

Sixth National Report to the United Nations Convention on Biological Diversity: United Kingdom of Great Britain and Northern Ireland

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Sixth National Report to the United Nations Convention on Biological Diversity: United Kingdom of Great Britain and Northern Ireland

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Version history

Version	Date	Update
1.0	11/3/2019	
2.0	27/3/2019	Correction made by JNCC to typo on page 115.

Section I. Information on the targets being pursued at the national level

If your country has set and/or adopted national targets or equivalent commitments related to the Strategic Plan for Biodiversity 2011-2020 please use the following template to describe them. Please complete this template for each of your country's national targets. National targets entered in this section will be linked to section III so that progress in their implementation can be assessed. If your country has not set or adopted any national targets related to the Strategic Plan for Biodiversity 2011-2020 please indicate so in the first box and move to section II.

<p>I. Information on the targets being pursued at the national level</p> <p><input type="checkbox"/> My country has adopted national biodiversity targets or equivalent commitments in line with the Strategic Plan for Biodiversity 2011-2020 and the Aichi Targets</p> <p>or</p> <p><input checked="" type="checkbox"/> My country has not adopted national biodiversity targets and is reporting progress using the Aichi Biodiversity Targets for reference. (Move to section II. In section III, the Aichi Biodiversity Targets should be used for the purpose of this report as the national targets and progress should be assessed towards their achievement in the national context.)</p>
<p>National Target (Please use the official title, if available)</p> <p><Text entry></p>
<p>Rationale for the national target</p> <p><Text entry></p>
<p>Level of application (Please specify the level to which the target applies):</p> <p><input type="checkbox"/> Regional/multilateral – please indicate area concerned <Text entry></p> <p><input type="checkbox"/> National/federal</p> <p><input type="checkbox"/> Subnational – please indicate area concerned <Text entry></p>
<p>Relevance of the national targets to the Aichi Biodiversity Targets (Links between national targets and Aichi Biodiversity Targets.)</p> <p>Main related Aichi Biodiversity Targets (Please select one or more Aichi Biodiversity Target to which the national target is wholly or partially related. Parties can select an entire target or a target component (not shown below))</p> <p> <input type="checkbox"/> 1 <input type="checkbox"/> 6 <input type="checkbox"/> 11 <input type="checkbox"/> 16 <input type="checkbox"/> 2 <input type="checkbox"/> 7 <input type="checkbox"/> 12 <input type="checkbox"/> 17 <input type="checkbox"/> 3 <input type="checkbox"/> 8 <input type="checkbox"/> 13 <input type="checkbox"/> 18 <input type="checkbox"/> 4 <input type="checkbox"/> 9 <input type="checkbox"/> 14 <input type="checkbox"/> 19 <input type="checkbox"/> 5 <input type="checkbox"/> 10 <input type="checkbox"/> 15 <input type="checkbox"/> 20 </p> <p>Other related Aichi Biodiversity Targets (Please select one or more Aichi Biodiversity Target to which the national target is indirectly related.)</p> <p> <input type="checkbox"/> 1 <input type="checkbox"/> 6 <input type="checkbox"/> 11 <input type="checkbox"/> 16 <input type="checkbox"/> 2 <input type="checkbox"/> 7 <input type="checkbox"/> 12 <input type="checkbox"/> 17 </p>

☐ 3 ☐ 8 ☐ 13 ☐ 18
☐ 4 ☐ 9 ☐ 14 ☐ 19
☐ 5 ☐ 10 ☐ 15 ☐ 20

or

☐ National target has no corresponding Aichi Biodiversity Target or relates to other parts of the Strategic Plan for Biodiversity – please explain

<Text entry>

Other relevant information (Please use this field to provide any other relevant information, such as the process of developing and adopting the national target, the stakeholders involved or the strategies and plans in which this national target has been included.)

<Text entry>

Relevant websites, web links, and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this national target can be found.)

<Add link> <Add file>

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

Using the template below, please report on the major measures your country has taken to implement its national biodiversity strategy and action plan. Please also provide an assessment of the effectiveness of these measures. The template should be replicated for each measure reported.

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Delivering an ecologically-coherent and well-managed network of Marine Protected Areas (MPAs) to safeguard marine biodiversity in United Kingdom seas

The United Kingdom (UK), its Crown Dependencies (CDs) and Overseas Territories (OTs) are responsible for the fifth-largest marine estate in the world. Marine Protected Areas (MPAs) are one of the tools that can help society to protect the marine environment, whilst also enabling its sustainable use, ensuring it remains healthy and contributes to our society for generations to come.

Transposition of European legislation into UK law, as well as the enactment of several ground-breaking 'Marine Acts', has enabled UK Governments to pave the way towards the development of an MPA network that is representative of UK marine life, where MPAs are considered to be the most appropriate conservation mechanism. All UK Governments are committed to the development and maintenance of an ecologically-coherent and well-managed MPA network by 2020 as set out in the Joint UK Administrations Statement 2012.

As of November 2018, there were 314 MPAs covering nearly 24% of the UK's marine area (Figure 1). All four countries exceed the 10% spatial coverage target set out under Aichi Target 11 (notwithstanding the contribution that other effective area-based conservation measures (OECMs) might add to the total (e.g. the work of Cunningham *et al.* 2011). Notably, the extent of MPA coverage across the UK has increased ten-fold since 2007 and further designations are being planned to address remaining gaps in the network in England, Wales and Scotland that are due to be formally designated by 2020.

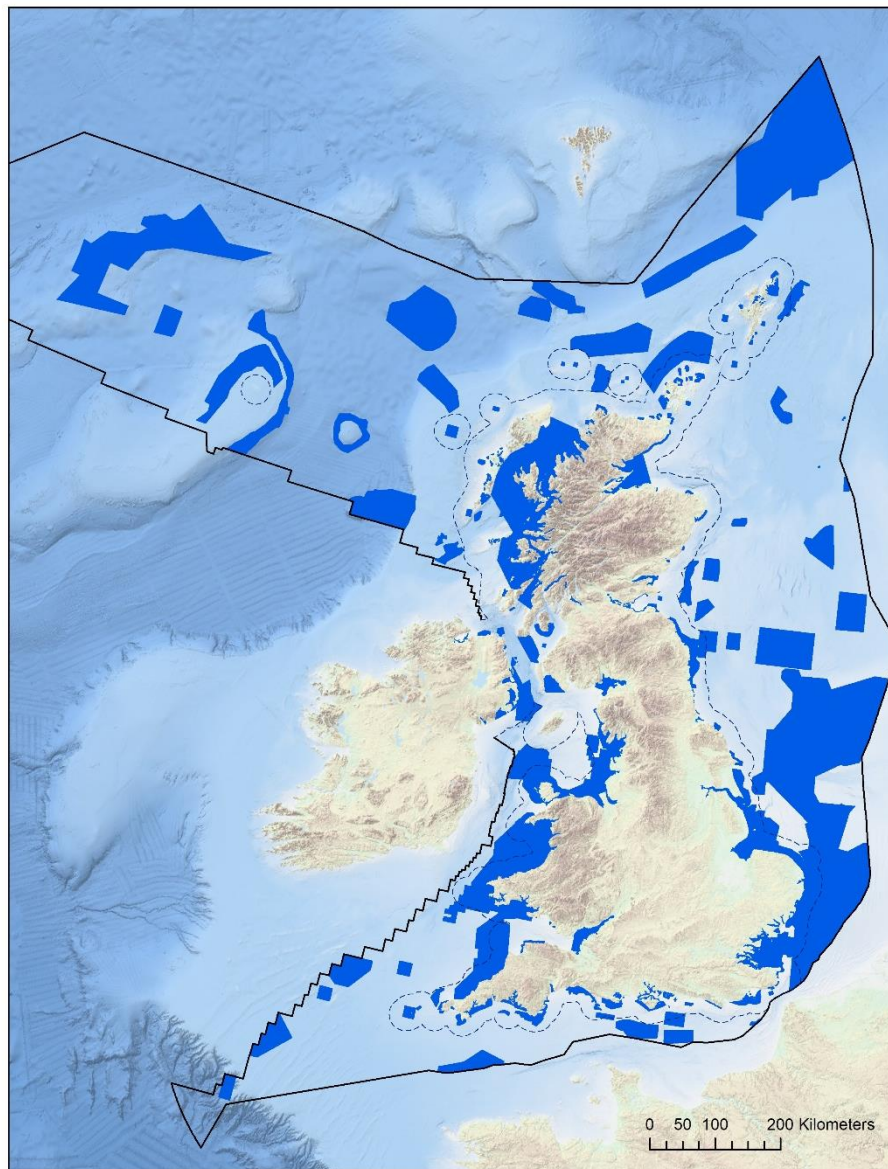


Figure 1: UK Marine Protected Area network covering 24% of UK waters.

A suite of new marine Special Protection Areas (SPAs) for birds have been identified and classified over the past few years, as a result of the very significant UK-wide effort at identifying a suite that will be ecologically coherent and well-managed. More are in the pipeline, but it is too soon to announce them yet. At the same time JNCC is working with governments in the UK to take stock of not just the marine SPA suite but also the role that wider measures play in marine (bird) conservation and the pressures and threats birds face. The UK has committed to assessing the adequacy of the marine SPA suite at the culmination of its programme of site identification and classification. A Network Assessment has recently been undertaken to confirm the contribution the marine SPAs make to the marine MPA network in Scottish waters. An appropriate mix of site-based and wider measures is being addressed in a Scottish Seabird Conservation Strategy, recently announced by Scottish Government. Similar action is being developed elsewhere in the UK.

Work is also ongoing in the UK's CDs and OTs to extend and enhance protection in the extensive marine space that surround these countries.

In 2017, the Bailiwick of Jersey protected two offshore reefs, Les Écréhous and Les Minquiers, from mobile fishing gear; strengthening protection for these areas and building on their designation in 2004 as wetlands of international importance under the Ramsar Convention. These MPAs cover an area of 62 km²; around half the land area of Jersey itself. In addition, Jersey has 88 km² of similarly protected marine areas along its coasts which means that, in total, 6.5% of their territorial waters are protected from mobile fishing gear.

As of June 2016, the Isle of Man has designated 10 MPAs encompassing 10.4% of Manx waters. Large-scale MPAs have already been established around the British Indian Ocean Territory (640,000 km² designated in 2010); South Georgia & the South Sandwich Islands (1 million km² designated in 2013); and the internationally agreed MPA on the Southern Shelf of the South Orkney Islands, British Antarctic Territory (94,000 km² in 2009).

The Blue Belt Programme supports the delivery of the UK Government's commitment to enhance marine protection of the marine environment across UK OTs. Since its commencement in 2016 the UK and its OTs have announced a number of initiatives, including:

- a full no-take MPA around Pitcairn's EEZ, established in 2016 (840,000 km²);
- a sustainable use MPA declared by St Helena in 2016 across its 445,000 km² maritime area;
- marine spatial planning around Montserrat, facilitated pro-bono by the Waitt Institute;
- Ascension Island Government has agreed an evidence-based MPA closed to commercial fishing, covering at least half of its 445,000 km² maritime zone by 2019; and
- Tristan da Cunha is developing a regime for protecting the waters across its maritime zone of 750,000 km² by 2020.

Of the approximately 6.8 million square kilometres of ocean surrounding the UK and its Overseas Territories, the UK has committed to developing measures to ensure the protection of 4 million square kilometres by 2020 (<https://marinedevelopments.blog.gov.uk/2017/09/05/uk-blue-belt-global-ambitions-for-marine-protection/>). Work on identifying opportunities and designating smaller MPAs domestically and within the CDs is ongoing (See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729608/Blue_Belt_Annual_report_2018_Update_ONLINE.pdf for the 2017/18 report).

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

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.

Related targets:

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 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.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

- ☐ Measure taken has been effective
☒ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

The UK Governments have followed a number of key principles in their development of an ecologically-coherent MPA network. These principles were derived from OSPAR Commission guidance (OSPAR, 2006):

- Features: the network should represent the range of habitats and species for which MPAs are considered appropriate – with a greater proportion of particularly threatened and/or declining features.
- Representativity: the network should include areas that best represent the range of habitats and species.
- Connectivity: the network should comprise MPAs that are well-distributed and take into account linkages between marine systems.
- Resilience: the network should include more than one example of a feature in individual MPAs and ensure they are of sufficient size to deliver conservation benefits.
- Management: the network should ensure the protection of marine habitats and species for which an MPA has been identified.

MPA selection processes in the UK have sought to protect examples of the range of marine life. These features include representative habitat types such as subtidal sedimentary communities, as well as more unusual seabed habitat types such as deep-sea sponge aggregations – a feature considered to be under threat and subject to decline across the North-east Atlantic. By example, all 23 broad-scale habitat types occurring in English waters are protected within MPAs more than once across all regions in which the feature occurs (Carr *et al.*, 2016). In Scotland, the MPA network affords protection to all known sub-types of habitats and species across their geographic range where MPAs are considered an appropriate conservation mechanism (Cunningham *et al.*, 2015).

Scientific understanding of the ability of marine animals and plants to disperse, and over what distance they do so, is limited. Consequently, a proxy is used to assess whether MPAs are well-connected: the OSPAR guidance states that nearshore/coastline MPAs should be less than 250 km apart and offshore MPAs (beyond 12 nautical miles) no more than 500 km apart. The UK MPA network exceeds this target, but there is much scientific understanding that needs to be developed in the area of MPA network connectivity.

As part of reporting activities to the OSPAR Convention for the protection of the marine environment across the North-east Atlantic, the UK have undertaken an assessment of progress of the UK MPA network around the MPA cycle (Chaniotis *et al.* 2018; Figure 2). Whilst significant

progress has been made, there is much work still to be done to best ensure the UK MPA network and its constituent components are meeting their objectives.

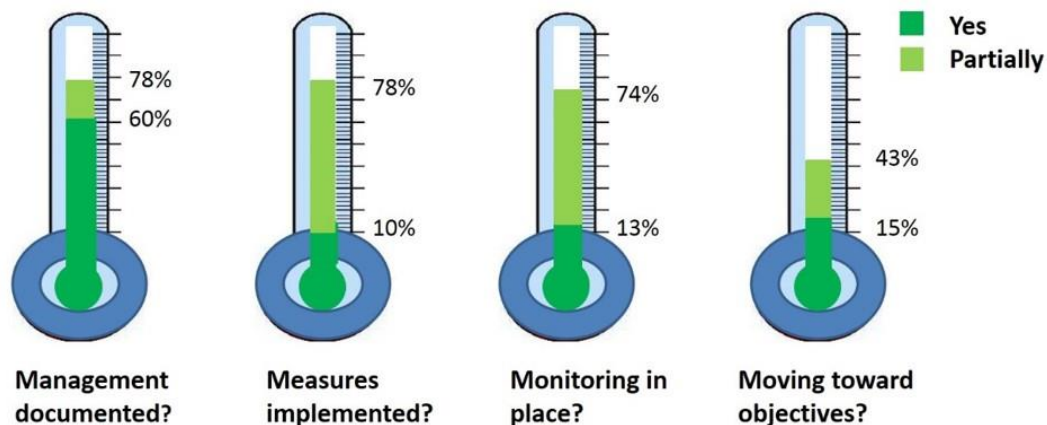


Figure 2: Progress on the management of all MPAs in the UK

The measure of 'moving towards objectives' is lower than the other thermometers because it is difficult to say with certainty whether the protected features of UK MPAs are moving towards or have met their conservation objectives while work is ongoing to implement the necessary management measures and for monitoring data to be collected that shows progress has indeed happened. Work moving forward will largely focus on the implementation of the management actions considered necessary to achieve the conservation objectives of the protected features of MPAs and collecting site condition monitoring information to help understand progress towards conservation objectives.

Summary of assessment

The UK has made substantial progress in the development of its MPA network. Work is ongoing to implement the management measures considered necessary to achieve the conservation objectives of the UK MPA network and its constituent components, and to put in place monitoring programmes to detect the effectiveness of these measures over time. There are still gaps in our knowledge of MPA network connectivity and how MPAs might be sustainably embedded into the wider seascape in the context of UK marine policy. While work is ongoing to realise all marine aspects of the target, the spatial coverage component has been met.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Carr *et al.* (2016). Assessing progress towards an ecologically coherent MPA network in Secretary of State Waters in 2016: Results. Available at:

http://jncc.defra.gov.uk/pdf/JNCC_NetworkProgressInSoSWaters2016_Results_Final.pdf.

Carr (2016) Assessing the contribution of Welsh MPAs towards an ecologically coherent MPA network in 2016: Results available at:

http://jncc.defra.gov.uk/pdf/JNCC_NetworkProgressWelshWaters_Final.pdf.

Chaniotis *et al.* (2018). Developing an ecologically-coherent and well-managed Marine Protected Area network in the United Kingdom: 10 years of reflection from the Joint Nature Conservation Committee, Biodiversity, DOI: 10.1080/14888386.2018.1467791.

Cunningham *et al.* (2011). Assessing the contribution of other area-based measures to the ecological coherence of the MPA network in Scotland's seas. Available at:

<http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/measures>

Cunningham *et al.* (2015). Assessment of the adequacy of the Scottish MPA network for MPA search features: summary of the application of stage 5 of the MPA Selection Guidelines post consultation. Available at: <http://www.snh.gov.uk/docs/A1567699.pdf>.

