plant genetic resources in its collection. Alongside the National Genebank, Genetic Heritage Ireland and Trinity College Dublin Botanic Gardens (NBG) manage the Threatened Irish Plants Genebank which contains some of Ireland's rarest species. Public and non-governmental organisations are involved in the conservation of plant genetic resources. A number of NGOs also hold important genebanks, including the Irish Seed Savers Association which holds a 'live genebank' of native and heritage Irish apples in a traditional Irish Orchard.

4.13.3 With an annual budget of €50,000 The Genetic Resources Grant Aid Scheme (GRGAS) is the major source of support for the in-situ and ex-situ conservation and sustainable use of genetic resources. Since the last national report to the CBD, the scheme has continued to provide funding for a diverse range of conservation projects including practical hands-on conservation initiatives, raising the public's awareness of the importance of genetic resources, and participation in internationally recognised research and collaboration with European and other international partners in the field of plant and animal genetic resources.

4.13.4 The NBG runs The Irish Threatened Plant Species Conservation Programme, an ex-situ conservation programme for rare and threatened flora, and holds a DNA and Tissue bank is to conserve wild Irish species, including crop wild relatives and heritage crop varieties (See Target 6.3, Section II). species. Alongside the work of the NBG, Fota Wildlife Park, Dublin Zoo and Tayto Wildlife Part all continue to participate in a number of ex-situ conservation programmes including the European Endangered Species Breeding programme.

Ex–Situ Conservation

- Irish Genebanks DAFM, Backweston (Cereal and CWR predominantly) DAFM,
- The Tops, Raphoe, Co. Donegal (Potatoes)
- Teagasc Oakpark, Co. Carlow (Forages Genebank)
- Irish Seed Savers Association (Brassicas, Cereals, Vegetable and including the full Irish Apple Collection)
- Trinity College Dublin (Vegetables and CWR)
- National Botanic Gardens, Dublin (CWR)
- University College Dublin (Irish Apple collection safety duplicate)

What species management plans or strategies have been put in place to maintain genetic diversity in situ and ex situ?

4.13.5 The DAFM has direct responsibility for the coordination of measures for the conservation and utilisation of genetic resources for food and agriculture. Since 1996, DAFM has been aided by an Advisory Committee on Genetic Resources for Food and Agriculture. A National Genetic Conservation Strategy for animal genetic resources was published in 2013. The strategy provides recommendations to ensure the conservation and use of animal genetic resources. An equivalent strategy document was produced for plant genetic resources in 2014, with 40 recommendations, 7 of which were subsequently prioritised for GRGAS funding. An outline strategy for sustaining and developing Forestry Genetic Resources was published by COFORD in 2007 with a follow-on project on forestry genetics developed in 2011. Alongside plans and strategies, Ireland has worked to increase the accessibility of information about genetic diversity, through the development of a National Crop Wild relative database hosted by the NBDC.

4.13.6 ## Indicators

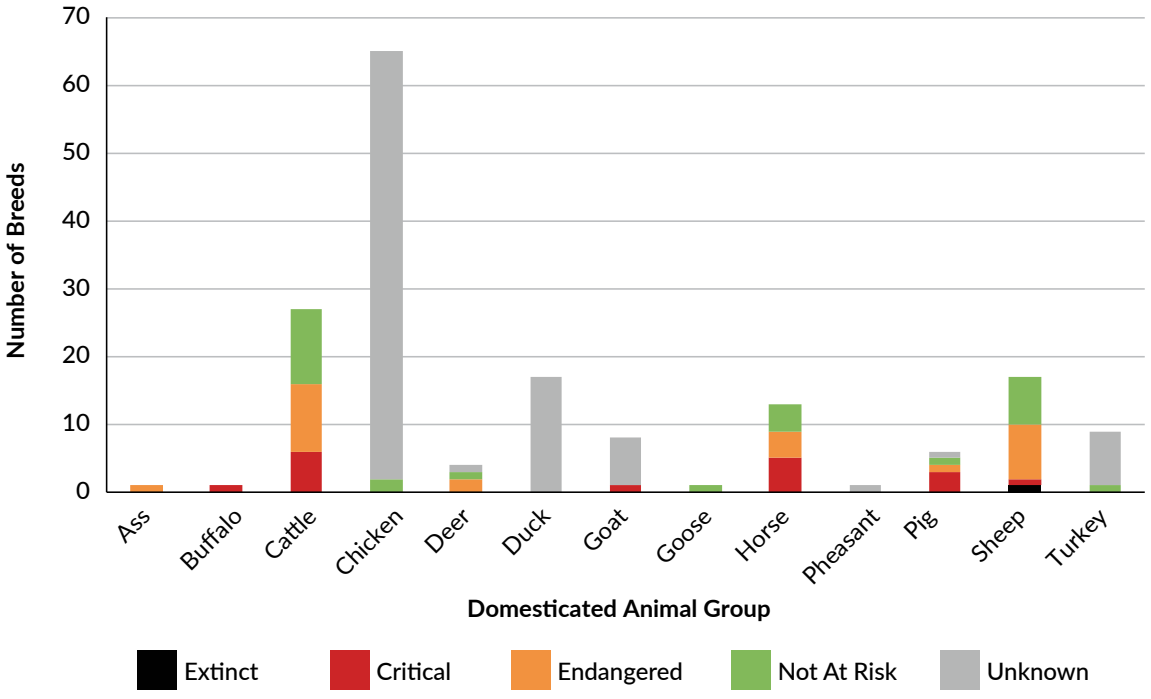


Figure 4.7: National Biodiversity Indicator 7: Trends in the status of rare breeds, cultivars and crop wild relatives

This indicator tracks the current status of animal and plant genetic resources in Ireland. Of the 170 breeds registered in Ireland, the risk status of 72 have been assessed, of which one breed is now extinct, 16 (22%) are critical, 26 (36%) are endangered and 29 (40%) are not at risk.

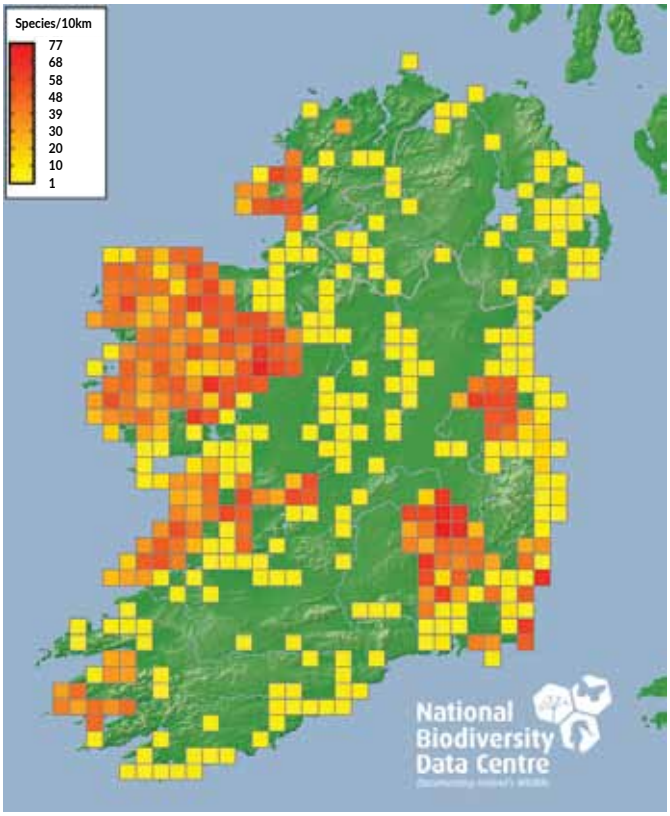


Figure 4.8: The number of crop wild relative species per 10 km2 across Ireland present in the Crop Wild Relative Database maintained by the NBDC on behalf of the DAFM.

Global impact

4.13.13 The effective management of animal and plant genetic resources is important to ensure sustainable agricultural production given increasing global demand for food and increasing environmental uncertainty in the context of climate change.

Sustainable Development Goals

4.13.14 Principal contribution to Goal 2: Zero hunger, Goal 3: Good health and well-being and Goal 15: Life on land.

Verdict

4.13.15 A variety of resources are in place to protect genetic diversity. Of the 72 registered breeds in Ireland which have been assessed, 40% are classed as 'not at risk'. However, considerable work still needs to take place to improve the status of 36% which remain 'endangered' and most importantly the 22% (16 breeds) which are classed as being in 'critical condition'. The status of 57% (98) of registered breeds in Ireland remains unknown.

Target 14: Ecosystems important for ecosystem services are restored and safeguarded

By 2020, ecosystems that provide essential services, including services related to water, and which contribute to health, livelihoods and well-being, are restored and safeguarded…

Which ecosystems are particularly important for providing ecosystem services for human well-being?

4.14.1 In Ireland, many ecosystems are important in providing ecosystem services for human-beings, although the degree of this reliance is often concealed by technology and social transfers to primary sectors. In some respects, agriculture and forestry, and associated livelihood, appear to be less dependent on ecosystem services than might be the case in some other, especially poorer, countries. Farm incomes are heavily supported by transfer payments under the EC Common Agricultural Policy. Irish agriculture is largely grass based (3.6m ha) and rain-fed with a smaller area of tillage (270,000ha), predominantly barley, oats and wheat. There are areas of oil seed rape (10,000ha), fruit and vegetables that do have a high reliance on pollination, but these account for modest land areas. Most pasture consists of sown rye grass that does not depend on insect pollination, but has poor biodiversity value and is reliant on fertiliser. A more diverse and nutritious grass sward containing pollination dependent clovers and herbs could be supported by the adoption of a more sustainable system of agriculture. Ultimately, however, agriculture and forestry rely on good soil fertility and this depends on the vital ecosystem services provided by soil biodiversity from soil bacteria, fungi to earthworms [44].

4.14.2 Ireland's population is dependent on clean water, and while most drinking water is treated, the level and cost of treatment of both potable water and waste water is heavily reliant on the regulating services provided by rivers and their associated fauna and flora [45]. Ireland's coastal population is protected from storms by coastal vegetation such as dunes and saltmarsh, while flooding of inland areas is mitigated by the natural surface vegetation, especially wetlands [46]. Quality of life for many people in Ireland is greatly enhanced by outdoor recreation and leisure, particularly the cultural ecosystem services performed by urban green space, coastal areas and diverse rural settings containing hedgerows, bogs, woods and forest, or uplands [47].

How have the pressures on these ecosystems changed?

4.14.3 No ecosystem services in Ireland have collapsed, but some are degraded. The prime example is sea fishing. Ireland's catch of fish reached a peak of 407,000 tonnes in 1995 compared with 20,000 tonnes in 1963, and, although the situation has been improving 35% of biomass is above MSY, while the of populations of 21% of commercial species remain below MSY [48]. Larger vessels and harvesting technology permitted over-fishing and ecosystem damage, but neither is a new phenomenon. Catches of several species are still too high from a biological perspective and unknown damage has been done to the ecosystem by indiscriminate harvesting and bottom trawling.