Joint UK Administrations Statement (2012) Joint UK Administrations Statement on an Ecologically Coherent MPA Network. Available at: <http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/engagement/UKMPANetworkStatement>.

OSPAR. 2006. Guidance on developing an ecologically coherent network of OSPAR marine protected areas (Reference number 2006-3). Available at: http://jncc.defra.gov.uk/pdf/06-03e_Guidance%20ecol%20coherence%20MPA%20network.pdf.

Scottish Marine SPA Network Assessment: <https://www.nature.scot/sites/default/files/2018-09/Scottish%20proposed%20SPA%20network%20assessment%20-%20September%202018.pdf>.

Other relevant information, including case studies to illustrate how the measure taken has resulted in (or is expected to result in) outcomes that contribute to the implementation of the NBSAP

The formal designation of MPAs is just one component of a wider cycle of work that must take place to ensure MPAs deliver tangible conservation benefits. This 'MPA cycle' is conceptualised in Figure 3 below (Chaniotis *et al.* 2018).

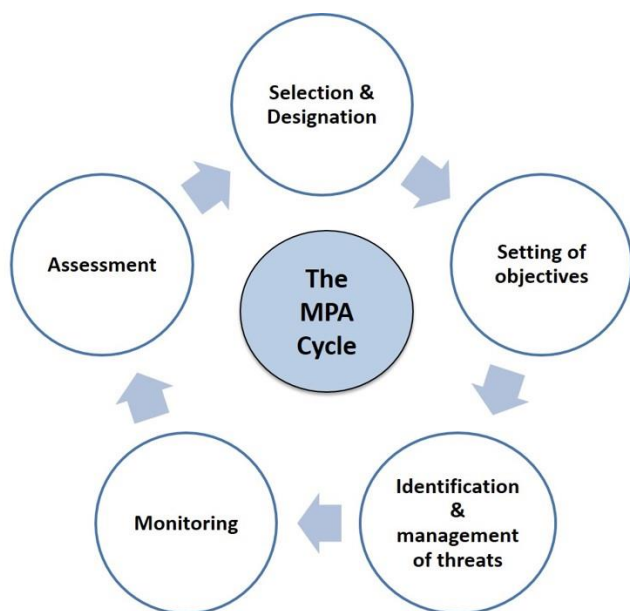


Figure 3: The MPA cycle

Setting of objectives: At the point of designation, all MPAs in the UK have draft high-level conservation objectives established and available. Work has been progressing across the UK Governments and its statutory advisors to further develop these high-level objectives; making them more operational to the range of users that need to assess the impacts of their activities against them and to use as a reference point to assess whether MPAs have achieved their objectives.

Identification and management of threats: At home and abroad, work is ongoing to implement management measures to address the threats that MPAs face and to determine how MPAs are nested within the wider seascape in the UK and within the Crown Dependencies and Overseas Territories. Marine plans in UK seas are due to be in place by 2021.

Monitoring and assessment: A strategy for marine biodiversity monitoring, including MPAs, is being developed. Once implemented, the strategy aims to:

- enable assessment of condition of the features within sites;
- enable assessment of the degree to which management measures are effective in achieving the conservation objectives for the protected features;
- support the identification of priorities for future protection and/or management; and,
- enable UK Governments to fulfil national and international assessment and reporting commitments in relation to MPAs and help identify where further action may be required.

To date, a large number of baseline and site condition monitoring surveys (e.g. see <http://jncc.defra.gov.uk/default.aspx?page=4543> for examples) of MPAs have been undertaken to help develop the start of a time series to detect change in condition of the protected features of MPAs. The UK has also undertaken a number of research and development related surveys to help test new approaches and develop new condition indicators to operationalise in the future.

Building ecological connections into the development of the MPA network around Scotland

The enactment of new national legislation in 2009 and 2010 paved the way for Scotland to further extend its network of MPAs. This network is intended to contribute to the conservation or enhancement of the marine environment. It is representative of the range of features present in the Scottish marine area. The Scottish MPA Selection Guidelines (Marine Scotland, 2011) set out the scientific process for the identification and selection of national MPAs for the protection of marine biodiversity and geodiversity interests.

Key to this process was the identification of areas considered to be of functional significance to the overall health and diversity of Scotland's seas. An ecosystems-based approach was adopted in order to identify national MPAs that complement the existing suite of sites in the network. In addition, available evidence was reviewed for areas of key functional importance around oceanographic features such as fronts, as well as physiographic features such as banks and mounds and seamounts.

The Firth of Forth Banks Complex MPA was one of the sites designated through this process (Figure 4). The outer Firth of Forth bank and mound features that make up this composite MPA are considered to be of wider functional significance to the health and diversity of Scotland's seas. These bank features support sand habitats suitable for the colonisation of sandeels (Wright *et al.*, 2000). Sandeels are a key prey item in the diet of top predators in the North Sea. Findings from the Centre of Ecology and Hydrology's long-term research programme based on the Isle of May demonstrate the critical importance of the Firth of Forth Banks to foraging seabirds, particularly black-legged kittiwake (*Rissa tridactyla*), northern gannet (*Morus bassanus*) and common guillemot (*Uria aalge*). The breeding success of the black-legged kittiwake has been linked to the availability of sandeels on the Firth of Forth Banks (Daunt *et al.* 2008) and seabirds nesting as far away as Berwick and Northumberland have been observed foraging in the Firth of Forth Banks area (Camphuysen *et al.*, 2011). Sandeels are provided with additional protection in the area by a precautionary fisheries closure.

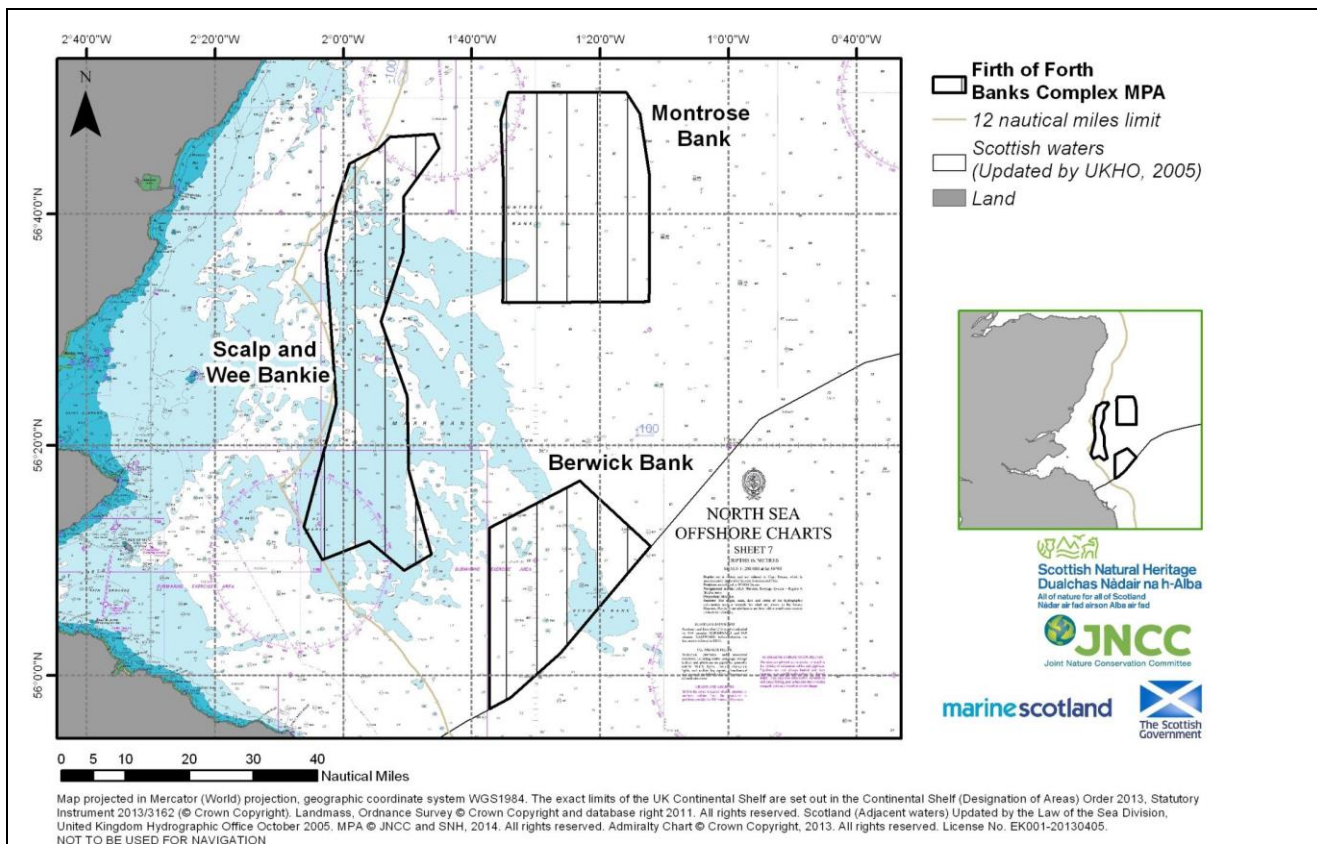


Figure 4: Location of the Firth of Forth Banks Complex MPA

Grey seal (*Halichoerus grypus*) are thought to use the bank areas, particularly the Wee Bankie and Berwick Bank, as foraging areas for sandeel and demersal fish (Prime and Hammond, 1990; McConnell *et al.*, 1999; Jones *et al.*, 2013). Berwick Bank is also thought to be an important spawning ground for European plaice (*Pleuronectes platessa*), the larvae of which may be important for repopulating exploited stocks along the east coast of England (Lockwood & Lucassen, 1984).

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information can be found)

Camphuysen *et al.* (2011) Distribution and foraging interactions of seabirds and marine mammals in the North Sea: a metapopulation analysis. Available at:

<http://www.abdn.ac.uk/staffpages/uploads/nhi635/ZSLpaper-kees.pdf>.

Chaniotis *et al.* (2018) Developing an ecologically-coherent and well-managed Marine Protected Area network in the United Kingdom: 10 years of reflection from the Joint Nature Conservation Committee. Biodiversity, doi:10.1080/14888386.2018.1467791.

Daunt *et al.* (2008) The impact of the sandeel fishery on seabird food consumption, distribution and productivity in the northwestern North Sea. Canadian Journal of Fisheries and Aquatic Science 65: 362-81. doi:10.1139/F07-164.

Jones *et al.* (2013) Grey and harbour seal density maps. Report from the Sea Mammal Research Unit to Marine Scotland. Available online from:

<http://www.scotland.gov.uk/Resource/0041/00416981.pdf>

Lockwood & Lucassen (1984) The recruitment of juvenile plaice (*Pleuronectes platessa*) to their parent spawning stock. ICES Journal of Marine Science 41: 268-75. doi:10.1093/icesjms/41.3.268.

Marine Scotland. (2011). Marine Protected Areas in Scotland's Seas. Guidelines on the selection of MPAs and development of the MPA network. Available from: <http://www.scotland.gov.uk/Resource/Doc/295194/0114024.pdf>

McConnell *et al.* (1999). Movements and foraging areas of grey seals in the North Sea. *Journal of Applied Ecology* 36: 573–90. doi: 10.1046/j.1365-2664.1999.00429.x

Prime & Hammond (1990) The diet of grey seals from the southwestern North Sea assessed from analyses of hard parts found in faeces. *Journal of Applied Ecology*. 27. 435-447. doi: 10.2307/2404292

Wright *et al.* (2000). The influence of sediment type on the distribution of the lesser sandeel, *Ammodytes marinus*. *Journal of Sea Research*, 44: 243-56. doi:10.1016/S1385-1101(00)00050-2

Obstacles and scientific and technical needs related to the measure taken: Please describe what obstacles have been encountered and any scientific and technical needs for addressing these, including technical and scientific cooperation, capacity development activities or the need for guidance materials.

While progress has been made against the quantitative marine aspect of Aichi Target 11, further work to realise delivery against the qualitative aspects is ongoing (ecological representativity, connectivity, effective and equitable management). To this end, the following list provides an overview of scientific and technical needs related to the measure taken:

- (1) Work collaboratively with other countries to develop and test indicators for detecting progress towards the achievement of conservation objectives of UK MPAs.
- (2) Ensure the objectives of UK MPAs are as specific as possible, building on improved scientific understanding over time.
- (3) Undertake a cost-effective programme of marine monitoring activities to ensure the necessary data are in place to detect progress towards conservation objectives of UK MPAs.
- (4) Ensure adequate capacity and resources to successfully manage and monitor UK MPAs. Opportunities exist to develop new partnerships, explore the concept of sustainable financing for MPAs and put in place novel approaches to monitoring (e.g. citizen science, utilisation of fishing vessel time at sea and eDNA).
- (5) Improve understanding and awareness of UK MPAs to society, including undertaking research in partnership with others to better conceptualise the benefits of UK MPAs using the concepts of natural capital and ecosystem services. Much work has been done to undertake awareness raising activities, but this is an area that needs ongoing attention.
- (6) Develop improved scientific understanding of UK MPA network connectivity.
- (7) Further explore how MPAs might be sustainably embedded into the wider seascape in the context of UK marine policy and EU Exit.
- (8) When scoping the Marine Bird Conservation Strategy, seek a better understanding of how stressors in the marine environment, individually and cumulatively, can be expected to impact marine species and ecosystems (and their services). A greater understanding of this will be a key to unlocking gaps in understanding the correct mix of measures to ensure sustainable use and management.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to these obstacles and scientific and technical needs can be found).

JNCC (2018) Marine Protected Areas Monitoring. <http://jncc.defra.gov.uk/page-7049>.

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Conserving the genetic diversity of the UK's tree and shrub species: The UK National Tree Seed Project

The ability of UK trees to meet present and future challenges depends strongly on genetic variation within species. Genetic diversity provides trees with the potential to adapt to new environmental conditions, including climate change and novel pests and diseases, through natural selection. It is important that planting material for new woodlands is drawn from a broad genetic base, and maintaining genetic diversity also provides the basis for tree improvement, which may strengthen traits required in future environmental and economic scenarios (Defra 2018, Forestry Commission 2017a).

At present woodlands cover 13% of the UK total land area, and the majority of this cover is planted with non-native species (Forestry Commission Forestry Statistics 2017). The UK has no truly natural forest, and there are around 650,000 hectares of semi-natural woodland. Of this, 340,000 hectares (~1.2% of UK land area) is identified as ancient semi-natural woodland, derived from the original forest cover of the British Isles. Native tree populations are generally relatively small and highly fragmented (Forestry Commission 2017a). UK trees and woodlands have also experienced a rapid increase in threats from pests and diseases over the past one-two decades, such as ash dieback (Freer-Smith & Webber 2017). It is important to conserve this genetic resource before it is further depleted.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

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.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

- ☒ Measure taken has been effective
- ☐ Measure taken has been partially effective
- ☐ Measure taken has been ineffective
- ☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

This case study focuses on the UK National Tree Seed Project, launched in 2013 by Royal Botanic Gardens, Kew to undertake multi-provenance seed collections in order to conserve the genetic diversity of UK forest genetic resources. The UK National Tree Seed Project can be evaluated against each of its three project aims (Trivedi & Kallow 2017):

- 1. Establishment of an accessible, genetically representative, national *ex situ* seed collection of UK trees and shrubs**

Phase 1 of the UK National Tree Seed Project was successfully completed in April 2018. During this first 5 years of the project, over 10 million seeds were conserved from approximately 7,623 maternal individuals across 60 native species of trees and shrubs. These species were ranked as the priority for action based on an objective set of criteria developed by the project because they are widely used in UK woodlands and/or are under specific threats (Kallow & Trivedi 2017). These species represent approximately three-quarters of UK native trees and shrubs.

At the outset of the project the development of a network, consisting of partner organisations with agreed workplans outlining their pledged contributions to the project, was considered essential to secure the seed collecting ambition of the project. To date, over 30 organisations have been involved in undertaking seed collections. Continued collaboration ensured that as many pledged collections as possible were actually made and sent to the Millennium Seed Bank. For each target species, the project aimed to make a seed collection in each Forestry Commission Seed Zone (Forestry Commission 2017b) overlapping with the species' native UK distribution. Through the partner network, for the 27 most widespread target species, seed collections have been made on average in over 85% of the seed zones covering their native distributions (Figure 1).

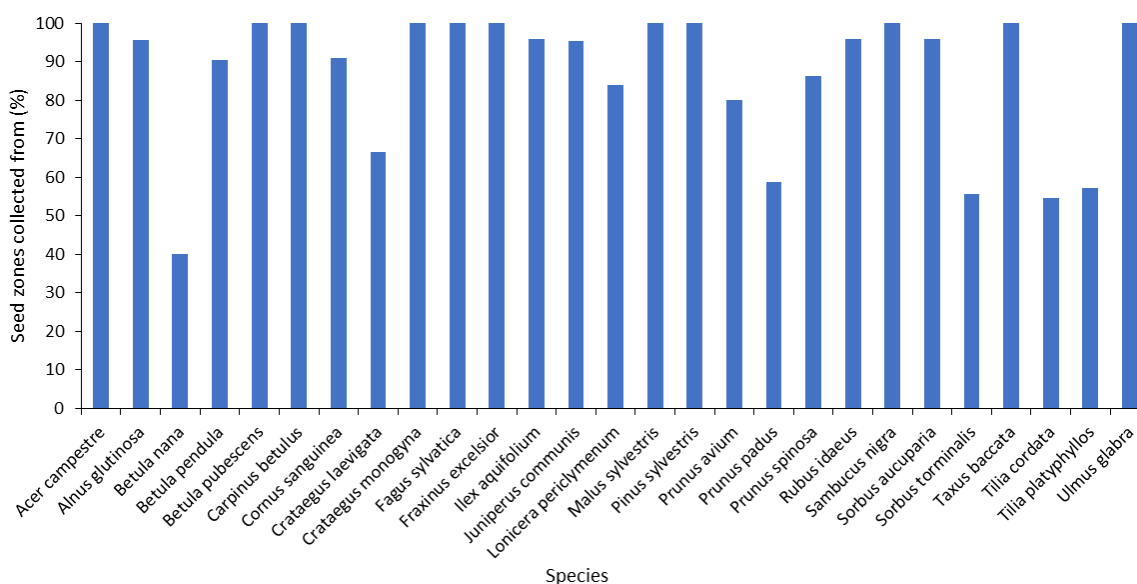


Figure 1: Percentage of seed zones from which collections have been made by species. 100% represents the total number of seed zones covering the native distribution of each species.