4.14.4 In agriculture, a trend continues, supported by current policy, towards more intensive farming.[66] This has contributed to a decline in pollinating insects and a gradual loss of soil organic matter. There is a continuing loss of more pristine rivers which has impacted on fish populations and spawning in

66 The Food Wise policy proposes significant increases in agricultural production, but acknowledges the need for sustainability, including the avoidance of loss of soil fertility and organic matter as emphasised by the Teagasc Soil Quality Assessment Project (SQUARE) and as required by the EU Seventh Environmental Action Programme

some rivers, particularly of wild salmon which were once harvested for food, but remain valuable for angling. Rivers and lakes are not so polluted as to place an undue burden on treatment for drinking, although investment in more intensive wastewater treatment has been required to ensure no further deterioration.[67] Coastal dunes and wetlands are in inadequate to bad condition and vulnerable to coastal squeeze due to rising sea levels. [18] While agricultural policy no longer finances new arterial drainage, exploitation of peatlands and general farm drainage has further reduced the soakage capacity of the environment which, together with urban development, has transferred flood risk to downstream locations. Possibly the most pervasive of impacts has been an on-going decline in biodiversity and the ability of ecosystems to maintain the quality of cultural ecosystem services for recreation, amenity and well-being.

What measures have been taken to reduce these pressures on ecosystem services?

4.14.5 The EPA State of the Environment report proposed more integration of a natural capital approach within sectoral policies [23]. Although there are some positive strategies in place to improve sustainability, there is little tangible evidence of recognition of the value of ecosystem services in the policies of Government Departments and Agencies, including the National Adaptation Framework. The baseline Mapping of Ecosystems and their Services (MAES), the National Land Cover and Habitat Mapping Programme, National Landscape Strategy and the Irish Soils Information System [49] will provide an evidence-base and improve monitoring. The situation for fishing is very gradually improving due to the introduction of an Ecosystem Approach in the EU Common Fisheries Policy. There are some promising new agri-environmental initiatives, and improved DAFM advice for farmers on soil fertility. The adoption of a catchment-based approach to water and river management has the potential to enhance ecosystem services to manage water quality and flood risk if adequately funded and applied.

Global impact

4.14.6 The benefits of most terrestrial ecosystem services are realised at national level, but grasslands, forests and peatlands in particular are important for carbon sequestration and storage whilst maintenance of marine biodiversity is clearly of importance at an international level.

Sustainable Development Goals

4.14.7 Contributions to Goal 2: Zero hunger, Goal 3: Good health and well-being, Goal 6: Clean water and sanitation, Goal 8: Decent work and economic growth, Goal 9: Industry, innovation and infrastructure, Goal 11: Sustainable cities and communities, Goal 12: Responsible production and consumption, Goal 13: Climate action, Goal 14: Life below water and Goal 15: Life on land.

Verdict:

4.14.8 Acknowledgement of the value of ecosystem services, but inadequate concrete action to date to protect environments and their associated biodiversity providing for carbon sequestration and storage, water quality, long term soil productivity, and terrestrial and marine provisioning services,

67 See forthcoming final report for ESManage www.ucd.ie/esmanage

Aichi Biodiversity Target 15: Ecosystem restoration and resilience

By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification

What areas and/or how much habitat have been restored?

Peatland and Fen habitats

4.15.1 The NPWS has furthered efforts to prevent damage to, and restore, raised bog habitats across Ireland. Since the last report to the CBD, 55 site specific restoration plans have been drafted for raised bog protected areas. Direct restoration efforts have been supported through Raised Bog LIFE (1 and 2) projects, and a partnership with Coillte and the Forest Service which will complete restoration on 166 ha of raised bog Protected Areas in 2018. Efforts to restore raised bog habitats have recently been up-scaled through the Living Bog LIFE project which plans to restore 12 raised bog sites in 2019. For fens, the OPW continues to progress experimental restoration work on a pilot SAC site, Tory Hill in conjunction with NPWS and it is proposed to extend this work to other sites.

Freshwater habitats

4.15.2 Freshwater enhancement of drained salmonid rivers has been supported by the OPW and IFI Environmental Rivers Enhancement Programme (EREP) (see 2.1.94, Section II, Several EU LIFE funded projects have also focused on the restoration of freshwater habitats, including the MulkearLIFE, DullhallowLIFE and KerryLIFE projects (see 2.1.133, Section II)

Grassland Habitats

4.15.3 At a national scale, the DAFM AES have included a number of actions which have helped to restore farmed habitats since the last report to the CBD This work has been complemented by the NPWS Farm Plans Schemes which supports farmers to restore habitats with species specific benefits. Alongside national initiatives, individual programmes have also worked to restore grassland habitats across Ireland. Between 2010-2015, farmers in the Burren removed 214ha of encroaching scrub to protect the Burren's orchid rich grassland through the Burren Farming for Conservation Programme. The Aran LIFE project successfully improved the conservation status of 1,001 ha of species-rich grassland habitats in the Aran Islands, working with 67 farmers to implement optimal grazing regimes. This model is being used to inform the wider thinking on the management of farmed protected areas.

Woodland Habitats

4.15.4 New planting of broadleaf trees under the Native Woodland *Establishment* Scheme between 2013-2018 totalled 1,040ha. The Native Woodland *Conservation* Scheme addresses the restoration of existing woodland areas. New woodland types have been added and grant levels raised along with support for fencing to protect against browsing by deer.[68] The area covered by the scheme between 2016 and April 2018 was 350ha.

68 FS-DAFM Circular 05/2018.

What types of restoration activities were used? How have social, economic and environmental objectives and the engagement of all relevant actors, including local communities been accounted for?

4.15.5 The activities and approaches used to restore different habitats have been wide ranging. For some habitats, such as Fen, restoration techniques remain experimental. In contrast, the EREP has benefitted from IFI's years of experience. The NPWS and partners have also worked to improve knowledge and practice. The 2017 publication of the Best Practice in Raised Bog Restoration in Ireland provides a scientific basis for restoration of raised bog habitats. Strengthening knowledge of raised bog restoration is particularly important given that the 50,000 ha of raised bog which remain in Ireland are in poor ecological condition. Concerted effort has also been made to engage all relevant actors in the restoration of raised bog sites, an approach that has been central to the National Peatland Strategy. At present, 53 draft raised bog site restoration plans are awaiting input from local stakeholders. The collaboration, multi-stakeholder and locally led approach has been a key part of the success of projects such as the Burren Farming for Conservation Programme and Aran LIFE. Farmer led conservation has also been pursued through the Result Based Agriculture Programme.

How have restoration activities affected ecosystem resilience?

4.15.6 The re-wetting of peat bogs has strengthened their resilience to drought, including projections of drier summers due to climate change, and is permitting some re-establishment of carbon sequestration functions. Restoration of previously drained rivers is allowing migratory salmon to repopulate former spawning tributaries. The clearance of invasive rhododendron, together with deer management, from restored native woodlands is permitting regeneration. All of these measures will need to be extended and supported by investment in maintenance. These measures need to be supported by actions to extend habitat connectivity through green infrastructure and a landscape approach (see Target 6.2, Section III).

Sustainable Development Goals

4.15.8 Contributions to Goal 3: Good health and well-being, Goal 6: Clean water and sanitation, Goal 13: Climate action, Goal 14: Life below water and Goal 15: Life on land.

Verdict

4.15.9 Investments have been made to restore some key ecosystems, but the extent of past damage is considerable, and examples of pristine peatland, species-rich grassland and healthy native woodland are few. Further investment is needed in habitat restoration and to provide connectivity to ensure resilience, particularly to climate change.

Aichi Biodiversity Target 16: Nagoya Protocol on Access and Benefit-sharing

By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation

If your country has not ratified or acceded to the Protocol, what actions are being taken to do so?

Ireland is a signatory, but not yet a Party to the **Nagoya Protocol**. With a view to ratifying the Protocol in the near future, the Irish authorities are currently preparing national legislation that will implement the provisions of the EU ABS Regulation (no. 511/2014) in the Irish context. This national legislation will form the basis for a new policy and legislative framework governing ABS in Ireland. Once this framework is in place, the Irish authorities intend to move forward with the ratification process.

Aichi Biodiversity Target 17: Biodiversity strategies and action plans

By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan

What actions have been taken to adopt your country's current NBSAP? At what level and by which body has the NBSAP been adopted? How will this assist with mainstreaming biodiversity concerns into sectoral and cross-sectoral plans and policies that impact biodiversity?

4.17.1 Ireland's NBAP 2017-2021 has been adopted by the cabinet of Ministers to the National Parliament. The Department of Culture, Heritage and the Gaeltacht (DCHG) is responsible for oversight of the implementation of the Plan and for coordinating with other Public Authorities, NGOs and private sector organisations.

Which actors and stakeholders were involved in NBSAP preparation or revision/updating and what was their role in this process? How will they contribute to NBSAP implementation?

4.17.2 The Biodiversity Working Group (BWG) comprises Departments, Agencies and other bodies that have a role in implementing the Plan. The preparation of Ireland's NBAP was a two-stage process consisting of a) consultation with the BWG and the Biodiversity Forum of independent stakeholders and NGOs in its initial scoping, development and drafting, and b) publication of the draft Plan on the NPWS website with open invitation for feedback from the public.

What measures are in place to evaluate how effective the NBSAP has been? Does the NBSAP have indicators and/or a monitoring mechanism to evaluate the effectiveness of its implementation?

4.17.3 The BWG will deliver an interim review of implementation in 2019. The review will quantify the success of implementation of the NBAP. Suggested indicators for each action are presented in the Table of Actions. The Biodiversity Forum will monitor the implementation of the Plan and advise the Minister accordingly.

Global impact

4.17.4 Relevant Government Departments, Agencies, eNGOs, academics and consultants have expertise to offer in relation to the international biodiversity agenda.

Sustainable Development Goals

4.17.5 Contributions Goal 14: Life below water and Goal 15: Life on land.

Verdict

4.17.6 Ireland's NBAP was prepared by officials in the NPWS section of the DCHG with the assistance of other Government Departments and Agencies, NGOs and other stakeholders. These same organisations have inputted to its implementation.

Aichi Biodiversity Target 18: Traditional knowledge

By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels

What steps have been taken since 2010 to respect the knowledge, innovations, practices and customary use of biological resources by local communities?

4.18.1 Some areas of conservation have been contentious, most especially the protection of peatlands where established rights exist to cut "turf" for household fuel. In principle, farmers have the right to farm their land as wish within the limited environmental constraints of Pillar I of the EU CAP. However, there are many individuals within these communities who have a respect for the natural environment and often an a long-learnt understanding of natural processes. Sometimes, individual property rights holders can be compelled to act in ways which can be harmful to biodiversity by the conventions of markets and policy. The same observations apply to anglers, inshore fishermen and hunters. More needs to be done to draw on traditional knowledge. The same is true of environmentally sustainable enterprises in productive sectors and tourism, including those where Ireland has particular natural and marketing advantages such as rain-fed pasture and aquaculture. The NPWS is now working hard to strengthen its ability to work with a variety of stakeholders as demonstrated by the National Peatland Strategy and Farm Plan Schemes.

Are local communities effectively participating in the implementation of the Convention, including in the revision/updating and implementation of NBSAPs?

4.18.2 The pubic generally and local communities also contain many individuals with a firm knowledge or love for wildlife and the natural environment. Programmes and measures such as EU LIFE projects, the Local Authority Waters Programme and the Forest Service Neighbourwood Scheme draw strongly on this interest, with many valuable habitats maintained as community resources. There are co-benefits too in this regard with recreation, health, tourism and local economic development.

Global impact

4.18.5 There are individuals engaged in community organisations and in more sustainable and organic enterprises in the agricultural, aquaculture, fishing and tourism sectors whose knowledge is of value to environmental and biodiversity management and sustainable production in other states.

Sustainable Development Goals

4.18.6 Contributions to Goal 11: Sustainable cities and communities, Goal 12: Responsible production and consumption, Goal 14: Life below water and Goal 15: Life on land.

Verdict

4.18.7 More could be done to acknowledge the ecosystem knowledge which exists in wider society and to realise social and economic benefits of Ireland's environmental assets.

Aichi Biodiversity Target 19: Sharing information and knowledge

By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied

What actions have been taken to improve the availability, accessibility and quality of biodiversity information?

4.19.1 The NBDC acts as a first point of reference for information on biodiversity and is actively encouraging public engagement and citizen science through, for example the All-Ireland Pollination Plan. The NPWS website has maps/spatial data, monitoring data and assessment data, together with publications. The Heritage Council performs a similar function in relation to natural and cultural heritage and supports the work of Local Authority Heritage Officers who work directly with local communities. The EPA monitors environmental quality and biodiversity and has greatly improved the availability, and accessibility, of environmental data in recent years, for example through the My Local Environment page of its website.

What mechanisms have been put in place or further developed to share biodiversity information and technologies?

4.19.2 Increasingly, environmental data is becoming available at a spatial level that is easily accessible through the internet using standard PCs and even mobile devices. Data is increasingly made available through the Government's open data portal (data.gov.ie). Public access to data is supported through the EU INSPIRE Directive and Aarhus Convention, although NGOs argue that some Government Departments and Agencies do not advertise what data exists and may be slow to make this data available, impairing their ability to independently evaluate environmental policy.

How is biodiversity information being used to support policy development and decision-making in the country?

4.19.3 Sound data is crucial to policies that protect biodiversity, particularly in relation to species distribution, land use/land cover, water quality and pollution. New steps are underway to include more environmental data in the official statistics collected by the CSO and to improve the accessibility and detail of spatial data, including land cover and habitat data collected by NPWS and OSi. New insights into the relationship between biodiversity and ecosystem services are becoming available through the Mapping and Assessment of Ecosystem Services (MAES) initiative of the EU 2020 Biodiversity Strategy (see Target 2.1 of Sections II and III).

Global impact

4.19.5 Research and expertise in available directly and through official and research publications. This information is becoming more readily available as accessible databases held by Government Departments and Agencies, through the internet and open source journals. Biological data is shared with the GBIF, EEA and European Vegetation Database.

Sustainable Development Goals

4.19.6 Contributions to Goal 4: Quality education, Goal 11: Sustainable cities and communities, Goal 14: Life below water and Goal 15: Life on land.

Verdict

4.19.7 Data on biodiversity or relevant to policy is becoming more readily available at national level. although there is a need for more centralised portals to guide interested parties to relevant information through accessible databases and the internet, but access to data and publications by some Government Departmental and Agency websites needs improvement and centralised portals to guide potential users to the existence of relevant data would be welcome.

Aichi Biodiversity Target 20: Mobilizing resources from all sources

By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties

What initiatives have been undertaken to examine national expenditure on biodiversity?

4.20.1 NPWS undertook a National Biodiversity Expenditure Review [3] in 2017 based on the UNDP BIOFIN Methodology to inform strategic planning by determining what expenditure was being made by Government Departments and Agencies, how effectively this was being spent on biodiversity, how it had changed over time, and how government expenditure compared with that of NGOS and the private sector. The report found that most expenditure was State-led, representing 96.6% of the total with most of the remaining spending by Local Authorities and NGOs also being supported by the State. However, 42% of state expenditure was linked to EU funding. Most of this is related to agricultural and fishing policy, but includes also EU Life funding that fills an important gap in national spending in supporting the enhancement of habitats and species.

What actions have been taken to mobilize additional resources for biodiversity?

4.20.2 A follow-up report is due to commence in 2019. This will include a Financial Needs Assessment to examine what funding is needed to protect and enhance biodiversity and how this might be spent most effectively. This will inform a Resource Mobilisation Strategy which will explore how existing biodiversity spending could be made more effective through efficiencies and by aligning Departmental policies with environmental and ecosystem services, and whether expenditure can be supplemented through new and alternative sources of finance.

Global impact

4.20.5 In common with many other signatories to the CBD, resource constraints are having an impact on biodiversity protection. There has been international interest in Ireland's application of the BIOFIN methodology in a developed country context.

Sustainable Development Goals

4.20.6 Principal contributions to Goal 14: Life below water and Goal 15: Life on land.

Verdict

4.20.7 At present, most expenditure derives from the State, but NPWS is commencing efforts to determine financial needs and to widen revenue sources, including Payments for Ecosystem Services and funding from the private and banking sectors, so as to provide for more sustainable strategies for biodiversity protection.

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SECTION V

Description of the national contribution to the achievement of the targets of the Global Strategy for Plant Conservation

Ireland National Strategy for Plant Conservation contains 16 Targets:

- Target 1: To produce a widely accessible preliminary census lists of all wild plant species, and fungi, found in Ireland;
- Target 2; To produce a preliminary assessment of the conservation status of all known plant species in Ireland completed and made widely available;
- Target 3: To produce a comprehensive and documented suite of practical solutions based on new or tested models, case studies, research and other experiences available for plant conservation and sustainable use in Ireland;
- Target 4: At least 10% of each of Ireland's plant habitats effectively conserved;
- Target 5: Protection of the most important areas for plant diversity assured;
- Target 6: At least 30% of production lands are managed consistent with the conservation of plant diversity;
- Target 7: Conservation of at least 60% of Ireland's threatened plant species assured in situ;
- Target 8: All threatened plant species in accessible ex situ collections, and all Critically Endangered and Endangered category species included in effective conservation management programmes;
- Target 9: Conserve the genetic diversity of all known indigenous traditional Irish agricultural plant varieties of crops, land races and crop relatives as well as other socio-economically valuable plant species;

- Target 10: Management plans in place for at least 10 major alien species that threaten plants, plant communities and associated habitats and ecosystems in Ireland;
- Target 11: No species of wild flora to be endangered by international trade;
- Target 12: All plant-based products derived from Irish wild plants to be harvested from sustainably managed sources;
- Target 13: Safeguard the traditional practices based on plant resources, and their associated knowledge, that support local communities and their livelihoods in Ireland;
- Target 14: Ensure that plant conservation and biodiversity issues are incorporated into the formal educational curricula at all levels, and in informal education and national public awareness programmes;
- Target 15: The number of trained people working with appropriate facilities in plant conservation is increased, as required, to achieve the targets of this Strategy;
- Target 16: A broadly based Irish network for plant conservation is established to achieve the targets for this strategy.

Please provide information on active networks for plant conservation present in your country.

Organisations involved in plant conservation or plant information networks include:

National Plant Conservation Organisations

National Parks and Wildlife Service (NPWS) https://www.npws.ie/
National Botanical Gardens (NBG) www.botanicgardens.ie
National Biodiversity Data Centre (NBDC) http://www.biodiversityireland.ie/

National Native Plant Network

Botanical Society of Britain and Ireland (BSBI): https://bsbi.org/
Dublin Naturalist Field Club (DNFC) http://www.dnfc.org
British Botanical Society (BBS) (Irish National Group) http://www.britishbryologicalsociety.org.uk/

General garden plant societies, which often feature, plant conservation issues to their members:

Irish Garden Plant Society http://irishgardenplantsociety.com/
Alpine Garden Plant Society – Dublin Branch https://www.alpinegardensociety.net/
Cacti & Succulent Society http://www.irelandcactus.com/2018.htm
Irish Orchid Society http://www.irishorchidsociety.org/
Royal Horticultural Society of Ireland https://www.rhsi.ie/

The Botany Department at Trinity College Dublin (TCD) is a an active collaborating partner in the **World Flora Online Consortium**. (www.worldfloraonline.org). The Director and Scientific Staff of the National Botanic Gardens (NBG, OPW) are also affiliated with the project and the most recent World Flora Online Council meeting took place in Ireland from the 3-7th December 2018.

GSPC Target 1: An online flora of all known plants

National Target 1: Produce widely accessible preliminary census lists of all wild plant species, and fungi, found in Ireland

5.1.1 Census catalogues and preliminary checklists for Ireland are available on the National Botanic Gardens website for Lichens (2010) marine algae (2008), mosses (2008), liverworts (2008), hornworts (2008), seed plants (1987) & alien species (2002). The National Strategy aims to update these checklists and the lichens and fungi checklists by 2020 http://botanicgardens.ie/science-and-learning/irish-flora-records/. Further overview information on Irish vascular plants can be found on http://www.biodiversityireland.ie/projects/biodiversity-inventory/taxonomic-groups/vascular-plants/.

5.1.2 **Irish Vascular plants** – The most recent **National Vascular Flora** was published by Parnell *et al.* (2012) (Parnell, J, Curtis, T and Cullen, E. (2012) *Webbs An Irish Flora*. Cork: Cork University Press, 2012. https://muse.jhu.edu/book/13894). This flora provides information and keys to the native vascular plant species found in Ireland. A synoptic list of the Vascular plants of Ireland (2008) and a downloadable spreadsheet for converting vascular plant names to their modern equivalent, with Irish names, English names and family placement can be found on the botanic gardens website (http://botanicgardens.ie/science-and-learning/irish-flora-records/).

- Natives: 980
- Natives (apomictic species): 273
- Alien (archeophyte): 111
- Alien (neophyte): 964

5.1.3 A guide to Irish Wildflowers is available by Devlin (2014) (Devlin, Z. (2014) The wildflowers of Ireland. A field guide. The Collins Press). Technical accounts of the alien species found in Ireland are available by Reynolds (2002) (Reynolds, S.C.P. (2002) A catalogue of alien plants in Ireland. NBG) along with a full census catalogue of the vascular flora by Scannell and Synnott (1987) (Scannell, M. & Synnott, D.M. (1987) Census Catalogue of the Flora of Ireland. Government Publications, Stationary Office). The Census Catalogue was developed from Irish herbarium specimens housed at the National Botanic Gardens.