The UKNTSP seed collections will be made publicly accessible through the Millennium Seed Bank seed list. Further information, such as germination protocols, will be available via Kew's Seed Information Database. Individual researchers may also approach Kew to share data as required.

2. Research to overcome constraints to the *ex situ* conservation and use of UK tree species

Through this project, individual summaries of genetic knowledge and gaps have been produced for 32 taxa to guide species sampling strategies. A modelling study of the project collections of ash (*Fraxinus excelsior*) has been carried out to evaluate effectiveness of the project sampling strategy. Results suggest that over 90% of the UK genetic diversity of this species has been conserved by the project (Hoban *et al.* 2018). Ongoing research, using complementary approaches is focusing on evaluating the effectiveness of genetic capture of yew (*Taxus baccata*) and preliminary results are encouraging.

Germination protocols have been developed for all target species, and detailed studies on the storage requirements of 27 UK National Tree Seed Project target taxa have been undertaken. Findings to date show that all species display short or medium storage behaviour. A summary report of all the findings of the project, covering germination and storage studies – what has been found and outstanding constraints, is planned, as is a scientific publication on storage behaviour.

3. To raise public awareness of the project, and the role of *ex situ* conservation in general, to meet the challenges facing UK forestry

A range of public awareness events specific to the UK National Tree Seed Project were undertaken throughout Phase 1. These included national and local press events (TV, Radio, newspapers and online, speaking at both scientific and forestry-sector events), and public events such as the Kew Science Festival. Blogs and social media posts, both from RBG Kew and from partner organisations, such as the Woodland Trust, are routinely used to discuss the findings and activities of the project.

Summary of assessment

The UK National Tree Seed Project is ongoing, with a second phase having started in April 2018, and so has not yet seed banked all native woody species. However, the project aims for Phase 1 have been successfully achieved, and the project has been effective in delivering this progress. Consequently, the project has been assessed as being effective to date.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Defra (2018) Tree Health Resilience Strategy Building the resilience of our trees, woods and forests to pests and disease.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/710719/tree-health-resilience-strategy.pdf.

Forestry Commission (2017a) The UK Forestry Standard The governments' approach to sustainable forestry. Available at:

[https://www.forestry.gov.uk/pdf/FCFC001.pdf/\\$FILE/FCFC001.pdf](https://www.forestry.gov.uk/pdf/FCFC001.pdf/$FILE/FCFC001.pdf).

Forestry Commission (2017b) Regions of Provenance and Native Seed Zones. Available at:

<https://www.forestry.gov.uk/forestry/infd-72kldl>.

Forestry Statistics (2017) (https://www.forestry.gov.uk/pdf/Ch1_Woodland_FS2017.pdf).

Freer-Smith & Webber (2017) Tree pests and diseases: the threat to biodiversity and the delivery of ecosystem services. *Biodiversity and Conservation* 26:3167-3181. doi:10.1007/s10531-015-1019-0.

Hoban *et al.* (2018,) Implementing a new approach to effective conservation of genetic diversity, with ash (*Fraxinus excelsior*) in the UK as a case study *Biological Conservation* 225:10-21 doi:10.1016/j.biocon.2018.06.017.

Kallow & Trivedi (2017) Collecting Genetic Variation on a Small Island. In: Snieszko *et al.* (tech. co-ords.) Gene conservation of tree species—banking on the future. Proceedings of a workshop. Gen. Tech. Rep. PNW-GTR-963. Portland, OR: US Department of Agriculture, Forest Service, Pacific Northwest Research Station: 129-136. Vol. 963. 2017. Available at: https://www.researchgate.net/profile/Simon_Kallow/publication/320491041_Collecting_genetic_variation_on_a_small_island/links/59f701c10f7e9b553ebd4ea2/Collecting-genetic-variation-on-a-small-island.pdf.

Millennium Seed Bank Seed List. Available at: <http://apps.kew.org/seedlist/>

Seed Information Database. Available at: <http://data.kew.org/sid/>.

Trivedi & Kallow (2017) Benefits and Challenges For Gene Conservation: a View From The UK National Tree Seed Project. In: Snieszko *et al.* (tech. co-ords.). Gene conservation of tree

species—banking on the future. Proceedings of a workshop. Gen. Tech. Rep. PNW-GTR-963. Portland, OR: US Department of Agriculture, Forest Service, Pacific Northwest Research Station: 44-47. Vol. 963. 2017. Available at:

https://www.researchgate.net/profile/Clare_Trivedi/publication/320467743_Benefits_and_Challenges_For_Gene_Conservation_a_View_From_The_UK_National_Tree_Seed_Project_1/links/59e742ea0f7e9b13acaca812/Benefits-and-Challenges-For-Gene-Conservation-a-View-From-The-UK-National-Tree-Seed-Project-1.pdf.

Other relevant information, including case studies to illustrate how the measure taken has resulted in (or is expected to result in) outcomes that contribute to the implementation of the NBSAP

In 2013 Royal Botanic Gardens, Kew launched the UK National Tree Seed Project with the aim to secure in long term storage at the Millennium Seed Bank genetically diverse seed collections of the UK's tree and shrub species. In addition, the collection provides an important resource for contemporary research on all aspects of UK forest genetic diversity and woodland management. The UK National Tree Seed Project is funded by Players of People's Postcode Lottery, the Steele Foundation and John Coates Foundation.

The Project seeks to capture the range of genetic diversity found in the UK for each species, by making a seed collection of each species from all the Forestry Commission seed zones (Forestry Commission 2017b) in which their native distribution falls (plus Northern Ireland). For example, 60 separate collections of ash have been made from all over the UK, comprising seed from 674 separate trees. Each tree is geo-referenced and the seed from individual trees is kept separately in the Millennium Seed Bank. In total, Phase 1 has collected 10 million seeds from 7,623 trees, through 950 seed collections (a collection is all the seed collected from a site on a given trip). Samples of these collections, and associated data, will be freely available via the Millennium Seed Bank seed list for use in science and conservation, such as research to better understand the variation in all kind of tree traits which may prove vital as our environment and economy changes in the future. As banked seeds will live for many decades they also provide a vital benchmark of current genetic diversity in our tree populations.

Collections have been made from all parts of the UK from the South coast of England, to the Scottish islands and from East Anglia across to Northern Ireland. The project only succeeded thanks to the involvement of a wide range of collaborating organisations and 280 individuals – both citizen scientists and professionals – with species expertise and knowledge of their local woodlands.

Phase 2 of the project has now been launched which involves two more years of collecting, focusing on ensuring representation of the remaining species, including the willow family which are known to be very difficult to collect.

Scientific research using the collections is already underway on topics including the relative longevity of species in the seed bank and optimal storage strategies, and genetic studies to consider the extent to which genetic diversity of ash and yew in the UK has been adequately captured. Further to this project the UK National Tree Seed Project team, in collaboration with the Centre for Ecology and Hydrology, Forest Research, Woodland Trust and Future Trees Trust, are developing a UK Strategy for Forest Genetic Resources. This strategy seeks to both better understand genetic diversity in UK trees and to minimise genetic erosion and safeguard genetic diversity through both in situ and ex situ conservation, and sustainable use.

Lessons learnt and implications for practice

- Partnership and collaboration have been essential for large-scale coordinated action, especially where detailed local knowledge of woodlands is required. However, using such a network, especially one with a citizen science component, requires substantial input to standardise quality of collections and data across partners, and to maintain volunteer numbers and enthusiasm. Key to this has been face to face training, production of training resources, and strong feedback between seed processing staff and collecting teams.
- Public engagement and information dissemination has increased awareness of the importance of genetic resources and can help generate additional resources to support projects through donations and volunteer hours.
- Germination protocols have and will need to be adapted on a collection by collection basis. Applying the same protocol to different collections of the same species can lead to very different outcomes and variability between trees within collections is very common.
- Standard sampling guidelines were not appropriate for capturing genetic diversity across taxa. Continued evaluation and adaptation of strategies are therefore required to identify taxa-specific sampling guidelines and ensure representative collections.
- It was found to be very difficult to apply widespread seed collecting guidelines which recommend making seed collections from at least 50 individuals in a population. This was due to both distribution of individuals in the UK landscape and logistical issues. However, genetic studies indicate that because the project collected many seed, and from many populations, genetic diversity was still captured though fewer individuals per population were collected.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information can be found)

Forestry Commission (2017b) Regions of Provenance and Native Seed Zones. Available at: <https://www.forestry.gov.uk/forestry/infid-72kldl>.

Kew, Banking the UK's seeds: <https://www.kew.org/science/projects/banking-the-uk's-seeds>.

Millennium Seed Bank: <https://www.kew.org/wakehurst/attractions/millennium-seed-bank>.

Millennium Seed Bank Partnership, UK National Tree Seed Project:

<http://brahmsonline.kew.org/msbp/Projects/UK/NTSP>.

Obstacles and scientific and technical needs related to the measure taken: Please describe what obstacles have been encountered and any scientific and technical needs for addressing these, including technical and scientific cooperation, capacity development activities or the need for guidance materials.

(1) Developing an appropriate sampling strategy

Very little information is available on the variation in genetic diversity within the UK for native trees and shrubs (Kallow & Trivedi 2017). Therefore, it was not possible to develop species-specific sampling strategies based on genetic evidence for this project, and instead existing biogeographic seed zones were used as a proxy for genetic variation. Another key issue was that most seed collecting guidelines recommend sampling from at least 50 individual plants from a population. However, this was found to be impossible for most populations because it was rare to find 50 trees of a species in one woodland (UK woodlands are very fragmented) and because a team of seed collectors cannot collect from more than 15-20 trees in one day. Consequently, we advised collectors to sample at least 15 trees for each species from each seed zone. To evaluate the effectiveness of this

sampling approach at capturing genetic diversity, genetic studies on collected seeds have been undertaken and efforts to improve sampling in the future are ongoing. Results will be used to provide advice on sampling for similar projects around the world.

(2) Ensuring long-term viability of collections

Our studies on UKNTSP collections suggest that a number of UK woody species are relatively short-lived in seed bank storage (likely decades rather than centuries before viability is lost). Furthermore, Oak (*Quercus* spp) is a major species in UK woodlands but is recalcitrant meaning it cannot be seed banked (Kramer and Pence 2012). Further research is required to better understand and develop optimal storage strategies for these difficult species, including the use of cryo-preservation and in vitro conservation as well as standard seed banking techniques

(3) Ensuring that collections are used for research and conservation activities

The collections provide a vital ex situ conservation resource for UK Forest Genetic Resources. However, the vision is for these collections to also be used for contemporary research and conservation activities. To achieve this significant time has been invested in outreach and networking with researchers and conservation and forestry organisations. Ensuring effective dissemination, easy access to data, up-to-date and accurate databases, and continued outreach and networking will be critical to ensuring that collections and associated data are comprehensively used to advance knowledge and conservation.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to these obstacles and scientific and technical needs can be found).

Kallow & Trivedi (2017) Collecting Genetic Variation on a Small Island. In: Snieszko *et al.* (tech. co-ords.) Gene conservation of tree species—banking on the future. Proceedings of a workshop. Gen. Tech. Rep. PNW-GTR-963. Portland, OR: US Department of Agriculture, Forest Service, Pacific Northwest Research Station: 129-136. Vol. 963. 2017. Available at: https://www.researchgate.net/profile/Simon_Kallow/publication/320491041_Collecting_genetic_variation_on_a_small_island/links/59f701c10f7e9b553ebd4ea2/Collecting-genetic-variation-on-a-small-island.pdf.

Kew, Banking the UK's seeds: <https://www.kew.org/science/projects/banking-the-uk's-seeds>

Kramer and Pence (2012) The Challenges of Ex -Situ Conservation for Threatened Oaks. International Oak Journal No.23. pp91-108.

Millennium Seed Bank: <https://www.kew.org/wakehurst/attractions/millennium-seed-bank>.

Millennium Seed Bank Partnership, UK National Tree Seed Project: <http://brahmsonline.kew.org/msbp/Projects/UK/NTSP>.

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Peatland restoration in the UK

Peatlands are found across the UK, with blanket bog the major type in the uplands, and fen and raised bog the major types in the lowlands. Peatlands cover 11% of England's land area, more than 20% of Scotland, 4.5% of Wales, and 12% of Northern Ireland. 80% of the UK's peatlands are estimated to be degraded to some extent.

In the UK peatlands are subject to a variety of direct and indirect anthropogenic pressures related to site management (e.g. drainage, livestock grazing, peat extraction, burning, scrub and woodland invasion etc.) and more regional pressures including groundwater abstraction, flood management schemes, afforestation, atmospheric deposition of pollutants (past and present), water pollution (e.g. eutrophication loading by livestock), development and climate change (IUCN UK Peatland Programme 2018). Importantly, even where damaging activities have stopped, continuing degradation of peatlands is often seen unless appropriate restoration and land management practices are put in place (Natural England 2010).

Habitat restoration aims to restore the quality (functional capacity) or increase the area extent of a habitat that has been adversely affected through past and present land uses, pollution, and other human influences. The overarching aim of peatland habitat restoration projects has traditionally been to re-establish populations of their characteristic plants and animals, many of which are rare and threatened, through restoring hydrological integrity to the peatland ecosystem. In the last ten years or so, the benefits of healthy peatlands to society in addition to their biodiversity value have increasingly been recognised and re-establishing and/or improving natural capital stocks to deliver these ecosystem services is now also an explicitly stated aim of most peatland restoration programmes. Peatland restoration is a long-term process and there has not been a consistent approach to monitoring and evaluation of restoration projects. Nonetheless, there is good evidence from the UK that interventions such as spreading mosses or moss fragments onto the peatland surface to promote vegetation establishment and raising the water table through, for example, blocking of drainage ditches are effective at promoting peat restoration (Taylor *et al.* 2018). Other measures such as the use of multiple interventions to restore or create peatland vegetation, exclusion of livestock, planting of mosses, are considered likely to be beneficial but effects are variable (Taylor *et al.* 2018).

The UK's governments have supported a number of peatland restoration projects to help land managers implement appropriate management and improve delivery of important services such as carbon sequestration and climate change mitigation. Re-establishing the characteristic plants and animals, many of which are threatened or rare and restoring the hydrological and ecological integrity of peatland ecosystems is central to this process.

The Scottish Government's Peatland Action Programme provides grants to land owners for peatland restoration. Since 2012 the programme has supported 193 restoration projects covering 15,000 hectares and provided £8 million in funding available in 2017/18. Education, awareness raising and community engagement are also core aims of the Peatland Action programme.

In England, the government launched a £10 million grant scheme for peatland restoration in April 2018, as well as the £4 million allocated for existing peatland restoration schemes. In addition, the Moors for the Future Partnership (MFFP) has supported peatland restoration in the Peak district and South Pennines since 2003. The MFFP runs seven active projects, mainly on designated Sites of Special Scientific Interest across more than 30 sites. Between 2010 and 2015 the MFFP ran MoorLIFE, a €6.7 million conservation programme located in the South Pennine Moors Special Area of Conservation, overlapping with two Special Protection Areas. The programme was financed through a combination of public and private funds that at its launch was the largest moorland conservation project in Europe. The project restored a total of 893 hectares of seriously degraded bog and 2,500 hectares of semi-degraded moorland. Like Scotland's Peatland Action Programme the MFFP supports education, awareness raising and community engagement activities. MoorLIFE 2020 has developed four demonstration sites on which to run knowledge exchange events to develop best practice for the protection of active blanket bog.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

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.

Related targets:

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

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.

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 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 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.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

- ☐ Measure taken has been effective
☒ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

This assessment focuses on the effectiveness of two peatland restoration umbrella schemes: the Peatland Action Programme in Scotland, and the Moors for the Future Partnership in England. While these case study areas are not representative of all peatland habitats across the UK due to variation in biogeography and pressures (past and present), they were chosen because of the strength of the evidence base upon which to assess their effectiveness. The assessment of effectiveness has been made against the aims of each project, using evidence from a literature review and consultation with project managers.