Cultivated Vascular plants

5.1.4 There is no comprehensive listing of cultivated plants in Ireland. However, old Irish ornamental cultivated varieties of plants were recorded in Nelson (2000) (Nelson, E.C. 2000. *A Heritage of Beauty*, published by the Irish Garden Plant Society in 2000). A complete list of trees and shrubs cultivated in 20 private and eight state owned gardens was published by Forrest (1985). This amounted to 117,500 woody plants of 7,000 different species (Forrest, M. 1985 - *Trees and Shrubs cultivated in Ireland*. Heritage Gardens Committee An Taisce) The National Botanic Gardens maintain ~17,000 species and 72,874 individual accessions of plants cultivated on site.

Irish Bryophytes

5.1.5 There are 797 species (including of 13 probable alien species). A checklist and census of Irish Bryophytes is available by Hill et al. (2008) (Hill, M.O., Blackstock, T.H., Long, D.G. & Rothero, G.P. (2008) *A checklist and census catalogue of British and Irish bryophytes updated 200*8. Middlewich, Cheshire: British Bryological Society) and a synoptic list of the Bryophytes of Ireland (2008), with full synonymy as used in Ireland (http://botanicgardens.ie/wp-content/uploads/2018/06/3-irishbryophyte.pdf) and a spreadsheet for converting bryophyte names to their modern equivalent, with English names, family placement, red book status and notes on the taxon name. (dohttp://botanicgardens.ie/wp-content/uploads/2018/06/4-bryosyn.xlswnload). Further overview information on Irish Bryophytes can be found on http://www.biodiversityireland.ie/projects/biodiversity-inventory/taxonomic-groups/bryophytes

Irish Algae

5.1.6 There are 1,079 known species (estimated at between 3,000 and 5,000). A checklist of Irish seaweeds is available by Hardy & Guiry (2008) (Hardy, G. and Guiry, M.D. (2008) *A Checklist and Atlas of the Seaweeds of Britain and Ireland*. 2nd corrected Edn. British Phycological Society) along with a synoptic list of the Characeae of Ireland 2008 (http://botanicgardens.ie/wp-content/uploads/2018/06/5-irishcharaceae.pdf). Freshwater Chara species also have a checklist by Bryant *et al.* (2002) (Bryant, J.A., Stewart, N.F. & Stace, C.A., (2002) *A checklist of Characeae of the British Isles*. *Watsonia* 24: 203-208). Further overview information on Irish Algae can be found on the National Biodiversity Data Centre website http://www.biodiversityireland.ie/projects/biodiversity-inventory/taxonomic-groups/algae/.

Fungi

5.1.7 There are approximately 5,500 known species of fungi (estimated to be up to 9,000). 2018 Census catalogues and preliminary checklist available on the National Botanic Gardens website for Fungi – lichens and Fungi- Lichenicolous species http://botanicgardens.ie/science-and-learning/irish-flora-records/

Some key fungi resources

- Fox, H. (2001) Census catalogue of the lichenicolous fungi of Ireland (~150 species). NBG, Dublin.
- Henderson, D.M. (2000) A Checklist of the Rust Fungi of the British Isles. British Mycological Society, Cambridge, England, UK.
- Legon, N.W., Henrici, A., Roberts, P.J., Spooner, B.M. & Watling, R. (2005) Checklist of the British and Irish Basidiomycota. Royal Botanic Gardens, Kew.
- O'Hanlon, R., & T.J. Harrington (2011) Diversity and distribution of mushroom-forming fungi (Agaricomycetes) in Ireland. Biology and Environment: Proceedings of the Royal Irish Academy, vol. 111B, no. 2, pp. 117–133.

An overview of Fungi in Ireland can be found on the National Biodiversity Data Centre website http://www.biodiversityireland.ie/projects/biodiversity-inventory/taxonomic-groups/fungi//

Lichens

5.1.8 A census catalogue is available on Irish lichens by Seaward (2010) (Seaward, M.R.D. (2010) *Census Catalogue of Irish Lichens* (3rd Edition). National Museums Northern Ireland, Belfast).

5.2.1

- Red list of Irish Vascular plants completed in 2016 (Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016). Ireland Red list No. 10. Vascular Plants NPWS, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin. https://www.npws.ie/content/publications/ireland-red-list-no10-vascular-plants
- Red Data List of Bryophytes completed in 2012 and available (Lockhart, N., Hodgetts, N. & Holyoak, D. (2012) Ireland Red List No.8: Bryophytes. NPWS, DAHG, Dublin) https://www.npws.ie/content/publications/ireland-red-list-no8-bryophytes
- Of the 1,211 vascular plants assessed for Ireland's Red List in 2016, 106 (8.8%) are assigned an IUCN Red List threat category: 20 (1.7%) are Critically Endangered, 25 (2.1%) are Endangered and 61 (5.0%) are Vulnerable.
- Ireland has recently updated its Flora Protection Order (2015). This gives legal protection to 68 vascular plant species, 65 species of bryophytes (25 liverworts and 40 mosses), 1 lichen species and 2 charophyte species http://www.irishstatutebook.ie/eli/2015/si/356/made/en/print
- Lichens, algae and fungi conservation status remains a key gap and progress on these groups conservation status by 2020 is unlikely.

😐 Progress towards target at national level but at an insufficient rate

GSPC Target 3: Information, research and associated outputs and methods necessary to implement the strategy developed and shared

National Target 3: A comprehensive and documented suite of practical solutions based on new or tested models, case studies, research and other experiences available for plant conservation and sustainable use in Ireland.

Ireland's plant diversity is relatively well surveyed. An updated Botanical Society of Britain and Ireland Atlas of the flora is due in 2020. This aims to provide maps for both native and introduced taxa, interactive maps to display frequency and distribution at various scales and an analysis of change summarising the state of the Irish flora in 2020 https://bsbi.org/atlas-2020.

The NBDC have a number of current initiatives providing information, on invasive species, vascular species, bryophytes, Irelands pollinator plan and national biodiversity indicators http://www.biodiversityireland.ie/.

5.3.3 Some more specific examples of actions carried out towards this target based on specific plant research, conservation and sustainable use are:

- The European Search Catalogue for Plant Genetic Resources (EURISCO) provides information about 1.8 million crop plant accessions preserved by almost 400 institutes in Europe. EURISCO is accessible at http://eurisco.ecpgr.org. The NBDC manages Ireland's contribution (unafitzpatrick@biodiversityireland.ie).
- Invasive species case studies for control and management (http://www.biodiversityireland.ie/category/invasive-species-news/ (coflynn@biodiversityireland.ie)
- Taxonomy, invasive species, rare Irish species research and conservation projects managed by the National Botanic Gardens in conjunction with partners can be found on http://botanicgardens.ie/science-and-learning/projects/

- The Department of Agriculture, Food and the Marine (DAFM) have produced a report on protection of Irish crop wild relatives by Curtis (2014).

  https://tinyurl.com/y2nb4z9e
- DAFM published 'Potato varieties of historical interest in Ireland' https://www.agriculture.gov.ie/media/migration/farmingsectors/crops/seedcertification/topspotatocentre/PotatoBook010610.pdf and the 'Heritage Apples of Ireland' https://store.irishseedsavers.ie/The_Heritage_Apples_of_Ireland_p/book-appl.htm
- Hedgerow management guidelines have been developed by Teagasc for agri-environmental schemes https://www.birdwatchireland.ie/LinkClick.aspx?fileticket=LzA4YLD7KQ4%3D&tabid=1439 published in 2004.
- Macrophytes are monitored by the EPA through the Water Framework Monitoring Programme http://www.biodiversityireland.ie/projects/biodiversity-inventory/taxonomic-groups/vascular-plants/
- Intertidal seagrasses are monitored by the EPA through the marine EU WFD monitoring programme http://www.biodiversityireland.ie/projects/biodiversity-inventory/taxonomic-groups/vascular-plants/

😐 Progress towards target at national level but at an insufficient rate

GSPC Target 4: At least 15 per cent of each ecological region or vegetation type secured through effective management and/or restoration

National Target 4 : At least 10% of each of Ireland's plant habitats effectively conserved

5.4.1 25% of our national area is classified as EU annexed habitat with 14% of it currently with additional legal protections through the protected area network and some form of management.

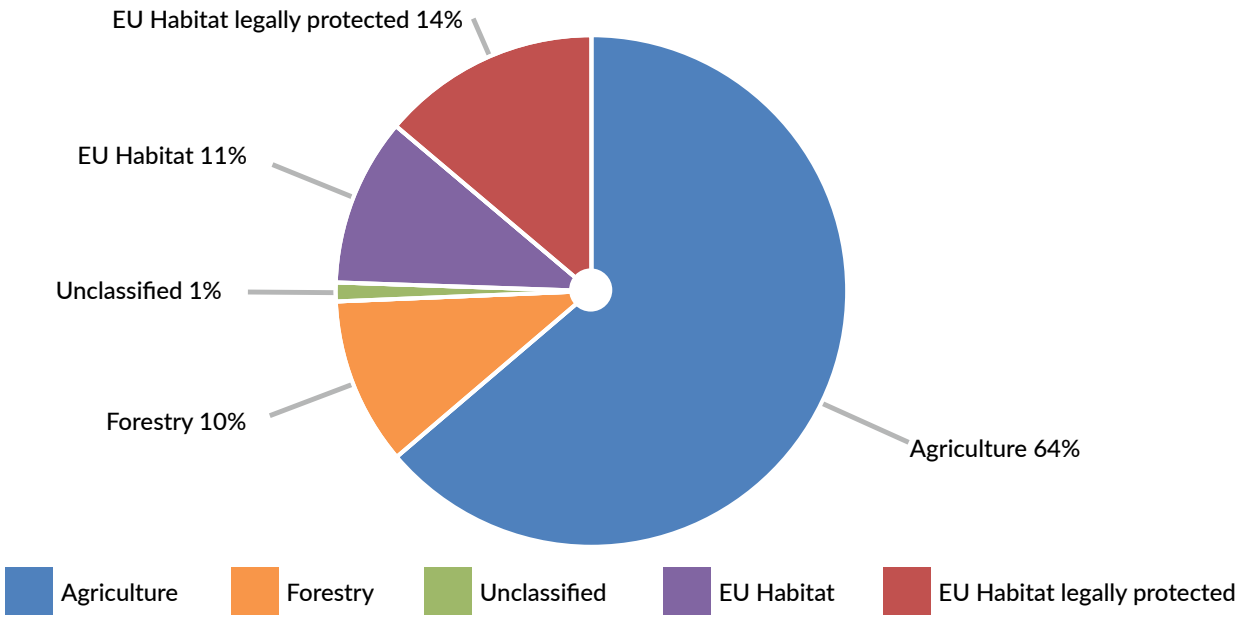

Figure 5.1: Land use types. Source: SDF Statistics June 2015 available from NPWS

5.4.2 Formally the EU Habitats Directive was adopted by Ireland in 1992. Under Article 11 each member state is obliged to undertake surveillance of the conservation status of designated natural habitats and species and under Article 17, to report to the EC every six years on their overall conservation status (see also 2.1.25 and 2.2.1).

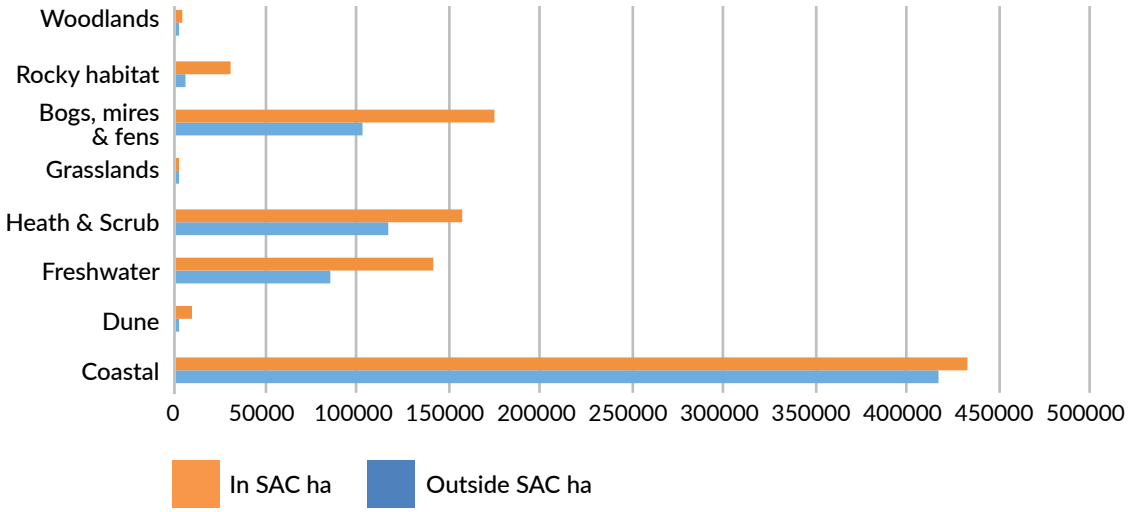

Figure 5.2: Area of terrestrial and freshwater habitats in SACs

Source: SDF Statistics June 2015 available from NPWS

5.4.3 In June 2013, Ireland submitted its second assessment under Article 17 on the conservation status for 58 habitats and 61 species, including three overview assessments of species at a group level. For many Irish habitats legally protected under the EU Habitats directive, the conclusion was that many are in Unfavourable conservation status. However, range of positive actions is underway i.e. the graph below highlights that a large percentage of our most important and distinctive Irish habitats are formally and nationally protected, it may take some more time to see the conservation benefit arising from such protections and a move towards favourable conservation status.

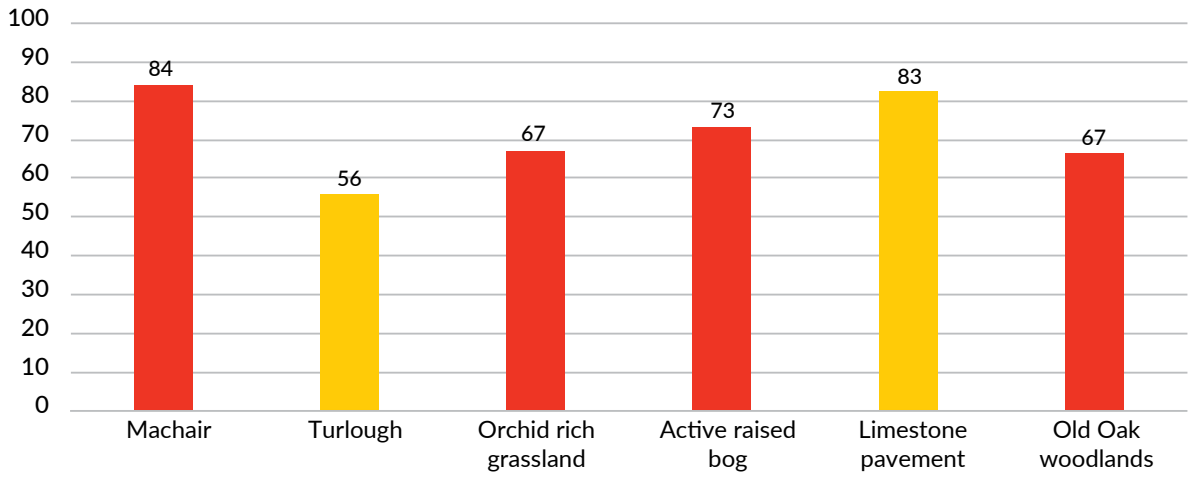

Figure 5.3: Percentage of selected EU Annexed Irish Habitats in Special Areas of Conservation

(Article 17 Assessment in 2013-Red = Bad & Orange = Poor) Source SDF Statistics June 2015 available (NPWS)

5.4.4 Annexed habitats that fall outside the SAC network, with nationally protected plant species listed on the Flora (Protection) Order, 2015 (http://www.irishstatutebook.ie/eli/2015/si/356/made/en/print), are protected under the Wildlife Act, 1976 & (Amendment) Act, 2000. Under this Act it is an offence to "wilfully alter, damage, destroy or interfere with the habitat or environment" of the listed species.

5.4.5 The Irish EU annexed habitats in Ireland found to be "of most pressing concern" from the 2013 reporting period were raised bogs and species rich grassland. A positive outlook on Irish peatlands comes from the Irish Peatland Conservation Council (IPCC), who found that despite many shortcomings they are confident that the target of "15% of each ecological region or vegetation type secured through effective management and/or restoration" is achievable within the target timeframe of 2020 for Irish peatlands. Data from Ireland's Peatland Conservation Action Plan 2020, the most recent action plan, and The National Peatlands Strategy, highlight that the total area of peatlands (excluding fens) in Ireland originally covered 1 003 080 ha. There has been a 26.7% loss in peatlands leaving approximately 735 108 ha remaining today. Of today's peatlands 35.8% or 263 288 ha is currently in conservation worthy status with 6% in State ownership and 29.5% in private ownership. To meet the 15% target set out in the NPCS the target equates with 33 493ha of conservation worthy peatlands being effectively managed. In light of the State owning in excess of that target, i.e. 45 015 ha, this is a most achievable target. These figures were derived from the 2015 published National Peatland Strategy (https://www.npws.ie/peatlands-and-turf-cutting/peatlands-council/national-peatlands-strategy p 31). Management plans have been completed for all raised bog SACs.

5.4.5 There is a less positive outlook for species rich grasslands with up to 30% losses in the last 10 years. However, large areas of the Burren, which supports 70% of the vascular flora of Ireland, is supported by the Burren Programme.

Measures are on track to achieve target at national level.

GSPC Target 5: At least 75 per cent of the most important areas for plant diversity of each ecological region protected with effective management in place for conserving plants and their genetic diversity

National Target 5: Protection of most important areas for plant diversity assured

5.5.1 Important Plant Areas for vascular plants and fungi have not been identified due to data gaps. Walsh (2015) highlighted that considerable resources are needed to clean and collate all data into a single useable database. The NBDC have been working with the NPWS, botanical recorders, citizen scientists and societies such as the BSBI in order to improve data on the distribution of Irelands plant diversity. However, data gaps remain for more cryptic groups such as fungi and lichens.

5.5.2 Lockhart *et al.* (2012) used a combination of Plant Life, Stewart (2004) and Green & Fitzpatrick (2008) approaches to identify 47 important bryophytes area in Ireland. Most of the areas identified were large and contained a mix of both protected and unprotected sites. 40% of the 19 identified Important Bryophyte areas were found within the protected area network

5.5.3 In general, important plant areas can coincide with important areas for birds, mammals and geology, the table below highlights the number of Irish sites designated for conservation purposes. Although the designated areas do not encompass all the Irish plant species of conservation concern, they do coincide with the majority (Walsh et al. 2015). Under Article 6 of the Habitats Directive an EU member states is required to avoid the deterioration of designated habitats within the SAC network and 60-80% of locations of rare species of concern in Ireland occur within designated areas. Many plant species of conservation concern found outside designated areas occur in pastures (49.3%) and land occupied by agriculture (5.6%). (Walsh *et al.* 2015). Ongoing agri-environmental schemes such as the Burren Programme will continue to have a positive impact on plant conservation. The number of hectares in each of the available areas for plant diversity in Ireland with some form of conservation management for plant diversity are listed in the table below.

Category	Objectives	Total area ha	No of sites	Protective measures
Nature reserve	Conservation of flora, fauna and habitats	20452.25	71	Statutory protection state ownership
Nature reserve	Conservation of flora, fauna and habitats	461.46	2	Private ownership
National Park	Nature conservation & public awareness	61157.78	6	State owned
Natural heritage areas	Protection of flora, fauna, habitats and geological sites	20452.25	155	Public & Private ownership
Special Areas of Conservation (SACs)	Conservation of flora, fauna and habitats of EU importance	708,185.80	439	Statutory protection to prevent damage
Special Protection Areas (SPAs)	Conservation of birds and habitats of EU importance	589,424.81	165	Statutory protection to prevent damage
Wildfowl sanctuaries	Hunting of wild birds prohibited	55155.75998	68	Statutory enforcement of bird hunting
Refuge for fauna	Conservation of habitat for animal	3089.04999	7	Statutory protection for named species

Data from Source - http://cdr.eionet.europa.eu/ie/eea/cdda1/envwfqylg/

References

Green, P. & Fitzpatrick, U. (2008) The identification of local Important Plant Areas (IPAs) in County Waterford.http://floraofcountywaterford.biodiversityireland.ie/media/docs/Important%20Plant%20Areas%20in%20County%20Waterford%20-%20July%202008(2).pdf

Lockhart, N. Hodgetts, N & Hollyoak, D. (2012) Rare and threatened Bryophytes of Ireland. National Museums Northern Ireland.

Stewart, N.F. (2004) Important stonewort areas. An assessment of the best areas for stonewort's in the United Kingdom. Salisbury: Plant life International.

Walsh, A. (2016) Methods for the Identification of Important Areas of Plant Diversity in Ireland. PhD. Thesis, TCD.

Walsh, A., Finn, J., Jebb, M., Waldren, S. & Sullivan, C. (2015) The distribution of vascular plant species of conservation concern in Ireland, and their coincidence with designated areas. Journal for Nature Conservation 24, 56-62.

😐 Progress towards target at national level but at an insufficient rate

GSPC Target 6: At least 75 % of production lands in each sector managed sustainably, consistent with the conservation of plant diversity.

National Target 6 : At least 30% of production lands are managed consistent with the conservation of plant diversity

5.6.1 This target is subject to the changing activities of EU agricultural interventions such as AES. In the forestry sector, there has already been a major shift from timber production to woodland creation in such projects as the Peoples Millennium Forests Project and the Native Woodland Scheme.