The Scottish Government's Peatland Action Programme

The Peatland Action grant scheme covers the whole of Scotland. It is funded by the Scottish Government and administered by Scottish Natural Heritage. Since 2012 Peatland Action has supported the restoration activity of over 15,000 hectares of peatland through 193 projects (McBride pers comm 2018). This year, Peatland Action in collaboration with the IUCN Peatlands Programme has trialled the first carbon sale through the Peatland Code. Given the extent and geographical coverage of peat in Scotland there has not been an area based strategic approach. The project focusses heavily on the restoration outcome rather than specific location. The project will fund restoration as long as the majority of the peat cover is over 50cm deep. The funding is reasonably flexible and relies heavily on the predetermined eligibility criteria, which outlines all the operations funded (SNH 2018).

The application process and approval process are kept as simple as possible. The use of a selection panel for innovative unusual or contentious applications maintains the opportunity for applicants to be innovative in this developing field of expertise. Funding is an annual basis which presents problems for the project and applicants, with various seasons, breeding periods and weather creating very tight windows for doing the work. Uptake has been excellent, with less than 3% of approvals not completing. Lying snow and ice in the winter of 2017/18 severely hampered completion of projects which have been delayed.

Land managers through the grant agreement are bound for ten years to maintain the restoration process. There are no annual management payments in the scheme. This has been found to be a major advantage as those who enter the scheme are committed to the restoration and not just an annual payment. The scale of the projects range from between 10 ha to 1,000 ha with the majority around 150 ha. Given the cost of the projects the Project endeavours to have a quick turnaround on payments once the work is completed.

Interviews with seven of the eleven Peatland Action Officers employed to support the Peatland Action programme between 2012 and 2015 documented a positive response to the programme with Officers considering it to be very successful in promoting peatland restoration, knowledge exchange and capacity building (Byg & Novo 2017).

In Scotland the value of ecosystem services from natural habitats such as peatlands are assessed through the Natural Capital Asset Index (SNH 2017). This index shows the continued degradation of ecosystem services from peatlands from 2000. However, since 2012 the downward trend in ecosystem value from peatlands has reversed and some recovery is shown. Coinciding with the start of the Peatland Action programme, this may be indicative of the effect from peatland restoration activities although cause and effect is difficult to determine.

Baseline and long-term monitoring is underway at a proportion of Peatland Action project sites (both baseline and post-works assessments), including the use of automated (water-level) data loggers, fixed-point vegetation monitoring, and UAV/drone surveys (including photographic, LiDAR, digital terrain modelling, and vegetation surveys). Sourcing long term funding streams for monitoring is an issue. A major outcome of the project has been the collection of peat depth data. Each restoration and feasibility application has to provide a peat depth survey for the areas involved. This has led to a massive increase in the amount of peat depth data and understanding of the scale of the carbon resource.

The sites are initially checked for grants compliance with a final report on completion of work. This will be followed with monitoring at year 5. Peatland Action has also helped support ongoing research by the James Hutton Institute, Royal Society for the Protection of Birds (RSPB) and the Centre for Ecology and Hydrology (CEH) at a number of sites in Scotland, including the purchase

of a Carbon-flux tower and associated monitoring equipment. There currently is no provision for long term funding beyond the 10-year agreement, but it is hoped that open access of data and future advances in satellite technology will provide ways of continued monitoring.

Moors for the Future Partnership (MFFP), England

The MFFP extensively monitored the MoorLIFE programme through annual surveys of treatment and control (reference) sites. When the MFFP began, the South Pennines was dominated by expanses of bare and eroding peat with deeply incised gullies. The first priorities were therefore peat surface stabilisation to reduce the rate of erosion.

Surface stabilisation by applying cut heather brush and a seed mix of ‘nurse crop’ grasses and geotextile fabrics on steep slopes where brush will not remain in place has been shown to successfully reduce the extent in bare peat and increase vegetation cover compared to control sites from >90% to <5% after 8 years (Figure 1a, Proctor *et al.* 2013). Vegetation diversity increases following stabilisation (Figure 1b), supported by plug planting of native moorland species in the third year of the restoration programme to increase species diversity, particularly of slow colonisers. *Sphagnum* mosses require targeted reintroduction and re-wetting of the peat surface to recolonise significantly. Work is ongoing to trial reintroduction techniques for *Sphagnum*. Breeding moorland bird populations have increased substantially following restoration (RSPB 2015).

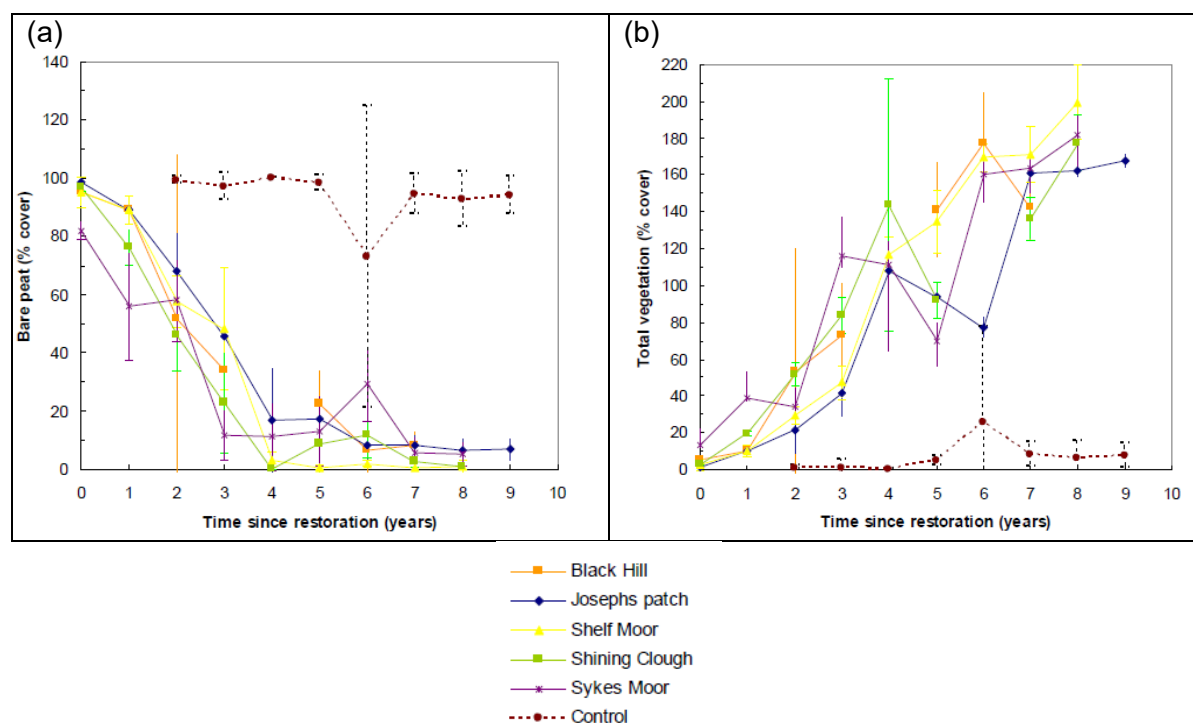


Figure 1. (a) Mean bare peat cover and (b) mean total vegetation cover across individual restoration sites with 95% Confidence Interval bars (Figure reproduced from Proctor *et al.* 2013).

The installation of gully blocks was shown to lead to a rapid accumulation of sediment (Crouch *et al.*, 2015; Maskill *et al.* 2015a) with a 99% reduction in particulate organic carbon in stream water in gully-blocked and revegetated sites compared to control sites with one year of restoration (Pilkington *et al.* 2015). In sites subject to revegetation but no gully-blocking a 98% reduction in particulate organic carbon in stream water was observed suggesting that vegetation is responsible for the majority of erosion reduction (Pilkington *et al.* 2015).

Revegetating and gully-blocking concurrently has been shown to be more effective than just revegetating sites to reduce peak storm discharge (37% to 8% respectively compared to pre-restoration behaviour) and increase the lag time from peak rainfall to peak storm discharge by 267% and 67% respectively (Pilkington *et al.* 2015). However, variability masks patterns and these differences have not been found to be statistically significant. Mean water tables at revegetated sites have risen by 35 mm after 3 years and 100 mm after 7 years in comparison with bare peat control representing progress towards hydrological restoration (Maskill *et al.* 2015b, Pilkington *et al.* 2015).

Ensuring appropriate site management following restoration intervention is key to delivering habitat gains. MFFP undertook restoration activities on Black Hill, a site owned by United Utilities and Yorkshire Water, in 2005. As part of the plan, land management was amended to ensure activities on the site complemented restoration aims, including a no-burn policy and a total exclusion of livestock. Outcomes on this site have been very positive, with significant development of sphagnum mosses and near total cover of the seeded sward. Conversely, for other sites where optimal management has not been secured, primarily where exclusion of stock has not been possible but restoration measures have been implemented, progress has not been so positive or as strong.

Summary of assessment

Action taken by the Peatland Action Programme and MFFP has had a positive impact on peatland restoration efforts in the UK. Management interventions under both projects have had promising initial results for the restoration of targeted areas of peatland (15,000 hectares in Scotland, and 893 hectares of seriously degraded bog and 2,500 hectares of semi-degraded moorland in England). Both projects have conducted community education and engagement activities to help raise awareness of the value of peatlands and encourage responsible use. In addition, both projects have conducted knowledge exchange activities in the UK and internationally to help share best practice and develop scientific understating of peatland restoration measures. Nevertheless, peatland restoration requires a long-term view and further monitoring is underway to determine the success of peatland restoration efforts under the Peatland Action Programme and MFFP. In addition, outcomes have not yet been consistent across all areas of peatland targeted by the projects, particularly where optimal ongoing site management has not been secured following the initial restoration intervention. Consequently, an assessment of partial effectiveness has been made.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

ASC (2016a) UK Climate Change Risk Assessment 2017 Evidence Report – Summary for Wales. Adaptation Sub-Committee of the Committee on Climate Change, London.

ASC (2016b) UK Climate Change Risk Assessment 2017 Evidence Report – Summary for Northern Ireland. Adaptation Sub-Committee of the Committee on Climate Change, London.

Bonn *et al.* (2014) Investing in nature: developing ecosystem service markets for peatland restoration. *Ecosystem Services* 9:54–65.

Byg & Novo (2017) Peatland Action Programme – lessons learned. Climate Exchange.

Crouch *et al.* (2015). Peatland Restoration Project: Rivers Alport and Ashop Monitoring Report. Moors for the Future Partnership, Edale.

HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Department of Environment Food and Rural Affairs.

IUCN UK Peatland Programme (2018) Commission of Inquiry on Peatlands. Available at: <http://www.iucn-uk-peatlandprogramme.org/publications/commission-inquiry>.

IUCN National Committee UK (2017) UK Peatland Code.

- JNCC (2013) Individual habitat reports – 3rd UK Habitats Directive Reporting 2013. Available at: <http://jncc.defra.gov.uk/page-6392>.
- Maskill *et al.* (2015a). Woodhead Gully Block Monitoring: Final Report. Moors for the Future Partnership, Edale.
- Maskill *et al.* (2015b). MoorLIFE: Changes to the water table and carbon budget. Moors for the Future Report, Edale, Derbyshire.
- Moxey & Moran (2014) UK peatland restoration: Some economic arithmetic. *Science of the Total Environment* 484:114-120.
- Natural England (2010) England's peatlands: carbon storage and greenhouse gases (NE257)
- Pilkington *et al.* (2015) Restoration of Blanket bogs; flood risk reduction and other ecosystem benefits. Final report of the Making Space for Water project. Moors for the Future Partnership, Edale.
- Proctor, S., Buckler, M., Walker, J. S., Maskill, R. (2013) Vegetation recovery on bare peat after restoration intervention: an analysis of nine years of monitoring data in the Dark Peak moorlands (2003 - 2012). Moors for the Future Partnership, Edale.
- RSPB (2015) Restoring bogs for water quality and wildlife: the positive effects on moorland birds. https://www2.rspb.org.uk/Images/restoring-bogs_tcm9-401009.pdf.
- SNH (2015) Scotland's National Peatland Plan: Working for our future.
- SNH (2018) Peatland Action Fund – Eligibility Criteria. Available at: <https://www.nature.scot/sites/default/files/2018-05/Guidance-Peatland-Action-Fund-Eligibility-Criteria.pdf>.
- Taylor *et al.* (2018) Peatland Conservation Global evidence for the effects of interventions to conserve peatland vegetation. Synopses of Conservation Evidence Series. University of Cambridge, Cambridge, UK.
- Xu *et al.* (2018) Hotspots of peatland-derived potable water use identified by global analysis. *Nature Sustainability* 1:246-253. doi:10.1038/s41893-018-0064-6.

Other relevant information, including case studies to illustrate how the measure taken has resulted in (or is expected to result in) outcomes that contribute to the implementation of the NBSAP

Case study: the Scottish Government's Peatland Action programme:

The Scottish Government has ambitions for 250,000 hectares of degraded peatland to be restored by 2030 (Scottish Government 2017). This ambition has been enacted by the Peatland Action programme which was initiated in 2012 to promote peatland restoration in order to contribute directly to the Scottish Government's targets on climate change mitigation. The project also aims to support knowledge transfer through demonstration sites and events to raise standards and encourage innovation for effective peatland restoration, as well as to build capacity and interest among land managers.

In 2015, Scotland's National Peatland Plan was published to highlight their vital importance in providing essential ecosystem services to Scotland, to emphasise the policy driver for their restoration, and to foster partnerships for their protection and restoration (SNH 2015). In 2017/18 funding of £6 million was made available through the Peatland Action programme with a restoration target of 6,000 hectares. Peatland restoration is also supported through the Scottish Rural Development Programme with £2 million of funds available through this route.

Between 2012 and 2018, Peatland Action has supported the restoration activity of over 15,000 hectares of peatland through 193 projects (McBride pers comm 2018). Over 48,000 ha of project feasibility work including baseline assessments have been funded by Peatland Action since 2012. The restoration has been as diverse as the peatlands with work extending from sea level to

800 metres. This necessitated the trialling and adaption of new and existing techniques which are still being perfected, but some on the ground targeted action shows promising early results (Figure 2).

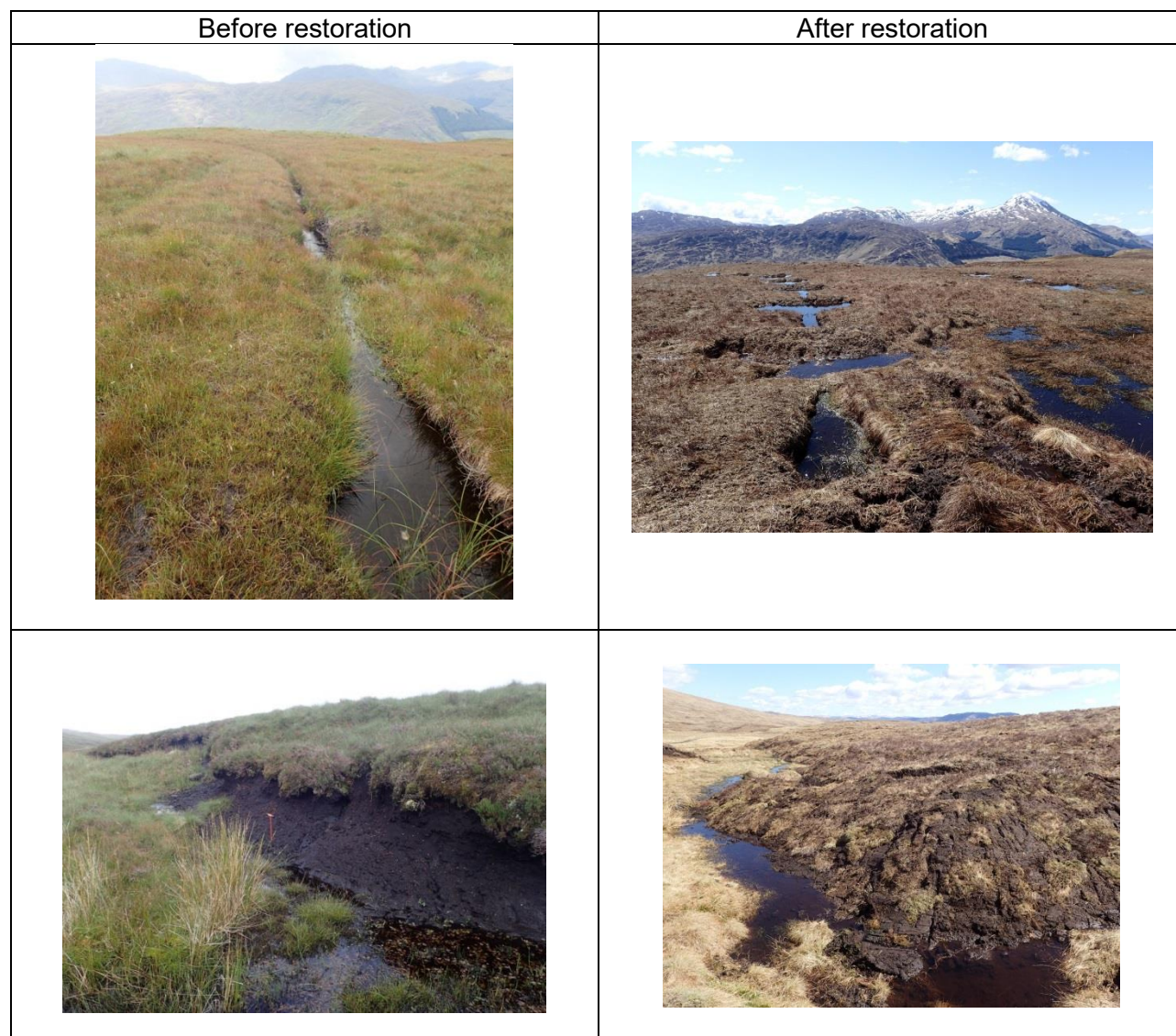


Figure 2: Auchlyne before (23 Aug 2017) and after (30 Apr 2018) restoration measures were implemented.