5.6.2 The Sustainable Use of Pesticides Directive (SUD) established a framework for European Community action to achieve the sustainable use of pesticides by setting minimum rules to reduce the risks to human health and the environment that are associated with pesticide use. It also promotes the use of integrated pest management. http://www.pcs.agriculture.gov.ie/sud/.

The GLAS scheme operates in Ireland where farmers apply for and farm under this scheme in order to receive payments. The scheme operates to ensure low C input and integrated pest management, and low fertiliser inputs into permanent pasture. Numbers applying for schemes approximates 23% - From https://www.agriculture.gov.ie/farmerschemespayments/glas/. GLAS is also part of Irelands RDP 2014-2020 and ties in with the green vision for Irish agriculture as contained in Food Harvest 2020 and as promoted by Bord Bia in the Origin Green campaign. There are 1787 organic farms registered in Ireland (2019. https://www.independent.ie/business/farming/agri-business/why-does-ireland-only-have-1787-organic-farmers-35164558.html) .

5.6.3 The highly successful Burren Programme has resulted in a target of 500 farmers enrolled in a results-based AES, the AranLIFE (https://www.aranlife.ie/) and RBAPS (https://rbaps.eu/) also piloted results-based projects in other areas in Ireland. If all these projects are successful then it is likely that the EU CAP post-2020 will have more positive impacts on the amount of land under more appropriate management from a plant conservation point of view http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=2661 accessed 21/12/2018. The BRIDE project aims to design and implement a results-based approach to conserve, enhance and restore habitats in lowland intensive farmland in the River Bride catchment. https://www.thebrideproject.ie/.

😐 Progress towards target at national level but at an insufficient rate

GSPC Target 7: At least 75 % of known threatened plant species conserved in situ

National target 7: Conservation of at least 60% of Ireland's threatened plant species assured in situ

5.7.1 Red-listed vascular plants occur in a wide variety of natural and semi-natural habitats, from grasslands to woodlands, limestone pavements, heaths, upland cliffs, rocks and screes. They are found in a range of aquatic and other wetland habitats – rivers, lakes, turloughs, ponds, bogs, fens and flushes. A significant number also occur in coastal habitats – sand dunes, shingle, cliffs, salt marshes and mud flats. Several species grow in artificial habitats such as ditches, walls and sandpits, and in association with arable crops.

5.7.3 A recent analysis estimated that 60-80% of locations of rare species of conservation concern in Ireland occur within nationally designated areas. Plant species of conservation concern found outside designated areas were mainly found in pastures (49.3%) and land occupied by agriculture (5.6%). (Walsh et al. 2015). A national programme into the conservation biology of threatened plant species to include 75 per cent of known threatened plant species conserved in situ is still needed and a recent paper highlighted the need for conservation management measures outside designated areas (Walsh, et al. 2015).

5.7.4 The Flora (Protection) Order, 2015 (S.I. No. 356 of 2015 http://www.irishstatutebook.ie/eli/2015/si/356/made/en/print) gives legal protection to 68 vascular plant species and 65 species of bryophytes (25 liverworts and 40 mosses). This Order specifies that the species and habitat that the species grows in is not allowed to be interfered with, other than with a licence granted by the Minister for Culture, Heritage and the Gaeltacht, i.e. it is an offence to "wilfully alter, damage, destroy or interfere with the habitat or environment". Information packs on locations and associated species are now available for each of the known FPO bryophyte populations, and sites maps with flora protection order bryophtes are available on line. https://www.npws.ie/maps-and-data/flora-protection-order-map-viewer-bryophytes.

5.7.6 Rare plant surveys have been on-going in Ireland since the 90s (NPWS, 1990s, 2000s). The BSBI Local Change Project: 1987-1988 (Rich, T.C.G., Beesley, S. & Goodwillie, R. 2001) recorded changes in the vascular plant flora of Ireland between pre-1960 and 1987-1988. Under the BSBI Monitoring Scheme 264 systematically selected tetrads were surveyed in Ireland between 1987-88 (Irish Naturalists' Journal 26: 333-350).

5.7.8 A new rare plant-monitoring scheme was launched by the NBDC in 2017. Volunteer recorders visit rare plant population once a year and count the total number of individuals present. Data on the rare plant location, the count and additional information about the site is submitted online. The main focus is on monitoring vulnerable, near threatened and rare least concern species as highlighted in the 2016 Vascular plant Red Data book. In 2017, volunteers monitored 37 populations across 22 species. In 2018, volunteers monitored 108 populations across 53 species. Newsletters are available on the work completed in 2017 & 2018 (NBDC 2017 & 2018).

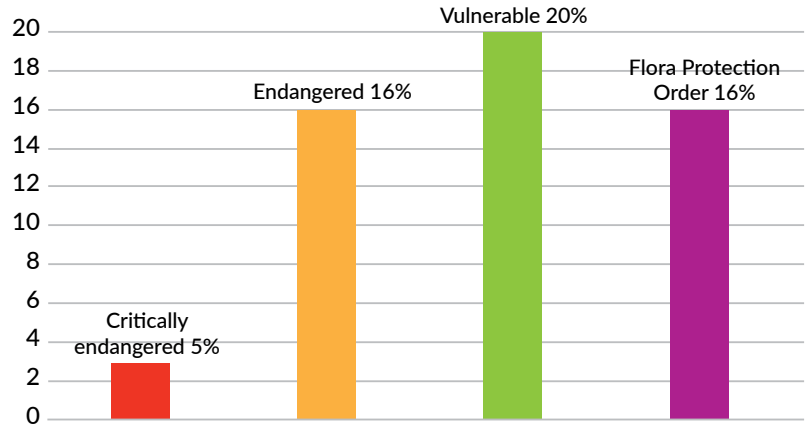

Figure 5.4: Percent rare and threatened vascular plant species monitored in situ 2018

Data extracted from NBDC 2018 and surveys of Achillea *maritima*, *Equisetum x moorei* (NBG), *Lycopodiella inundata* & *Trichomonas speciosum* (EU Article 17 report)

5.7.9 Conservation management plans and objectives have been drawn up for a number of protected areas. The plans include a management framework section that outlines conservation objectives and strategies https://www.npws.ie/protected-sites/conservation-planning/available-plans.

References

FitzPatrick, Ú., Regan, E. and Lysaght, L. (editors). 2010. Ireland's Biodiversity in 2010: State of Knowledge. NBDC. http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Irelands-Biodiversity-20101.pdf

NBDC 2017 newsletter: Rare Plant Monitoring Newsletter 2017

NBDC 2018 newsletter: Rare Plant Monitoring Newsletter 2018

Walsh, A., Finn, J., Jebb, M. Waldren, S. & Sullivan, C. (2015) The distribution of vascular plant species of conservation concern in Ireland, and their coincidence with designated areas. *Journal of Nature Conservation* 24: 56-62.

Measures are on track to achieve target at national level.

GSPC Target 8: At least 75% of threatened plant species in ex situ collections, preferably in county of origin, and at least 20 % available for recovery and restoration programmes.

National Target 8: All threatened plant species in accessible ex situ collections, and all Critically Endangered and Endangered category species included in effective conservation management programmes

5.8.1 Since publication of the first vascular plant Red Data Book nearly 30 years ago, Ireland's landscape and management of has been subject to many changes, and not surprisingly a change in the number of plants in threatened categories has also occurred. The number of critically endangered species increased by 25% (15 to 20 species); the endangered category increased by 24% (19 to 25 species) and most changes were observed in the vulnerable category with an increase of 39% (37 to 61 species). In the most recent red data book assessment (2016), 106 species (8.8%) are assigned an IUCN Red List threat category; 20 of these species (1.7%) are Critically Endangered, 25 (2.1%) are Endangered and 61 species (5.0%) are Vulnerable. However, in highlighting these increases it must be noted that any increase must be interpreted with caution, as the two publications utilised different assessment criteria, so analysis of category change between the two publications may not be an accurate reflection of change.

5.8.2 Work on cultivating all threatened species of vascular plants is ongoing on a species-by-species basis at the National Botanic Gardens and Trinity College Botanic Gardens have a number of threatened Irish species in their collections. The living collections catalogue at the National Botanic Gardens contains a database of the living and seed collections within the garden. The database has 120 accessions of legally protected Flora Protection Order (FPO) species. This represents 33 threatened plant species for various locations around Ireland. Of the Flora Protection Order 2015 species list as a list of threatened plant species. Out of 68 species of vascular plants in the FPO, the NBG currently has 22 species (32%) in the native pot collection, which in theory could be bulked up for a restoration programmes.

5.8.3 Of the 106 Irish red listed plant species, the NBG hold 40 species (38%) well below the target of 75% but exceeding the 20% target, which are available for restoration, as living material can be bulked for restoration programmes. NBG currently holds 40% of the critically endangered species, 28% of the endangered and 41% of the vulnerable species.

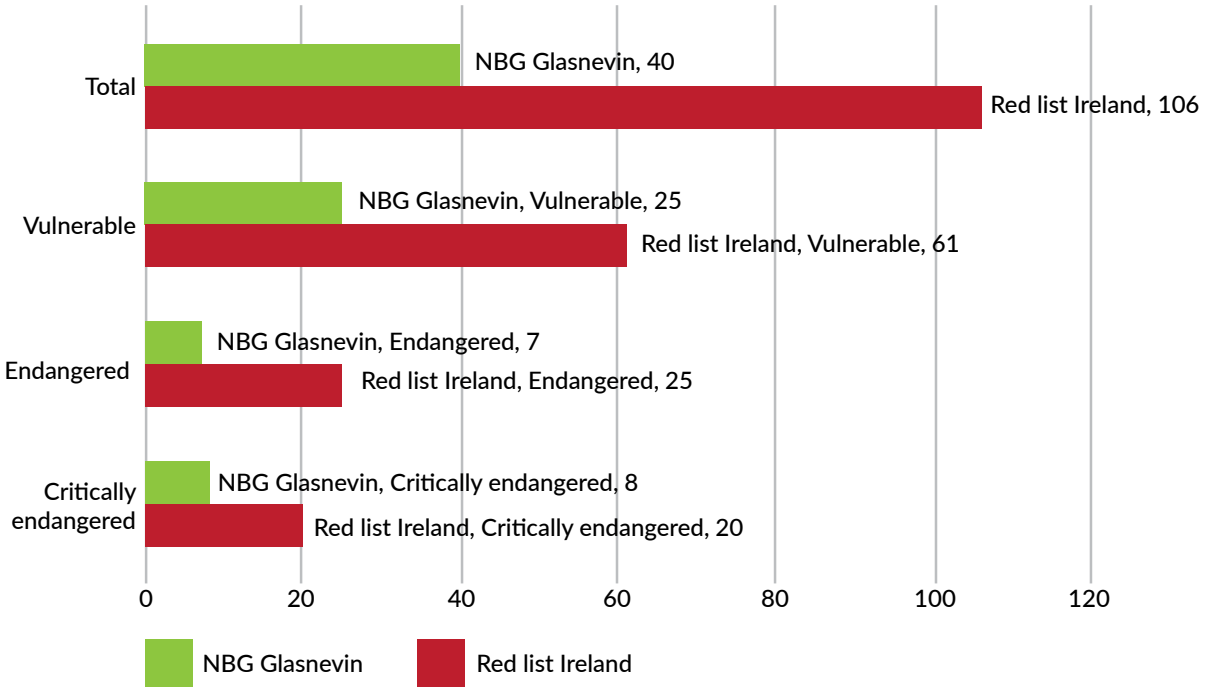

Figure 5.5: Number of threatened species conserved ex situ at National Botanic Gardens

NBG Living plant collections database 2019.

5.8.4 TCD Botanic Gardens has previously led on various collecting and species recovery programmes for some of Irelands most threatened species e.g. *Gymnocarpium robertianum*, *Achillea maritima* and *Inula salicina*. Trinity College Botanic Gardens also house a seed bank of Irish flora with 165 seed collections, representing 59 plant species classified in The Irish Red Data Book as either threatened, rare or possibly extinct. (https://www.irishtimes.com/news/endangered-plants-are-protected-in-freezers-1.172692)

5.8.5 A project launched by PlantNetwork: the Plant Collections Network of Britain and Ireland in relation to Target 8 is still ongoing through there has been less inputs more recently. The project has a set of eight sub-targets in order to develop three major goals:

- a complete database of cultivation and propagation protocols for all the threatened plant species of Britain and Ireland;
- formation of partnerships between ex situ and in situ conservation efforts, through developing horticultural knowledge of these species;
- to increase the number of species in cultivation so as to provide material for experimental or public awareness programmes.

https://plantnetwork.org/plantnetwork-projects/target-8-project-summary/.

5.8.6 Overall it can be said that recent red lists of Irish threatened vascular and bryophyte plant species do exist to form the basis for national actions going forward, however more species need to be accessible in ex situ collections.

😐 Progress towards target at national level but at an insufficient rate.

GSPC Target 9: 70% of the genetic diversity of crops, including their wild relatives and other socio-economically valuable plant species conserved, while respecting preserving and maintaining associated indigenous and local knowledge.

National Target 9: Conserve the genetic diversity of all known indigenous traditional Irish agricultural plant varieties of crops, land races and crop relatives as well as other socio-economically valuable plant species

5.9.1 Ireland has a full list of all traditional Irish-bred agricultural plant varieties and this list is available on the EURISCO website which, provides information about 1.8 million crop plant accessions preserved by almost 400 institutes in Europe http://eurisco.ecpgr.org.

5.9.2 Many agricultural crops bred in Ireland today supply small and specialist markets including malting Barleys and Sugar Beet. There is increasing interest in heritage varieties of grain crops for craft brewing and DAFM have projects to genetically characterise these varieties. Teagasc at Oakpark maintain the forage genebank with the heritage varieties of grasses and clovers.

5.9.3 The Irish Seed Savers Association (ISSA) in Capparoe is a charity set up to preserve the agricultural biodiversity of Ireland. Backweston is the national gene bank for food crops. ISSA has been providing DAFM with duplicates of regenerated Irish accessions over the past years.

The following progress has been made:

- The ISSA apple collection has been DNA profiled which has resulted in great progress, but has raised as many questions as it has answered: further follow-up investigation of historical documents and interviewing of relevant people required to complete.
- A recent inventory of all Irish landraces has been commissioned by DAFM and compiled by Dr Tom Curtis (2014). This list includes all of Irish Seed Savers' landraces accessions, except for potatoes and fruit trees.
- GLAS promotes the use of some crop varieties (Traditional Orchards) but the work carried out under this scheme needs to be evaluated.
- There is an "Incredible Edibles" programme for schools through Agri Aware.
- ISSA have a dedicated Education officer who works with schools on their syllabus for biodiversity. The education project makes children aware of the importance of agricultural diversity.
- Trinity College Dublin, Backweston & National Botanic Gardens are all working on projects and collections in relation to Genetic Heritage Ireland Landraces.

Reference

Curtis, T. 2014. Report on the production of a genetic conservation strategy for plants in Ireland: crop wild relatives and landraces. Report to the Department of Agriculture, Food and the Marine: Conservation of genetic resources grand aid scheme for food and agriculture.

Measures are on track to achieve target.

GSPC Target 10: Effective management plans in place to prevent new biological invasions and to manage important areas for plant diversity that are invaded.

National Target 10: Management plans in place for at least 10 major alien species that threatened plants, plant communities and associated habitats and ecosystems in Ireland

5.10.1 In Ireland, under the EC (Birds and Natural Habitats) Regulations 2011 (SI 477/2011), a Third Schedule list of non-native plants, animals and vectors are included. For third schedule listed species the two most relevant regulations that apply to them are: Regulation 49 Prohibition on introduction and dispersal of certain species and Regulation 50 Prohibition on dealing in and keeping certain species. EU regulation 1143/2014 on Invasive Alien Species (IAS) entered into force January 1st 2015. The list of Invasive Alien Species of Union concern – (the Union list) outlined in Commission Implementing Regulation 2016/1141, comprises of 37 species (23 animals and 14 plants) this was added to in 2017, with a further 12 species (3 animals and 9 plants).

5.10.2 Three plant species have been the focus of some control and monitoring projects. Large scale control and management programmes were implemented for curly water weed (*Lagaropsion major*) (CAISIE 2013, Caffrey *et al* 2011 & 2010), Hottentot fig (*Carpobrotus edulis*) and Giant Rhubarb (*Gunnera tinctoria*) by the National Botanic Gardens (OPW), Mayo & Fingal Co. Council (Smyth 2013 a & b) and other Co Councils such as Longford has begun to step up actions on invasive species.

5.10.3 General Invasive species case studies control and management can be found on the NBDC website (http://www.biodiversityireland.ie/category/invasive-species-news/ coflynn@biodiversityireland.ie).

5.10.4 Risk assessments for invasive species based on the Non-native Species Application Based Risk Analysis (NAPRA) tool. NAPRA is a computer-based tool for undertaking risk assessment of any non-native species developed by the European and Mediterranean Plant Protection Organisation (EPPO) and adapted for Ireland and Northern Ireland by Invasive Species Ireland. Inland Fisheries Ireland (IFI), the NBDC and external expert reviewers developed the assessments. A full list of the species for which risk assessments were conducted is provided on the Species List (http://nonnativespecies.ie/species-list/)

5.10.5 The following plant species were risk assessed using NAPRA tool in Ireland.

- *Allium triquetrum* (Three-cornered Leek)
- *Aponogeton distachyos* (Cape Pondweed)
- *Azolla filiculoides* (Water Fern)
- *Carpobrotus edulis* (Hottentot-fig)

- *Crassula helmsii* (Australian Swamp Stonecrop)
- *Egeria densa* (Large-flowered Waterweed)
- *Elodea canadensis* (Canadian Pondweed)
- *Elodea nuttallii* (Nuttall's Pondweed)
- *Gunnera manicata* (Brazilian Giant-rhubarb)
- *Gunnera tinctoria* (Giant-rhubarb)
- *Hippophae rhamnoides* (Sea-buckthorn)
- *Hyacinthoides hispanica* (including *H. non-scripta x H. hispanic*a) (Spanish Bluebell)
- *Hydrocotyle ranunculoides* (Floating Pennywort)
- *Impatiens glandulifer*a (Himalayan Balsam)
- *Juncus planifolius* (Broad-leaved Rush)
- *Lagarosiphon major* (Curly-leaved Waterweed)
- *Ludwigia* (*L. grandiflora*, *L. peploides* and *L. hexapetala*) (Water-primrose)
- *Lysichiton americanus* (American Skunk-cabbage)
- *Myriophyllum aquaticum* (Parrots Feather)
- *Nymphoides peltata* (Fringed Water-lily)
- P*ersicaria perfoliata* (Mile-a-minute Weed)
- *Pistia stratiotes* (Water Lettuce)
- R*hododendron ponticum* (including *R. x superponticum*) (Rhododendron)
- *Rubus spectabilis* (Salmonberry)

5.10.6 A campaign to engage with the Horticultural sector in Ireland to prevent introductions and spread of invasive plants and hitchhiker species was undertaken. This included development of the Horticulture Code of Practice (http://invasivespeciesireland.com/wp-content/uploads/2010/07/Horticulture-Code-Final.pdf) and launch of the Plant Wise Campaign for Ireland.

5.10.7 The planting of wildflower seed is increasing, partly driven by the All-Ireland Pollinator Plan. The Plan strongly recommends planting only native, local provenance wildflower seed. From 2017 will assess how much wildflower seed is being used and from what source. Studies are necessary to assess the risk of genetic pollution to native populations of some of the more commonly introduced species (http://pollinators.ie/).

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😐 Progress towards target at national level but at an insufficient rate

GSPC Target 11: No species of wild flora endangered by international trade

National target 11: No species of wild flora endangered by international trade

5.11.1 Ireland's target of ensuring that "no species of wild flora is endangered by international trade" is met primarily by our implementation of the CITES Convention (www.cites.org) and also the EU Wildlife Trade Regulations (http://ec.europa.eu/environment/cites/legislation_en.htm), which are somewhat stricter than the CITES Regulations. Ireland became a Party to CITES in 2002. In terms of monitoring our implementation of CITES, Ireland submits annual reports to the EU and national reports on a biennial basis to the CITES Secretariat (these are available on the CITES website at https://cites.org/eng/cms/index.php/component/cp/country/IE/national-reports).

5.11.2 Ireland is represented at EU Scientific Review Group (SRG) and Expert Group (EG) meetings which focus on day-to-day sustainable trade and implementation of CITES Regulation 2017/160 in rare plant and animal species within the EU.

5.11.3 It is worth noting that there is a Resolution in CITES (Resolution Conf. 16.5 Cooperation with the Global Strategy for Plant Conservation of the Convention on Biological Diversity (https://cites.org/eng/res/16/16-05.php) formally recognises the link between CITES and GSPC.

5.11.4 The NPWS commissioned a review on wildlife trade in Ireland, carried out by UNEP-WCMC. Ferriss, S. E., Inskipp, T.P., Kloda, J. & Sinovas, P. (2007) Wildlife Trade in Ireland – A Review. Confidential Report to the National Parks and Wildlife Service, Ireland. UNEP World Conservation Monitoring Centre. Although this report was not made publically available, it was useful in the development of the "National CITES enforcement plan, 2010-2015" which was developed in conjunction with Revenue Customs Service.

5.11.5 For the non-CITES listed species, of relevance to the issue of plant-based product importations is the EU timber regulation managed by the Department of Agriculture, food and the Marine (http://ec.europa.eu/environment/forests/timber_regulation.htm), which forms part of the EU's FLEGT (Forest Law Enforcement, Governance and Trade) Action Plan (http://www.euflegt.efi.int/home).