Peatland Action has also organised a series of peatland restoration demonstration events aimed at both landowners/land managers and restoration contractors at various sites across Scotland since 2013. Peatland Action has also organised several training courses aimed at restoration contractors and ecological consultants from across the UK, with a focus on restoration techniques and project feasibility work. Key to the success of this national project is the network of 11 project officers working within SNH or working in partner organisations. The location of project officers has enabled the project to make strong links with other organisations like National Parks, Scottish Water and Fisheries Trusts, and harvest a wealth of local knowledge and contacts.

Education, awareness raising and community engagement are also core aims of the Peatland Action programme. To support the scheme, a peatland learning module was designed and is freely

available online (Martin-Ortega *et al.* 2017a). This module explains what peatlands are, how they are managed, their role in the wider environment and the benefits of peatland restoration. Peatland Action has also funded community engagement and outreach work to raise awareness about the importance of peatland habitats and their biodiversity. For example, the Bog Squad Project run by Butterfly Conservation and supported by Peatland Action creates educational resources and gives talks to various community groups and family days and conferences as well as coordinating citizen science events for surveys and monitoring of butterflies and moths.

Support from the public for peatland restoration is high. A Scotland-wide public survey conducted in 2016 found that 95.2% (n=1,790) of respondents agreed that future generations will benefit from peatlands being restored now and that peatland restoration will benefit them (66.1% out of 1,790 responses) and others (82.1% of 1,791 responses) (Martin-Ortega *et al.* 2017b). Reasons given for their support of peatland restoration include environmental benefits (e.g. improving water quality, climate change mitigation), cultural identify, recreational value, economic gains, intergenerational equity and moral obligation. Peatland Action now utilises these survey methods in application and final report forms to measure the change in understanding and realisation of benefits by participants in the grant scheme.

In Scotland the value of ecosystem services from natural habitats such as peatlands are assessed through the Natural Capital Asset Index (SNH 2017). This is one of Scottish Government's Key Performance Indicators. The 55 National Indicators do not provide comprehensive measurement of every activity undertaken to achieve the Scottish Government's Outcomes and Purpose. Instead they are a carefully chosen set which it is believed most clearly show progress towards the achievement of a more successful and prosperous Scotland. The Natural Capital Asset Index shows the continued degradation of ecosystem services from peatlands from 2000. However, since 2012 the downward trend in ecosystem value from peatlands has reversed and some recovery is shown. Coinciding with the start of the Peatland Action programme, this may be indicative of the effect from peatland restoration activities although cause and effect is difficult to determine, and ecological recovery will take time.

Case Study: Moors for the Future Partnership, England

England is in the process of developing a Peat Strategy (due for publication late 2018) and launched a further £10 million grant scheme for peatland restoration in April 2018 (HM Government 2018; Defra 2018). This is in addition to the £4 million allocation for existing Natural England peatland restoration schemes.

In England, peatland restoration in the Peak District and South Pennines landscapes has been supported by the Moors for the Future Partnership (MFFP) since 2003 (www.moorsforthefuture.org.uk). The Partnership aims to raise awareness of the value of peatlands in this region (typically upland, deep peats), encourage responsible use, restore moorland resources, and to develop expertise and knowledge transfer on sustainable management and restoration of peatlands. Primed with funding from Agri-Environment Schemes and National Park funding, MFFP then received additional funding from the Heritage Lottery Fund. The MFFP is composed of members from UK government agencies (Environment Agency, Natural England), conservation organisations (National Trust, RSPB), the private sector (Severn Trent Water, United Utilities, Yorkshire Water), local landowners and members of the local farming community, and Pennine Prospects – a rural regeneration partnership comprising local authorities amongst others.

The MFFP runs seven active projects, mainly on designated Sites of Special Scientific Interest across more than 30 sites. Between 2010 and 2015 the MFFP ran MoorLIFE, a €6.7 million conservation programme located in the South Pennine Moors Special Area of Conservation,

overlapping with two Special Protection Areas. The programme was financed through a combination of public and private funds that at its launch was the largest moorland conservation project in Europe. The project restored a total of 893 hectares of seriously degraded bog and 2,500 hectares of semi-degraded moorland. The project aimed to contribute significantly to the whole bog system at a landscape scale and implemented numerous interventions including: stabilisation of bare peat with heather cuttings and geotextiles; application of lime to reduce acidity caused by industrial pollution; reseeding with grass and heather; planting of native plug plants including *Sphagnum*; blocking of gullies to raise the water table. MoorLIFE 2020, a €16 million project, extends the MoorLIFE programme conservation actions including further development of monitoring and engagement activities. MoorLIFE 2020 is funded through the EU-LIFE programme, Severn Trent Water, Yorkshire Water, United Utilities, and Agri-Environment Schemes.

The MFFP supports education, awareness raising and community engagement activities. MoorLIFE 2020 has developed four demonstration sites on which to run knowledge exchange events to develop best practice for the protection of active blanket bog. The custom built Bogtastic van visits town and city centres to communicate the value of peatlands through interactive games, an audio visual experience of a virtual peat bog and interpretation boards. Campaigns such as Bogtastic, Bogathon and Fire Aware are also being used to communicate the benefits of peatlands, responsible use and importance of avoiding fires to stakeholders, including the general public in local communities and urban areas surrounding the South Pennine Moors. MFFP also support 12 partnership youth groups providing opportunity for active participation in conservation activities, and web and social media development is actively used to connect with people. The MFFP also prepare free resources available for teachers and educators that support class and field work with lesson plans and PowerPoint presentations, and guidance for dog walkers on responsible use (www.pawsonthemoors.org). The Partnership have also developed a series of audio trails to accompany moorland walks detailing their history, use, hydrology, ecology and conservation efforts.

Knowledge exchange activities and networking with other UK and international projects have also been built into the project. A decision making toolkit including land management guidance for blanket bog restoration has been produced (Uplands Management Group 2017). The MFFP and IUCN Peatland Programme co-run a three-day BogFest event to share experience and knowledge on peatland management and delivery (IUCN 2017). Across the three days almost 800 people attended (excluding MFFP & IUCN staff, casuals and volunteers) and sessions covered restoration activities and peatland management, finance, communications, policy, agri-environment, and science.

Lessons learnt and implications for practice

Similar challenges and opportunities for best practice were identified by each project programme and so identified lessons learnt are summarised collectively below.

- The process of restoration was supported by developing wide partnerships. Contributions from private and public sector organisations, groups, individuals, charities, and volunteers have been critical to the success and the long-term security of restoration projects.
- Successful action also required statutory protection, policy measures, and adequate financial investment.
- Knowledge transfer amongst stakeholders between regions helped alleviate negative cultural preconceptions and allowed stakeholders to visualise the end goal (e.g. through site visits) increasing buy in.
- Flexibility in the application of restoration techniques was necessary to respond to site-specific contexts.

- Landowner feedback suggested that the ease and speed of the application process and financial reimbursement was an important incentive for participation.
- Restoration required a long-term perspective with multiple interventions over many years and with appropriate long-term site management to be in place.
- Long-term funding mechanisms to deliver restoration measures and support researcher-community-practitioner partnerships have been critical.
- Moving towards successful restoration required an ecosystem perspective that takes into account the interdependencies between the peatland soil, water and biota and spatial heterogeneity in ecosystem diversity across a peatland landscape.
- An important component of the projects has been ensuring there is a clear pathway to long term recovery so that blanket peatlands are resilient to climate change
- In areas of high visitor use, education and awareness raising have been important components of a peatland restoration programme to ensure visitor pressures have not compromised conservation actions.
- Peatland restoration activities offered conservation benefits to a broader suite of species and habitats beyond the extent of the peatland habitat itself emphasising the importance of considering ecological links and securing multiple outcomes. For example, the density of crane-fly larvae increases with the moisture content of peat and rewetting peat by blocking drainage ditches (grips) may help increase the resilience of bird species that feed on crane-flies, such as the Golden Plover (*Pluvialis apricaria*), to climate change (Pearce-Higgins 2011, 2010; Pearce-Higgins & Yalden 2004).
- To facilitate monitoring, evaluation and assessment of progress, site restoration plans benefitted from agreed outcomes and interventions.
- To evaluate restoration techniques and trajectories, monitoring and evaluation programmes were only effective if implemented prior to the start of restoration measures to establish baseline. The partnerships were keen to emphasise that monitoring should continue beyond the restoration programme to determine long-term trends, and that results should be published to inform future management. Monitoring programmes agreed as the first element of any peatland restoration programme secured effective management because they: (1) identify whether recovery is progressing in the absence of intervention and therefore save unnecessary financial investment, (2) identify the most appropriate measures to put in place for the peatland area in question if active intervention is required, and (3) provide baseline data against which to evaluate the success of restoration activities, and therefore the return on investment. Monitoring across a range of ecosystem functions provides a coherent picture of change and should include the use of reference (control) sites to enable statistical analysis evaluating the effectiveness of restoration techniques. Concurrent recording of ongoing activities in the land matrix surrounding peatlands has also been helpful in pinpointing activities that may limit the effectiveness of restoration activities.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information can be found)

Butterfly Conservation Bog Squad. <https://butterfly-conservation.org/5381/bog-squad.html>.

Defra (2018) Grants for Peatlands Restoration. Available at:

<https://www.gov.uk/government/news/grants-for-peatlands-restoration>.

HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Department of Environment Food and Rural Affairs.

IUCN (2017) BogFest 2017: Statistics, Sessions and Messages <http://www.iucn-uk-peatlandprogramme.org/bogfest17/report>.

Martin-Ortega *et al.* (2017a) Online Peatland Learning Module. Peatland Action, Scottish Natural Heritage. www.see.leeds.ac.uk/peatland-modules/?type=learning.

Martin-Ortega *et al.* (2017b) Public views and values of peatland restoration in Scotland results of a quantitative study.

Pearce-Higgins (2010) Using diet to assess the sensitivity of northern and upland birds to climate change. *Climate Research*, 45, 119–130.

Pearce-Higgins (2011) Modelling conservation management options for a southern range-margin population of Golden Plover *Pluvialis apricaria* vulnerable to climate change. *Ibis*, 153, 345–356.

Pearce-Higgins & Yalden (2004) Habitat selection, diet, arthropod availability and growth of a moorland wader: the ecology of European Golden Plover *Pluvialis apricaria* chicks. *Ibis*, 146, 335–346.

Scottish Government (2017) Draft Climate Change Plan The draft third report on policies and proposals 2017-2032.

SNH (2015) Scotland's National Peatland Plan: Working for our future.

SNH (2017) Scotland's Natural Capital Asset Index.
www.gov.scot/About/Performance/scotPerforms/indicator/naturalcapital.

Uplands Management Group & MFFP (2017) Blanket Bog Land Management Guidance.
<http://www.moorsforthe future.org.uk/blanket-bog-land-management-guidance>.

Obstacles and scientific and technical needs related to the measure taken: Please describe what obstacles have been encountered and any scientific and technical needs for addressing these, including technical and scientific cooperation, capacity development activities or the need for guidance materials.

The UK faces a number of challenges for peatland restoration:

- (1) *Broadening the funding base for peatland restoration (and other ecosystems providing multiple economic and social benefits.*

Much peatland restoration is currently funded through government and EU funding mechanisms however the role of the private sector is increasingly being recognised. The Peatland Code has been developed as a mechanism to try to attract private finance. Since 2000, the UK has received c.26 million Euros towards peatland restoration and management from the EU LIFE programme (Figure 3, country breakdown: England €16,305,050, Scotland €4,187,698, Wales €5,502,606). The scale of income from EU LIFE has been fundamentally important in delivering peatland restoration programmes across the UK. Further research and evaluation on the costs and benefits of peatland restoration would strengthen the case for broadening the funding base.

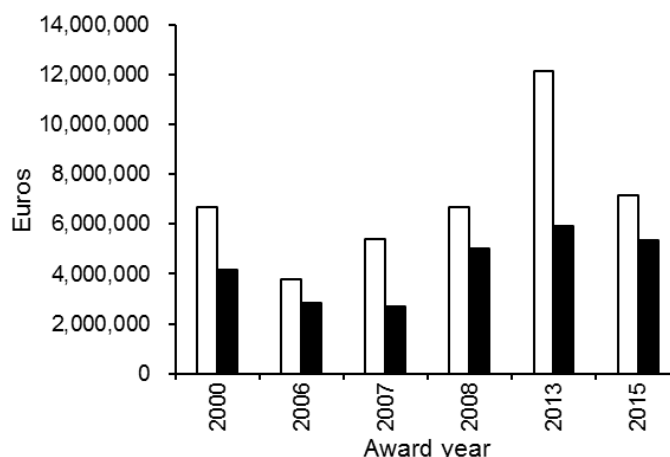


Figure 3: Contribution of EU LIFE funding to peatland restoration projects in the UK. White bars show total project budget. Black bars show total funding of those projects received from the EU LIFE programme. Note that not all funds are allocated directly to peatland restoration but may

include action on related habitats, development of management plans and/or trialling restoration activities. Details of EU LIFE funded projects can be accessed at:

<http://ec.europa.eu/environment/life/countries/unitedkingdom.html>. Data source:
<http://ec.europa.eu/environment/life/project/Projects/index.cfm>.

- (2) *Understanding the effectiveness of peatland restoration techniques for peatlands experiencing different pressures and in different localities with site-specific contexts and land-use conflicts.*

The UK is addressing this challenge through continued research, monitoring, shared practical knowledge and technological expertise and stakeholder engagement to target peatland restoration more effectively and efficiently. Work is ongoing to integrate small- and large-scale restoration programmes into open-access data and knowledge inventories, and enable the evaluation of landscape-scale restoration approaches.

- (3) *Developing cost-effective methods (e.g. remote sensing) and proxies to monitor restoration programmes.*

Effective monitoring of peatlands is time-consuming and expensive, particularly peatland restoration programmes are large-scale and/or remote. The UK is currently exploring remote sensing approaches and model development to monitor site condition and link vegetation and greenhouse gas fluxes. Additionally, the continued support and development of researcher-community-practitioner partnerships enable citizen science programmes to contribute effectively to monitoring programmes.

- (4) *Understanding how peatlands will be affected by climate change and incorporating this knowledge into prioritisation of areas for future restoration.*

In the UK climate change will bring about changes in plant communities and species distribution, hydrology and climate, all of which will affect peatlands across the UK to varying degrees. Understanding the local and regional predicted impacts of climate change and the implications of this for continuation of peatland functioning will be important for ensuring the long-term success of restoration programmes. Nonetheless, the historical record shows intact peatlands to be resilient to changes in climate (Charman *et al.* 2013) suggesting restoration programmes and removal of all other pressures, such as nutrient enrichment and groundwater abstraction, will help deliver long-term resilience (Natural England & RSPB 2014).

- (5) *Understanding the value of peatlands and their restoration.*

Many of the ecosystem services peatlands provide represent a public good. However, much of the UK's peatland is located on private land and public good services offer intangible benefits to landowners. Peatland restoration can require a large upfront capital investment. The return generated through ecosystem service benefits should therefore outweigh the loss of services provided by the degraded peatland to the landowner, such as timber, fuel, or grazing. Furthermore, not all peatlands will deliver the same ecosystem services, and restoration costs will vary from site to site.

- (6) *Cross-jurisdictional responsibility for peatland restoration.*

In the UK, multiple teams have responsibility for elements of peatland restoration. The parameters defining effective and successful restoration are likely to vary depending on the perspective of the team driving funding for restoration programmes and the full range of co-benefits from restoration activities may not be effectively achieved. Establishing cross-jurisdictional teams for the purpose of determining effective restoration has been beneficial for fully accounting for the multi-functionality of peatlands.

- (7) *Forming effective partnerships to manage competing interests.*

In addition to actions to restore degraded peatland, long-term maintenance of restored peat has also required action to address on-going management by grazing, digging of drainage channels, creation of moorland tracks and car parking areas and rotational burning of vegetation. Ongoing management of other pressures, for example from atmospheric deposition, have been and will continue to be important in supporting restoration.

Improvements in air quality are believed to be responsible for the bryophyte recovery that appears to be taking place in the uplands but ongoing monitoring is needed to confirm if this can be sustained.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to these obstacles and scientific and technical needs can be found).

Artz & McBride (2017) Data from the Peatland Action Programme and their use for evaluations of ecosystem benefits. Climate Exchange.

Aitkenhead *et al.* (2016) Detection of peatland drainage with remote sensing – a scoping study. Climate Exchange.

Byg & Novo (2017) Peatland Action Programme – lessons learned. Climate Exchange.

Charman *et al.* (2013) Climate related changes in peatland carbon accumulation during the last millennium. *Biogeosciences* 10:929–44.

Natural England & RSPB (2014) Climate Change Adaptation Manual. Available at: <http://publications.naturalengland.org.uk/publication/5629923804839936>.