🙂 Measures are on track to achieve target.

GSPC Target 12: All wild harvested plant based products sourced sustainably.

National Target 12: All plant-based products derived from Irish wild plant resources to be harvested from sustainably managed sources

5.12.1 One key area for Ireland with regard to this target is the harvest of seaweeds, prior to the issuing of a licence to harvest seaweed; consultation occurs with the Marine Institute and other statutory consultees to ensure the environmental sustainability of the harvest. Irish legislation covering seaweed harvest is contained within the Foreshore Act 1933.

Measures are on track to achieve target.

GSPC Target 13: Indigenous and local knowledge innovation and practices associated with plant resources maintained or increased, as appropriate, to support customary use, sustainable livelihoods, local food security and health care.

National Target 13: Safeguard the traditional practices based on plant resources, and their associated knowledge, that support local communities and their livelihoods in Ireland

5.13.1 There was a need for information on indigenous and local knowledge and practices associated with Irish plant resources. This gap has been partially met through the publication of a book called *"Ireland's Generous Nature: The Past and Present Uses of Wild Plants in Ireland"* (2014) by Dr Peter Wyse Jackson. There are national groups that focus on plant species and aspects of Irish culture including the Irish basket-makers association, the Hedge-Laying Society of Ireland, the Coppice Association of Ireland, the Thatcher's Guild.

Reference

Wyse Jackson, P. (2014) Ireland's Generous Nature: The Past and Present Uses of Wild Plants in Ireland. Missouri Botanical Garden Press, St. Louis.

Measures are on track to achieve target.

GSPC Target 14: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.

National Target 14: Ensure that plant conservation and biodiversity issues are incorporated into the formal education curricula at all levels, and in informal education and national public awareness programmes

5.14.1 The National Botanic Gardens act as the focal point for the Global Strategy for Plant Conservation and act as the National Plant Conservation Strategy coordinators. Visitor numbers to the gardens remain at over half a million people per annum. In 2018, the number of visitors recorded was 655,606 which approximates to 15% the total Irish population between the ages of 5-65.

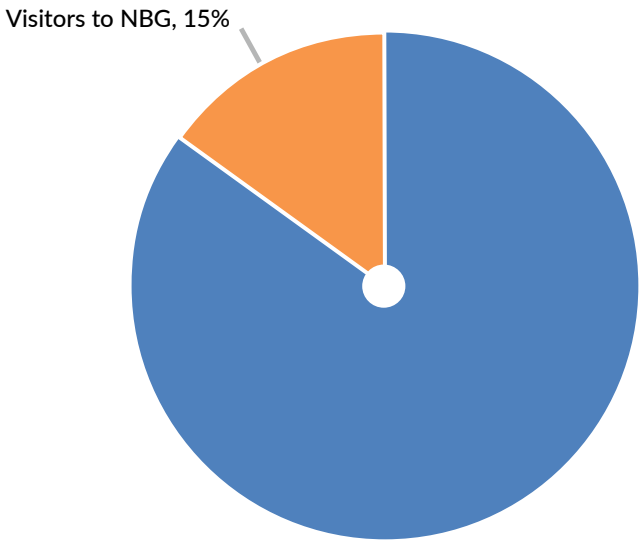

Figure 5.6: Number of people who visited the National Botanic Gardens in 2018

Data source: https://www.cso.ie/en/releasesandpublications/ep/p-cp3oy/cp3-/.

5.14.2 The National Botanic Gardens Science and Learning Education Team (http://botanicgardens.ie/science-and-learning/) manage an extensive education programme highlighting plants, conservation and plant diversity to a wide range of audiences. A total of 25,469 people attended specific lectures, tours and workshops and 51% (13,088) attended events focused o n plant diversity and conservation.

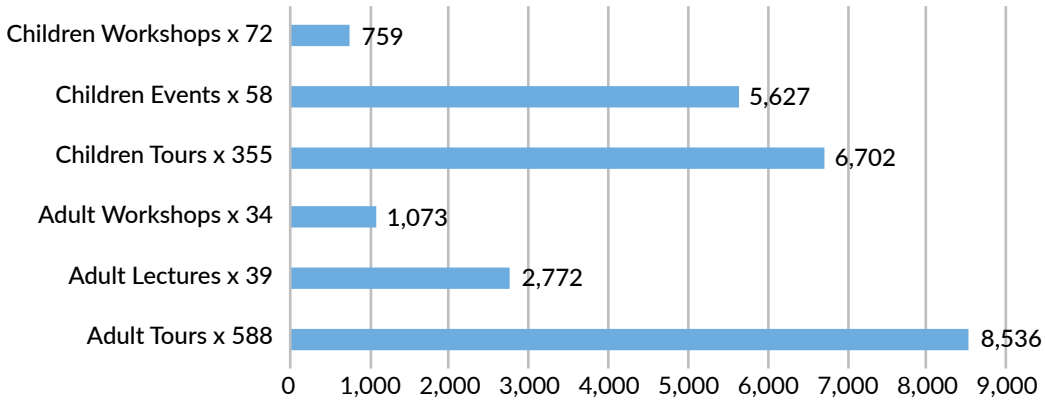

Figure 5.7: Number of people attending workshops at the National Botanic Gardens 2018

Data source: NBG Education and Learning Department

5.14.3 Ireland has various networks to communicate the importance of plant diversity with many national radio, TV and newspaper columns dedicated to biodiversity e.g. a daily radio show Mooney goes wild, https://www.rte.ie/radio1/mooney/ and Michael Viney's regular weekly column in the Irish Times which often covers plants and ecosystems (see also 3.3.8).

5.14.4 At the schools level for primary school level 'Environmental Awareness and Care' and 'Living Things' is covered in the curriculum. Native plant ecology is incorporated in secondary & post-secondary curricula, e.g.

- Junior Certificate Science Syllabus contains 'Ecology', which covers 'Conservation'. The new syllabus mentions ecosystems and conserving biodiversity.
- Leaving Certificate Biology Syllabus covers 'General Principles of Ecology' and 'Human impact on an ecosystem' with 'define conservation' mentioned.
- Transition Year programmes include 'Environmental Studies' and 'Green Schools Programme'.

5.14.5 There are a number of national conservation focused organisations, networks, societies and local groups focused on national and international plant species conservation.

National Plant Conservation Organisations:

- NPWS https://www.npws.ie/ - 6 national parks host a variety of education events throughout the year. https://www.npws.ie/national-parks
- NBG (OPW) www.botanicgardens.ie run an extensive education programme highlighting plants and plant diversity to a wide range of audiences
- NBDC http://www.biodiversityireland.ie/ - offer citizen science training and invasive species workshops throughout Ireland.

National native plant networks:

The Botanical Society of Britain and Ireland are very active in the area of communication, education and awareness and an Irish Officer for the society is in place and based at the National Botanic Gardens. BSBI https://bsbi.org/ - with over 200 members, the BSBI run field meetings, training events and surveys throughout the year.

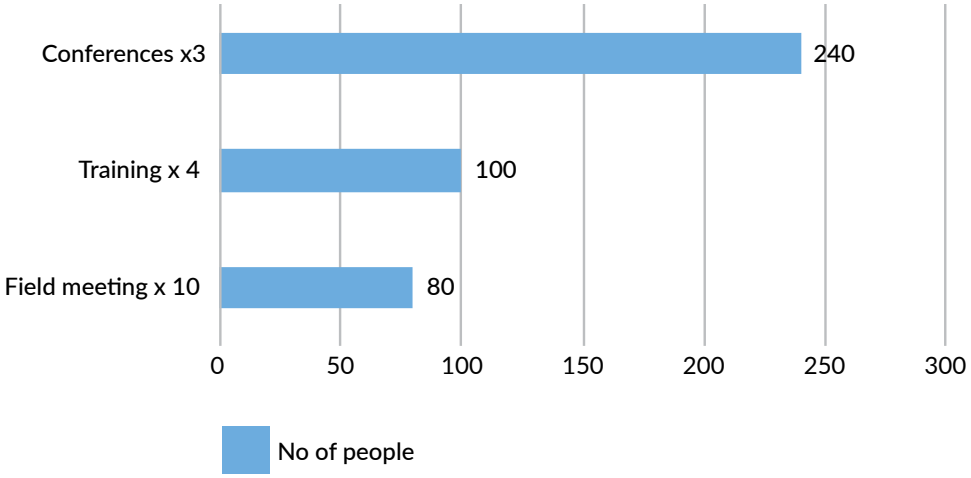

Figure 5.9: BSBI event participants 2018

Data source. M. Long BSBI Irish Officer

Dublin Naturalist Field Club http://www.dnfc.net/

British Bryological Society Irish regional group http://www.britishbryologicalsociety.org.uk/

General horticultural plant societies, which often feature plant conservation issues for members:

Irish Garden Plant Society http://irishgardenplantsociety.com/

Alpine Garden Plant Society – Dublin Branch https://www.alpinegardensociety.net/

Cacti & Succulent Society http://www.irelandcactus.com/2018.htm

Irish Orchid Society http://www.irishorchidsociety.org/

Royal Horticultural Society of Ireland https://www.rhsi.ie/

Many local groups promote nature conservation by offering public events and are involved in the education and increasing awareness of the need for conservation as well as information on invasive species e.g. Cork Nature Network .

Measures are on track to achieve target.

GSPC Target 15: The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this strategy.

National Target 15: The number of trained people working with appropriate facilities in plant conservation is increased, as required, to achieve the targets of this strategy

- Irish Universities that offer plant ecology and conservation courses include Trinity College Dublin, University College Dublin, National University of Ireland Galway and other Institutes of Technology (IT) around the country.
- Waterford Institute of Technology (IT) runs a 10 week Irish Wildlife Conservation course
- Tralee IT offer a Degree programme in wildlife management.
- TCD run a specific Biodiversity and Conservation Masters course
- National Botanic Gardens regularly provide Irish Botany Courses www.botanicgardens.ie
- Teagasc incorporate biodiversity and ecology into horticultural training https://www.teagasc.ie/education/teagasc-colleges/botanic-gardens/
- BSBI offer training courses on all aspects of plant identification https://bsbi.org/

Measures are on track to achieve target at national level.

GSPC Target 16: Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this strategy.

National Target 16: A broadly based Irish network for plant conservation is established to achieve the targets for this strategy

- All our national plant conservation organisations and institutions manage and coordinate on national biodiversity projects e.g. NPWS https://www.npws.ie/ , NBDC http://www.biodiversityireland.ie/, NBG www.botanicgardens.ie, Trinity College Botanic Garden, Teagasc. DAFM etc.
- Some excellent plant conservation research is conducted at Irish Universities and Institutes e.g. TCD, UCD, NUI Galway, and the various Institutes of technology around the country.
- University College Dublin is involved with FESPB (Federation of European Societies of Plant Biology) and EPSO (European Plant Science Organisation) – both place significant importance to plant conservation particularly through their economic and environmental benefits.

Measures are on track to achieve target at national level.

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