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Implementing Agri-Environment Schemes in reversing declines in farmland bird populations in England

Agri-Environment Schemes (AES) have been implemented throughout the UK to provide funding incentives to farmers and land managers to promote environmental stewardship and activities that support or enhance biodiversity and ecosystem services directly or indirectly through improvements to water, air and soil quality (see Section III, Target 7). 72% of the UK is classified as agricultural land (Defra 2018) representing large areas of land on which much biodiversity can be positively or negatively affected depending on land management strategies. AES are therefore designed to capitalise on this land and work in concert with other biodiversity conservation measures, such as protected areas, to more effectively manage the wider landscape matrix that connects these sites. As agriculture is a devolved matter, different schemes operate in each country intended to deliver the same objectives (see Section III Target 7 for more information).

Farmland birds, such as turtle dove (*Streptopelia turtur*), are amongst England's most threatened wildlife (Hayhow *et al.* 2017). Consequently, they are a focus of AES policy in England.

Interventions supported through AES agreements in England include: creation, restoration and sympathetic management of hedgerows, low-input grassland and arable cropping, retention of over-winter stubble management, and creation of flower-rich margins and wild bird seed mixes, amongst others.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Related targets

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.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

- ☐ Measure taken has been effective
- ☒ Measure taken has been partially effective
- ☐ Measure taken has been ineffective
- ☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

This case study focuses on the effectiveness of AES in England in reversing declines in farmland bird populations. A review of the literature identifies positive impacts of AES on bird abundance in England, at the option, farm and landscape-scale. Not all studies show an impact, but where they do, the benefits of more targeted elements of the scheme are greater than those in the entry-level or broad and shallow schemes. (e.g. Davey *et al.* 2010b; Baker *et al.* 2012; Williams *et al.* 2012; Bright *et al.* 2015; Walker *et al.* 2018).

The schemes have been particularly effective when targeted and delivered in partnership with NGOs and landowners to support recovery of scarce or restricted range species such as ciril bunting (*Emberiza cirilus*, see below), and stone curlew (*Burhinus oediconemus*) (Evans & Green 2007, Jeffs *et al.* 2018).

Localised benefits to granivorous bird species have been positively related to the area operating under AES options (surveyed 2005-2010 and mainly broad and shallow schemes) that provide seed-rich habitat although the scale of provision was insufficient to generate landscape-scale population effects (Baker *et al.* 2012). An update of these surveys extending the timeframe to 2013 suggested that while wild bird seed mix crops has benefits for some species, negative significant associations between some species and these crops are also observed (BTO 2016). By contrast, stubble management benefits almost all of the species surveyed (BTO 2016). A further update suggests positive effects for farmland bird populations in the long-term even for those options where results were previously more equivocal (Pringle & Siriwardena unpublished) illustrating the importance of long-term monitoring to inform management.

Between 2008 and 2011, 65 farms under targeted higher-level scheme agreements were shown to have greater positive effects on six species of farmland breeding bird density than 21 farms operating outside of AES across three regions of England (Bright *et al.* 2015). Extending this study, breeding bird surveys on 68 farms under targeted agreements in the arable dominated East Anglia, grassland dominated west midlands, and mixed farming Oxfordshire between 2008 and 2014 showed more positive changes in abundance for the majority of surveyed species compared to surveys in the surrounding countryside, although regional variation was observed (Walker *et al.* 2018). There were no species for which changes in abundance were more negative on farms with targeted AES in place. To halt ongoing landscape-scale population declines in these regions, the authors estimate that one-third of the farmed landscape or up to 26-33% of farmland bird

populations would need to be subject to targeted AES, although substantial uncertainty is associated with these figures (Walker *et al.* 2018).

Surveys conducted in 2017 to update data published in Bright *et al.* (2015) and Walker *et al.* (2018) and provide monitoring over a ten-year period showed continued positive responses to targeted management in comparison to both farms outside of AES and those that had only a low level of bird friendly habitat (Defra unpublished).

Previous entry level (broad and shallow) agreements allowed farmers accepted onto the scheme to freely select interventions from a suite of management options. However, this led to variable uptake of some options meaning that some management practices remained uncommon in the landscape (Davey *et al.* 2010a). To address this, a more targeted 'Farmland Bird Package' was developed to encourage farmers to provide three key habitats - seed-rich foraging winter habitat, insect-rich foraging summer habitat, and high-quality nesting habitat. This package approach continues to be applied and initial evidence suggests that a packaged approach provides significant benefits for many species of farmland birds (Bladon *et al.* unpublished). There is good evidence that conservation interventions by committed land managers can work – for example the change in fortunes of the grey partridge (*Perdix perdix*) (Aebischer and Ewald J.A. 2004, 2010, Connor and Draycott 2010, Ewald *et al.* 2010, 2012, Game & Wildlife Conservation Trust 2018, Sotherton *et al.* 2014).

Positive population level impacts of scheme implementation have been observed for rare/scarcely species and some of the more widespread species, such as tree sparrow (*Passer montanus*), have shown early signs of recovery from low levels

(<https://app.bto.org/birdtrends/species.jsp?s=tresp&year=2017>). However, the ongoing declines in abundance for other widespread species (Defra 2017) suggest either that uptake of the right options in the right place has been insufficient, or that other pressures, such as illegal killing on migration or detrimental changes in land management (e.g. the loss of compulsory set-aside land), limit the gains from improved habitat provision. The relative importance of different pressures varies from species to species and knowledge of their relative importance is partial.

Summary of assessment

Farmland birds (particularly farmland specialists) continue to decline in England although the rate of decline overall appears to have slowed (Defra 2017). While agricultural practices are a major contributor to declines, changes in the numbers of some species may be further driven by other pressures, including disease and land management, and other pressures on farmland not under AES. Due to the complex nature of the landscape and ecological responses, it is often difficult to quantify the ecological benefits of specific interventions. Nonetheless, evidence suggests variable but generally positive impacts of AES on bird abundance in England, at the option, farm and landscape-scale, with more targeted schemes delivering greater benefits than broad and shallow schemes. It is therefore likely that in the absence of AES greater declines in farmland bird biodiversity and abundance, as well as that of other species, would have been experienced. Consequently, an assessment of partial effectiveness for AES implementation to reverse declines in farmland birds has been made.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Aebischer, N.J. & Ewald, J.A. (2004). Managing the UK Grey Partridge *Perdix perdix* recovery: population change, reproduction, habitat and shooting. *Ibis*, 146 Supplement 2: 181-191.

Aebischer, N.J. & Ewald, J.A. (2010). Grey Partridge *Perdix perdix* in the UK: recovery status, set-aside and shooting. *Ibis*, 152: 530-542.

- Baker *et al.* (2012) Landscape-scale responses of birds to agri-environment management: a test of the English Environmental Stewardship scheme. *Journal of Applied Ecology* 49:871-882 doi: 10.1111/j.1365-2664.2012.02161.x.
- Bladon *et al.* (no date) The effects of a farmland conservation package on avian abundance. UNPUBLISHED.
- Bright *et al.* (2015) Higher-tier agri-environment scheme enhances breeding densities of some priority farmland birds in England. *Agriculture, Ecosystems and Environment* 203:69-79 doi: 10.1016/j.agee.2015.01.021.
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- Connor H.E., & Draycott R.A.H. 2010. Management strategies to conserve the grey partridge: the effect on other farmland birds. *Aspects of Applied Biology* 100:359-364.
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- Ewald, J. A. Potts G. R. & Aebischer N. J. 2012. Restoration of a wild grey partridge shoot: a major development in the Sussex study, UK. *Animal Biodiversity and Conservation* 35.2:363-369.
- Game & Wildlife Conservation Trust. 2018. Working Conservationists: The land managers saving British wildlife. <https://www.gwctshop.org.uk/2269---working-conservationists-519-p.asp>.
- Hayhow *et al.* (2017) The state of the UK's birds 2016. The RSPB, BTO, WWT, DAERA, JNCC, NE, NRW and SNH, Sandy, Bedfordshire. Available at: <https://www.bto.org/sites/default/files/publications/state-of-uk-birds-2016.pdf>.
- Jeffs *et al.* (2018) The UK Cirl Bunting population exceeds one thousand pairs. *British Birds* 111:144-156.
- Pringle & Siriwardena (no date) Impacts of Environmental Stewardship on Bird Populations in Farmland 2005-2017: Report to NE March 2018. UNPUBLISHED.
- Rae (2017) A land cover atlas of the United Kingdom. DOI: 10.15131/shef.data.5266495.
- Sotherton N.W., Aebischer N.J. & Ewald J.A. 2014. Research into action: grey partridge conservation as a case study. *Journal of Applied Ecology* 2014, 51, 1–5 doi: 10.1111/1365-2664.12162.
- Walker *et al.* (2018) Effects of higher-tier agri-environment scheme on the abundance of priority farmland birds. *Animal Conservation* 21:183-192 doi:10.1111/acv.12386.

Williams *et al.* (2012) Bird Conservation: Global evidence for the effects of interventions. Exeter, Pelagic Publishing. Available at: <https://www.conservationevidence.com/synopsis/index>.

Other relevant information, including case studies to illustrate how the measure taken has resulted in (or is expected to result in) outcomes that contribute to the implementation of the NBSAP

The best example in the UK of AES delivery underpinning species recovery is that of the ciril bunting (*Emberiza cirilus*). Although probably never common, ciril buntings were once widespread across southern England but suffered major population decline and range contraction in the 20th century with only a remnant population in south Devon remaining by the late 1980s (Peach *et al.* 2001; Jeffs *et al.* 2018). Associated with low intensity mixed arable/livestock farmland featuring spring-sown crops and overwintered stubble and cattle-grazed permanent pasture, ciril buntings are usually very sedentary, typically moving <2 km between wintering and breeding grounds. A priority bird species in the UK, AES were introduced through the original Countryside Stewardship Scheme in 1991 to provide financial and practical support to farmers to deliver ciril bunting habitat. In 1993, a dedicated project officer was appointed by RSPB (joint funded by Natural England) to raise awareness of ciril bunting and develop close working relationships with farmers by providing one-to-one support and advice, and helping guide them through the application process for AES. Using the Countryside Stewardship Scheme and then later the Environmental Stewardship scheme as delivery mechanisms, farmers were encouraged to respond to emerging scientific evidence regarding ciril bunting ecology and habitat needs with appropriate land management.

Between 2006 and 2011, a reintroduction project was also undertaken to establish a geographically separate population in Cornwall, to improve the conservation outlook for ciril bunting as natural range restoration was unlikely due to the sedentary nature of the species (Jeffs *et al.* 2018). During this 5 year period, up to 72 birds were removed annually from Devon as nestlings, hand reared through a partnership project between RSPB, Natural England, Paignton Zoo, the National Trust, and the Zoological Society of London, and were released at a site in south Cornwall. Breeding commenced a year after the first releases and a self-sustaining population was established by 2015, with ciril buntings occupying 65 territories by 2016 (Jeffs *et al.* 2018). This is the first example of a successful passerine reintroduction in Europe (Jeffs *et al.* 2018), with AES delivery in the release area being a key ingredient of that success.

With essential support from farmers, the UK ciril bunting population has increased from 118 pairs in 1989 to over 1,000 pairs in 2016, with an accompanying range expansion in Devon (Jeffs *et al.* 2018). Ciril buntings have also become re-established in Jersey after becoming extinct in 2004. Between 1992 and 1998 a significantly greater rate of increase in ciril bunting was demonstrated on land under AES agreements than in adjacent countryside (Peach *et al.* 2001). Concurrently, benefits to other declining farmland birds such as yellowhammer (*Emberiza citrinella*) and reed buntings (*Emberiza schoeniclus*) (NE unpublished) as well as vascular plants, butterflies, carabid beetles, foliar invertebrates and bats (MacDonald *et al.* 2012) from actions designed to benefit ciril buntings have been documented.

Because of the limited range of ciril bunting, it was possible to use AES as a delivery mechanism to influence a large enough proportion of the population to make a difference at the population scale. While lessons can be learnt from this process, it is more challenging for land management actions to have population scale effects for species with a larger range, because the scale of delivery needs to be increased to cover the required proportion of a population (Walker *et al.* 2018).

The Countryside Stewardship Facilitation Fund is a scheme that supports a facilitator to foster co-operation amongst farmers and other land managers to deliver the Countryside Stewardship

priorities across a number of holdings. The aim is to deliver bigger, better and joined up agreements.

The Countryside Stewardship (CS) Facilitation Fund supports people and organisations that bring farmers, foresters, and other land managers together to improve the local natural environment at a landscape scale. This landscape scale approach can cover land under existing agri-environment and forestry/woodland agreements, common land and land not currently covered by a scheme. It builds on the principles of partnership working to deliver environmental benefits, as demonstrated by various initiatives, including farm clusters and the farmer-led Nature Improvement Area.

- The CS FF was set up in 2015 and allocated a budget of £7.2M of RDPE funding over the programme period. This was increased to £7.8M in 2017
- It now funds 98 groups, farming 453,000 ha of land delivering landscape-scale measures for wildlife, water management, landscape and the historic environment.
- There have been three national funding rounds and a Northern Flood Focussed round which was developed in response to the Winter storms of 2015/16.
- The final 2017 national round attracted 49 applications, of which 37 were successful, prompting a request for an additional £600K of funding.
- All the allocated budget £7.8M is now committed.
- The 98 groups, involving over 2,240 land managers are now delivering coordinated training and advice until 2020/2021.
- There is a good geographical spread of groups across the country. Groups range in size and area of holdings covered, are diverse with some being farmer led, some led by NGOs/land agents, some in National Parks/AONBs.
- The core environmental issues targeted by CS are biodiversity and water management. Historic environment, landscape and climate change are secondary objectives.

The funding to support co-operation is based on the concept and principles of Nature Improvement Areas (NIAs). This is to support co-ordinated delivery across land holdings at sufficient scale to deliver environmental outcomes and help and support and empower farmer led approaches to deliver a more effective ecological network. This ambition to deliver a more effective ecological network is now a central pillar of the 25 Year Plan, which the Facilitation Fund can contribute to as one delivery mechanism for the Nature Recovery Network.

An evaluation of Countryside Stewardship and the Facilitation Fund is underway, with the first phase scoping completed (June 2018) and being assessed, with second phase starting late 2018. This evaluation aims to capture the environmental benefits directly driven by Countryside Stewardship, and the wider benefits resulting from the establishment of supportive networks and learning/capacity-building (social capital), changes in land management practice through long-term behaviour change, connections between farming and wider society and any associated economic activity or co-benefits.

The evaluation aims to test whether the Facilitation Fund leads to

- better alignment with targeting priorities;
- more coherent and mutually supporting options;
- greater uptake of Countryside Stewardship options in facilitated management areas; and
- better placement and/or implementation of options (through the impact of advice, training, peer-learning etc.).

The Facilitation Fund appears popular and effective and is also producing additional benefits and resources. Early indications suggest alignment and option choice is better informed, aided by the

focussed training and advice provided by the group facilitator. Proposals to develop further rounds are underway.

Further details and case studies can be found

at: <https://www.gov.uk/government/collections/countryside-stewardship-facilitation-funding>.

Another example is that of Farmer Clusters. These have been established with support from the Game & Wildlife Conservation Trust and Natural England with funding available through an AES Facilitation Fund, although some Farmer Clusters are self-funded. Farmer Clusters are composed of a collection of farmers working together voluntarily to devise conservation and land management plans at the landscape-scale rather than as separate farms underpinned by AES and facilitated by an advisor. They therefore take a 'bottom-up' approach to management.

A 'super cluster', composed of three existing Farmer Clusters with a combined total of 36 farmers and covering 23,600 hectares (236 km²), was established in 2016 around Martin Down National Nature Reserve and Site of Special Scientific Interest in Hampshire, south England (Brooks unpublished). Martin Down is the third largest chalk grassland in England and is important for biodiversity, including hosting the last south-western population of turtle dove (*Streptopelia turtur*). The super cluster aims to manage the surrounding farmland in a way that benefits species present in the reserve and help them to spread out into the wider countryside. Actions taken include planting flower-rich grass strips for bees and butterflies; growing patches of seed-bearing plants for winter food for birds, making sure there are good nesting areas, and maintaining fallow areas to attract birds. Other species such as butterflies, bumblebees, hedgehog (*Erinaceus europaeus*), harvest mouse (*Micromys minutus*), reptiles and plant species such as orchids are also being targeted. For example, by 2020 the Farmer Cluster aims to increase pollinator habitat on arable land by 55%.

The social benefits of Farmer Clusters are evident. For example, the Martin Down Farmer Cluster (one of the three groups forming the super cluster around Martin Down National Nature Reserve) has extended membership to include approved individuals as part of their 'Friends' group, has held Open Days for schools, and involved local people in monitoring surveys. This cluster is self-funded with members contributing £1 per hectare of their holding for three years to pay towards employing a facilitator, and consequently high levels of buy-in and motivation have been observed. This is further demonstrated by self-funded conservation work being conducted by farmers throughout the cluster. Biodiversity knowledge in the Farmer Cluster area has also dramatically improved with over 4,200 new records being submitted as part of baseline surveys conducted in 2017. It is too early to comment on changes to biodiversity in this area as a result of the cluster approach and component management actions however continued monitoring will enable changes from baseline surveys to be recorded over time.

Lessons learnt and implications for practice

Evidence from AES shows that farmland biodiversity will respond if the right options are put in the right places at the right scale. To achieve this, a number of key elements are thought to be important:

- Sufficient evidence on the limiting factors affecting the key species and what options will address each of them, individually or collectively. Research and development and monitoring and evaluation have been critical in designing effective remedial action and solutions. In the case of the cirl bunting, land management solutions that could be targeted through AES were identified through research programmes and these were essential to recover the species.

- An appropriate mix of options and clarity on how they can be tailored for different situations (e.g. light and heavy land/different landscape and farming types).
- An understanding of the scale at which the options need to be applied to have the desired population-level impact on the target biodiversity (i.e. how much land do you need under sympathetic management/how much of the population do you need to affect, to make a difference).
- Effective scheme design, process and guidance to ensure that the quality of the options delivered is sufficient to meet outcomes, including advice on option choice, placement, establishment and management/aftercare.
- Locations are identified where individual options/option packages should be targeted for best effect (i.e. effective geographical targeting, which could be temporal as well as spatial).
- A degree of 'market testing' to ensure that the packages are acceptable to farmers and can actually be delivered, in practice.
- Evaluation of both the option delivery and biodiversity response, so design/delivery can be subsequently amended, as appropriate, to maximise both wildlife gain and cost effectiveness.

More broadly, experience with AES design and delivery suggests that:

- Targeted management (focused measures often with high advisory input) has been generally more effective for threatened farmland birds than broad and shallow measures with more limited advice. Greater impact is likely to be achieved by employing a landscape-scale approach to ensure that sufficient habitat is provided throughout the year and at sufficient density to support population recovery. Such an approach is likely also to require additional guidance for landowners/farmers. Species-focussed targeted management has delivered measurable gains for threatened species, but take-up of relevant management options generally has also provided conservation benefits.
- Although at an early stage, the Countryside Stewardship Facilitation fund and Farmer Cluster approach look promising and likely to help deliver landscape-scale conservation, assuming effective measures are taken.
- Advice and guidance to land managers from a dedicated, area-based project/facilitation officer can enhance the delivery of AES by increasing awareness, buy-in, momentum and achieving quality AES agreements with appropriate land management packages.
- Partnerships between government, non-governmental organisations and local farming communities can work together to deliver shared nature objectives. AES can provide a vital delivery mechanism for this.
- It takes time to achieve species recovery with management actions likely to take years to produce detectable effects as a consequence of the history of the site, environmental changes from management, and confounding factors such as environmental variables/stochastic effects such as poor weather. A multi-faceted approach may also be required (e.g. through the use of multiple land management options, research, recovery and reintroduction or reinforcement programmes), reducing the ability to draw conclusions on the effectiveness of individual actions.
- Nature reserves and protected sites play a role in securing species survival and recovery. However, as the majority of land in the UK is agricultural, AES are likely the most effective method currently available for conserving biodiversity on farmland and creating a more 'joined up' landscape for wildlife by enabling a large enough proportion of a population to be captured in management interventions. Nonetheless, delivering widespread, wildlife-friendly management will require a farming system that is designed around the ecological needs of species.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information can be found)

Brooks, J. (unpublished) Martin Down Farmer Cluster Landscapes for Wild Pollinators Initiative and general project update for Natural England and Defra, March 2018.

Jefferies *et al.* (2018) The UK Cirl Bunting population exceeds one thousand pairs. *British Birds* 111:144-156.

MacDonald *et al.* (2012) Effects of agri-environment management for cirl buntings on other biodiversity. *Biodiversity & Conservation* 21: 1477-1492 doi: 10.1007/s10531-012-0258-6.

Natural England (no date) Natural England Policy Note, ELMS projects partnerships proforma - cirl bunting recovery programme. UNPUBLISHED.

Peach *et al.* (2001) Countryside stewardship delivers cirl buntings (*Emberiza cirlus*) in Devon, UK. *Biological Conservation* 101:361-373 doi: 10.1016/S0006-3207(01)00083-0.

UK Biodiversity Indicator B1a (<http://jncc.defra.gov.uk/page-4242>).

Walker *et al.* (2018) Effects of higher-tier agri-environment scheme on the abundance of priority farmland birds. *Animal Conservation* 21:183-192 doi:10.1111/acv.12386.

Obstacles and scientific and technical needs related to the measure taken: Please describe what obstacles have been encountered and any scientific and technical needs for addressing these, including technical and scientific cooperation, capacity development activities or the need for guidance materials.

1) *Understanding effectiveness of AES measures for different species and in different contexts.*

Relative abundance for a number of farmland birds at national scale continues to decline despite the implementation of options designed to provide nesting and feeding habitat AES. Benefits from AES agreements vary geographically and by species and will be likely to interact with the complex landscape they sit within. Incomplete knowledge of the habitat or resource requirements for declining species, or of the effectiveness of the options when deployed at a landscape-scale limits our understanding of 'what works' and of the relative priorities for further action.

2) *Long term security of options.*

There is evidence that habitat options for birds can take several years to establish, and that there is a lag before species respond. Continuity of management benefits wildlife, and allows for a fuller assessment of the effects of different option combinations and deployment (e.g. Baker *et al.* 2012; BTO 2016; Pringle & Siriwardena unpublished),

3) *Changes to the funding landscape and policies.*

The UK Government has clearly signalled its intention to introduce a new Environmental Land Management scheme in England, , focussed on environmental outcomes. EU-exit does offer the UK the opportunity to reform AES and consider innovative delivery mechanisms. For example, greater focus on payments for outcomes rather than prescriptive measures would change the cultural landscape from one of compensation to rewards, and may promote a greater sense of shared ownership and responsibility amongst landowners. It would also integrate natural capital into the market system by diversifying the farm outputs from simply products to a system which includes public goods. There is also the potential for diversifying funding sources, for example through innovative financing models (e.g. private sector biodiversity/sustainability funds, eco-labels, environmental net gain, biodiversity offsetting, conservation covenants, tax systems) and improving consumer awareness regarding the impact of market choices.

4) *Landscape-scale delivery.*

There is increasing interest in the value of landscape-scale delivery of environmental interventions for sustained improvements in species (e.g. population increases) or habitats

(e.g. restoration activities) (HM Government 2018). This presents the opportunity to unite AES with other environmental interventions, including species recovery measures such as reintroduction and other bespoke interventions, to extend environmental benefits more widely onto surrounding land and to strengthen ecological responses to AES activities. Greater understanding of what effective mechanisms to drive landscape-scale delivery might be is required.

5) *Understanding how the impact of climate change on biodiversity and outcomes of AES measures.*

In the UK climate change will alter plant communities and species distribution, hydrology and climate. Understanding the local and regional predicted impacts of climate change and the implications of this for AES measures will be important for evaluation and prioritisation of activities.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to these obstacles and scientific and technical needs can be found).

Baker *et al.* (2012) Landscape-scale responses of birds to agri-environment management: a test of the English Environmental Stewardship scheme. *Journal of Applied Ecology* 49:871-882 doi: 10.1111/j.1365-2664.2012.02161.x.

BTO (2016) Responses of farmland birds to eight years of Environmental Stewardship. Defra publication. Available at:

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=19204&FromSearch=Y&Publisher=1&SearchText=LM0436&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>.

HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Department of Environment Food and Rural Affairs.

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Freshwater habitat restoration for species recovery: The case of the vendace (*Coregonus albula*) in England

Freshwater habitats include rivers, lakes, wetlands, streams, and underground aquifers. They provide numerous ecosystem goods and services including: water for drinking, farming, energy, transport, and manufacturing; food; natural waste disposal and processing; protection against flooding; climate regulation, and cultural services such as recreation, boating, fishing and hunting. Freshwater habitats are habitats of principal importance for nature conservation under section 41 of the 2006 Natural Environment and Rural Communities Act and eight freshwater habitat types found in the UK are listed under Annex I of the EU Habitats Directive (JNCC 2018).

Freshwater habitats present particular challenges for habitat restoration and management because they are fed by water from within an entire catchment. This means that while site-specific protection may be afforded to freshwater habitats, a landscape-scale approach to their management is required to address activities on land within the catchment that are negatively affecting the freshwater habitat.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Related targets:

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 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 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.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

- ☐ Measure taken has been effective
☒ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

This case study focuses on the process of improving water quality in Bassenthwaite Lake, Cumbria to enable vendace (*Coregonus albula*) recovery.

Vendace is a coregonid fish with an r-selected life history (produces many small eggs with a low probability of survival, fast growth and a relatively short generation time of 2-3 years). The majority of vendace populations spend their life cycle confined to one waterbody, and exhibit daily vertical migration spending daylight hours near to the lake bed and night time in the water column feeding. It is one of only three coregonid fish found within the UK and is considered the rarest freshwater fish in Britain, being known to have ever existed in only four sites in England and Scotland. In Scotland, the native populations in Castle Loch and Mill Loch became locally extinct in the 1910s and 1970s respectively. In the original locations, only two extant populations in England are now in existence, Bassenthwaite Lake and Derwent Water which are linked via the River Derwent, in the Lake District of north-west England (Winfield *et al.* 2004, 2012; Waters *et al.* 2018).

The size of the Derwent Water population has been cycling at around 5,000 individuals since 1998 when regular monitoring began (Winfield *et al.* 2017). Being upstream of Keswick, water quality in Derwent Water has remained good with large areas of little to no fine sediments on suitable spawning sites (Winfield *et al.* 2006). By contrast, following rapid declines, the Bassenthwaite Lake vendace population was considered locally extinct by 2001. Remarkably, following this, six individuals were caught between 2013 and 2017, and as of 2014 the population was estimated to be approximately 2,400 individuals (Winfield *et al.* 2017). This recolonisation of Bassenthwaite Lake is thought to have occurred from individuals migrating downstream from Derwent Water after 2008 and evidence of spawning suggests the population has successfully established itself.

Freshwater habitat quality in Bassenthwaite Lake has improved over the last 2-3 decades as a result of a variety of management interventions. Phosphorus budgets have been produced for Bassenthwaite Lake in 1993, 1995, 1996, 1997, 1998, 2000 and 2001 (Thackeray *et al* 2006). The 1993 phosphorus budget estimated that 78% of the total external annual load of the lake was derived from the four treatment works in the catchment, and 72% from Keswick Waste water Treatment Works (WwTW) alone. The remaining 22% was derived from the catchment. Internal loading of phosphorus was not included in this assessment. This budget led to the introduction of phosphate-stripping at the Keswick WwTW in 1995 which immediately reduced the total phosphorus load from Keswick WwTW by 63% and the total lake phosphorus load by 23% (Thackeray *et al.* 2006, Figure 1).

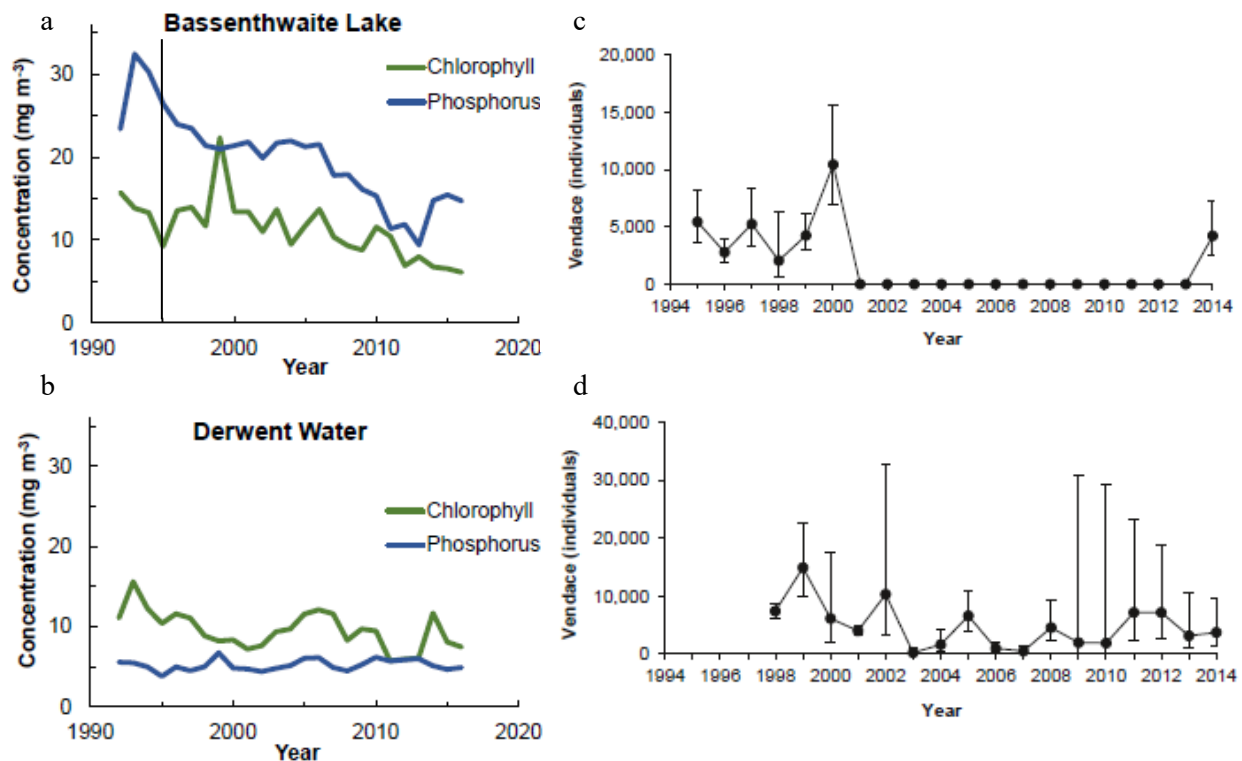


Figure 1: Chlorophyll and phosphorus concentrations and vendace abundance in Bassenthwaite Lake (a, c respectively) and Derwent Water (b, d respectively). Black vertical line in (a) represents the introduction of phosphate stripping at Keswick Waste Water Treatment Works. Source: (a, b) Waters *et al.* 2018, and (c,d) Winfield *et al.* 2017, data collected with support from Natural England and United Utilities.

Improved waste water treatment increased the proportion of the phosphorus load contributed by the catchment from 22% to 44%, thereby increasing the importance of managing the catchment land to improve water quality. The Countryside Stewardship Agri-Environment Scheme is being used to promote catchment sensitive farming in the Bassenthwaite catchment to further reduce water pollution from agriculture.

Marked changes in fish communities in Bassenthwaite Lake and Derwent Water have been observed in response to invasive species (Winfield & Durie 2004). Roach (*Rutilus rutilus*) were first recorded in Bassenthwaite Lake in 1986 and greatly increased in number in the 1990s. Ruffe (*Gymnocephalus cernuus*) were first recorded in Derwent Water in 1991 while dace (*Leuciscus*

leuciscus) were first recorded in Bassenthwaite in 1996. Assessment of invasion pathways attributed discarded or escaped live-bait used by recreational anglers as the source of invasion. This led to a byelaw banning dead or live-baiting with freshwater fish, salmonids or eel in 14 lakes across the Lake District in 2002. No further species introductions have been recorded at Bassenthwaite Lake since this measure was introduced.

Summary of assessment:

Improvements to the Keswick WwTW in 1995 led to a substantial reduction in phosphorus loads in Bassenthwaite Lake. With the effective reduction of phosphorus loads in Bassenthwaite Lake, the importance of effectively managing activities within the Bassenthwaite catchment has increased and catchment sensitive farming is being promoted. The improvement of freshwater habitat quality is likely to have led to the successful recolonisation of Bassenthwaite Lake by vendace. However, phosphorus loads in Bassenthwaite Lake remain high compared with Derwent Water and in recent years the downward trend has been more variable. Further changes to land management may therefore be required to ensure the ongoing restoration of Bassenthwaite Lake and the survival of its vendace population. An assessment of partial effectiveness has been made on this basis.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

JNCC (2018) UK Interest Features. Available at:

http://jncc.defra.gov.uk/Publications/JNCC312/UK_habitat_list.asp.

Thackeray *et al.* (2006) The Ecology of Bassenthwaite Lake (English Lake District). Ambleside, Freshwater Biological Association, 80pp. (Freshwater Forum 25). Available at:

<https://www.fba.org.uk/journals/index.php/FF/article/viewFile/167/67>.

Waters *et al.* (2018) Is the Vendace, Britain's rarest freshwater fish, on the brink of extinction? British Wildlife 29:159-164.

Winfield & Durie (2004) Fish introductions and their management in the English Lake District. Fisheries Management and Ecology 11:195-201.

Winfield *et al.* (2017) The 'reappearance' of vendace (*Coregonus albula*) in the face of multiple stressors in Bassenthwaite Lake, U.K. Fundamental and Applied Limnology 189:227-233 doi: 10.1127/fal/2016/0799.

Other relevant information, including case studies to illustrate how the measure taken has resulted in (or is expected to result in) outcomes that contribute to the implementation of the NBSAP

Vendace are afforded full protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and is listed in Section 41 of the Natural Environmental and Rural Communities Act 2006 as a priority species. Bassenthwaite Lake is designated a Site of Special Scientific Interest, a National Nature Reserve, and a Special Area of Conservation, as well as a Sensitive Water under the European Union Urban Wastewater Treatment Directive. Derwent Water is a Site of Special Scientific Interest and a Special Area of Conservation.

Associated with deep, cool, well-oxygenated water bodies, with areas of clean gravel lake bed for spawning, suitable habitat for vendace is limited in the UK. For extant populations, threats to vendace include water quality declines, sedimentation of spawning sites, de-oxygenation of waters, invasive species, climate change, and, in the past, fishing (Winfield *et al.* 2004; Elliott & Bell 2011; Waters *et al.* 2018).

The Centre for Ecology & Hydrology (CEH) has been monitoring Bassenthwaite Lake and Derwent Water since 1990 with funding contributions from the Environment Agency, United Utilities water company, and Natural England. Vendace population changes in Bassenthwaite Lake have been linked to high nutrient, and particularly phosphorous, concentrations (Winfield *et al.* 2017; Waters *et al.* 2018, Figure 1). The findings of this monitoring and evaluation programme, namely the presence of vendace and identification of its habitat requirements, as well as the requirement to maintain and improve designated sites, have led to several management interventions to improve water quality following recognition of water status and its impact on the freshwater ecosystems. Interventions have included implementation of catchment sensitive farming measures and improved wastewater treatment in the catchment (Figure 2).

The 2015 Lakes Tour report (Maberly *et al.*, 2016) states that “in terms of the current Water Framework Directive (WFD) classification boundaries, Bassenthwaite Lake is categorised as being in a Good ecological state for total phosphorus and for phytoplankton chlorophyll a; an improvement from Moderate in the 2010 Lakes Tour”. It also states that “the water quality in Bassenthwaite Lake has improved over the last decade”. The report does comment on the fact that whilst there are no statistically significant changes in the main nutrients in Bassenthwaite Lake between 1984 and 2015, there are encouraging signs of declining concentrations of total phosphorus, chlorophyll a and improving Secchi depth since around 2000.

There has been strategic targeting around Bassenthwaite of agri-environment low input options through Entry Level Stewardship and Higher Level Schemes or equivalents for the last decade, alongside Catchment Sensitive Farming initiatives. Bassenthwaite was one of the original pilots.

These schemes and programmes have offered advice on nutrient management and planning, application with crop demand and soil testing, synchronising application of nutrients with the growing season i.e. precision farming techniques. In addition, advice and support to maximise storage - separate clean and dirty water and agricultural manures. The schemes have highlighted the value of farm manures to improve the farm economy and how to dovetail with environmentally friendly practice. They have also targeted upland scrub creation and identified areas of soil erosion to reduce sediment loading.

Potential risks for the future in terms of land management include:

- Uptake of voluntary schemes – economically driven in marginal areas
- Uncertainty around the long term future of schemes

The agri-environment initiatives are considered to have been partially effective; there is still work to be done.

To ensure the continued survival of vendace in the UK, a partnership of organisations including Environment Agency and Scottish Natural Heritage relocated juveniles, eggs and larvae, and adults to five lakes and ponds across Scotland and England in the late 1980s and late 1990s-mid 2000s, chosen on the basis of habitat suitability (Lyle *et al.* 2006; Waters *et al.* 2018). These relocations have had varying degrees of success (Lyle *et al.* 1996; Winfield *et al.* 2012; Bean *et al.* 2016; Waters *et al.* 2018, Figure 2).

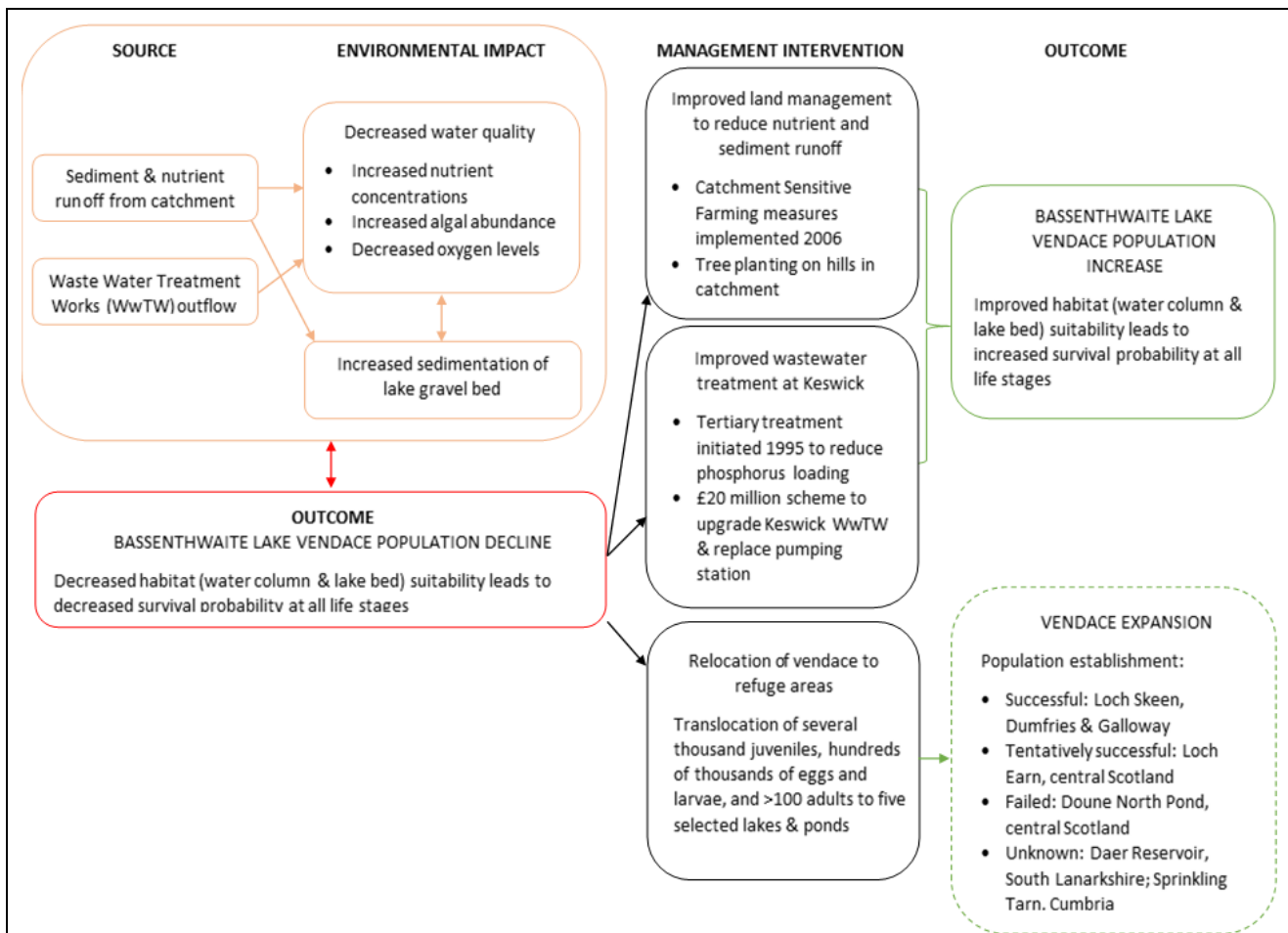


Figure 2: Causes of vendace decline in Bassenthwaite Lake and management response for species recovery

Lessons learnt and implications for practice

Freshwater habitat restoration is an effective method for promoting species recovery. From the examples provided a number of lessons may be learnt for future practice:

- Successful freshwater restoration benefits from an ecosystem perspective that takes account of the whole catchment area adopting a landscape-scale approach.
- Species recovery has been effective because there was sufficient understanding of the root cause of decline and an understanding of the biology and ecological role of the species.
- Ensuring connectivity between sites has allowed relocation and recolonisation of species naturally as ecological conditions allow, facilitating a good prognosis for further recovery.
- A long-term monitoring programme has allowed for determination of the status of populations and ecosystems and informed management decisions. It has also allowed the partners to learn about the requirements of particular species to enable identification of suitable translocation locations for refuge populations, and to track the success or failure of management interventions.
- Monitoring, evaluation and assessment of progress has been more effective because site restoration plans clearly outlined the agreed outcomes, interventions required and milestones to measure progress towards these outcomes against.
- Targeting invasion pathways has prevented the spread of invasive species and is more cost-effective than retrospectively controlling or attempting to remove invasives.
- Partnership working has allowed for the pooling of resources and sharing of expertise.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information can be found)

- Bean *et al.* (2016) Vendace. In Gaywood *et al.* (eds) The Species Action Framework Handbook. Scottish Natural Heritage, Bottleby, Perth. Chapter 10. Available at: <http://www.snh.org.uk/pdfs/publications/corporate/SAFHandbook2016.pdf>.
- Elliott & Bell (2011) Predicting the potential long-term influence of climate change on vendace (*Coregonus albula*) habitat in Bassenthwaite Lake, U.K. *Freshwater Biology* 56:395-405 doi:10.1111/j.1365-2427.2010.02506.x.
- Lyle *et al.* (1996) Re-introduction of vendace – phase 1. Scottish Natural Heritage.
- Lyle *et al.* (2006) Translocation of vendace from Derwentwater to safe refuge locations. Environment Agency.
- S.C. Maberly, M.M. De Ville, S.J. Thackeray, D. Ciar, M. Clarke, J.M. Fletcher, J.B. James, P. Keenan E.B. Mackay, M. Patel, B. Tanna, I.J. Winfield, K. Bell, R. Clark, A. Jackson, J. Muir, P. Ramsden, J. Thompson, H. Titterton, P. Webb (2016) *A survey of the status of the lakes of the English Lake District: The Lakes Tour 2015*. Centre for Ecology and Hydrology.
- Waters *et al.* (2018) Is the Vendace, Britain's rarest freshwater fish, on the brink of extinction? *British Wildlife* 29:159-164.
- Winfield *et al.* (2004) Conservation ecology of the vendace (*Coregonus albula*) in Bassenthwaite Lake and Derwent Water, U.K.
- Winfield *et al.* (2006) Ecology and management of Vendace spawning grounds Final Report
- Winfield *et al.* (2012) Conservation of the vendace (*Coregonus albula*), the U.K.'s rarest freshwater fish. *Advances in Limnology* 63:547-559 doi: 10.1127/advlim/63/2012/547.
- Winfield *et al.* (2017) The 'reappearance' of vendace (*Coregonus albula*) in the face of multiple stressors in Bassenthwaite Lake, U.K. *Fundamental and Applied Limnology* 189:227-233 doi: 10.1127/fal/2016/0799.

Obstacles and scientific and technical needs related to the measure taken: Please describe what obstacles have been encountered and any scientific and technical needs for addressing these, including technical and scientific cooperation, capacity development activities or the need for guidance materials.

While vendace have re-established in Bassenthwaite Lake, significant challenges remain to its continued survival:

- (1) *Lag time between interventions and outcome, and diffuse sources of pollution.*
Improvement in water quality slow due to other sources of phosphorus from allochthonous origin entering lake (Thackeray *et al.* 2006), and retained phosphorus in lake-bed sediments being re-released into water column (internal loading). It can also take time to change the culture and practices in land management.
- (2) *Sustained monitoring effort.*
Funding for research and for environmental land management is often easier to secure than funding for monitoring.
- (3) *Climate change.*
Climate change will likely increase lake temperatures and decrease oxygen concentrations (Elliott & Bell 2011) and may cause higher rainfall that increases sediment and nutrient runoff into the lakes (Thackeray *et al.* 2006), presenting challenges for the long-term habitat suitability of Bassenthwaite Lake for vendace.
- (4) *Invasive non-native species.*
Invasive non-native species (Roach *Rutilus rutilus*, Dace *Leuciscus leuciscus*, Ruffe *Gymnocephalus cernuus*) have been introduced into both Bassenthwaite Lake and Derwent Water presenting challenges to vendace from competition and egg predation.

More broadly, freshwater restoration faces a number of ongoing challenges:

- (1) *Sustained population growth will continue to place pressure on the existing waste water treatment system.*

The waste water treatment network across the UK is continuously being upgraded to ensure adequate capacity however sustained population growth in particular regions of the UK places pressure on these areas.

- (2) *Plastic pollution.*

The problem of macro- and micro-plastic pollution in the environment is a subject of increasing public awareness. The full scale of plastic pollution in freshwater habitats across the UK, and its ecological impact on the wildlife that inhabit this habitat would benefit from further research to address current knowledge gaps.

- (3) *Invasive non-native species.*

Risk management plans are in place from priority species known to be invasive, but not yet established in Great Britain. However, in most cases, the ecological impacts of invasive non-native species often have to be based on studies overseas or by modelling likely impacts. Negative effects on native species have been documented as a result of the introduction of some, but their co-occurrence is likely to result in complex additive, antagonistic and/or synergistic effects. Good biosecurity measures and early reporting systems have been effective in preventing establishment of known invasive species.

- (4) *Climate change.*

The impact of climate change on river flows, water quality and freshwater ecosystems in catchments across the UK is uncertain, although predictive models are widely used. Greater research on the effects of climate change on freshwater ecosystems and management measures to impart resilience to change would improve predictive capability.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to these obstacles and scientific and technical needs can be found).

Costes *et al.* (2018) Lee tunnel project – the first step toward a cleaner River Thames. Proceedings of the Institution of Civil Engineers – Civil Engineering 171:69-76 doi: 10.1680/jcien.17.00044.

Elliott & Bell (2011) Predicting the potential long-term influence of climate change on vendace (*Coregonus albula*) habitat in Bassenthwaite Lake, U.K. Freshwater Biology 56:395-405 doi:10.1111/j.1365-2427.2010.02506.x.

Thackeray *et al.* (2006) The Ecology of Bassenthwaite Lake (English Lake District). Ambleside, Freshwater Biological Association, 80pp. (Freshwater Forum 25). Available at: <https://www.fba.org.uk/journals/index.php/FF/article/viewFile/167/67>.

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Species reintroduction and reinforcement programmes: Reintroducing dormice (*Muscardinus avellanarius*) to England

Priority species for conservation action have been identified for each UK country on the basis of their threatened status or population trends. Measures implemented to prevent species extinction and improve the conservation status of species in decline include protected areas, species reintroductions and reinforcement programmes, together with a suite of broader conservation measures intended to improve land management, promote habitat recovery or restoration, and reduce pollution through, for example, Agri-Environment Schemes, and legal protection.

Species reintroduction and reinforcement programmes have been undertaken across the UK to bolster efforts to recover many priority species that have been assessed as being threatened or in decline. Reintroductions and reinforcements are complemented by measures intended to minimise or reduce the pressures identified as contributing to the declines of these species.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

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.

Related targets:

Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve it and use it sustainably.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

- ☐ Measure taken has been effective
☒ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

This case study focuses on the Dormouse Reintroduction Programme in England. The success of this programme (see case study description below) has been evaluated at a number of progress stages (updated 2018, Table 1):

- (1) Birth of second generation young: 95% success – 19 of the 20 sites with more than 3 years since release at the time of assessment (1994-2014) have reached this stage.
- (2) Evidence of dispersal: 67% success – 12 of the 18 sites where release was more than 5 years ago at the time of assessment (2012 or earlier) have reached this stage. Based on 10 sites with adequate data available, it took an average of 4.5 years to reach this stage (median 3.5 years, range 1-10 years).
- (3) Evidence of dispersal from the original reintroduction woodland: 60% success – 9 of the 15 sites released more than 10 years ago at the time of the assessment (2007 or earlier) have

reached this stage. Based on 8 sites with adequate data available, it took an average of 10.5 years to reach this stage (median 10 years, range 1-23 years).

In the short term, 95% of sites (19 out of 20) may be considered successful when using the criterion of young being born in the third year of release. In the long-term, for the 15 sites where dormice were released more than 10 years ago, seven are considered fully successful with a stable population and range extension, although there may not have been enough time for all sites to have reached this stage. It is too early to assess the effectiveness of three sites. Building population numbers and natural spread are slow processes, requiring time for reintroduction programmes to reach their full potential. As of 2018 populations are known to have failed to survive at four sites with failure in a further three sites likely. Numbers also appear to be declining at two sites. Populations are known to have spread beyond the boundaries of the woodland at 9 sites.

Table 1: Status of dormice reintroduction efforts, as of June 2018.

Site for dormouse reintroduction	Year of release	Outcome (as of June 2018)
Brampton Wood, Cambridgeshire	1994	Success Population within the woodland considered stable. Animals have spread beyond the boundaries of the release woodland. Ongoing woodland management by Bedfordshire, Cambridgeshire and Northamptonshire Wildlife Trust
Treswell Wood, Nottinghamshire	1994	Failure Population assessed as locally extinct in 2005 due to a lack of appropriate land management with habitat management changes subsequent to reintroductions thought to be detrimental to dormice. Coppice management by Nottinghamshire Wildlife Trust since then suggests habitat has been improved sufficiently for a further release (see 2013 entry).
Stockton Dingle, Cheshire	1997	Risk of failure Population declining due to lack of appropriate land management – management has recently been implemented by volunteers from Cheshire Wildlife Trust. Animals have spread beyond the boundaries of the release woodlands. Some indication that populations may be on the rise again.
Little Linfield Wood, Buckinghamshire	1998	Success Population increasing. Animals have spread beyond the boundaries of the release woodlands. Dormice are not presently recorded in the wood in which they were released (which has only had management undertaken by small volunteer teams) but they have dispersed to the roadside habitat of the M1 motorway.
Bubbenhall, Warwickshire	1998	Failure Population thought to be locally extinct. Lack of appropriate land management and subsequent habitat management changes thought to be detrimental to dormice.
Rievaulx Wood, Yorkshire	1999	Likely failure Population thought to be locally extinct due to lack of appropriate land management.
Priestley Wood, Suffolk	2000	Success Population stable. Animals have spread beyond the boundaries of the release woodlands. Ongoing woodland management by the Woodland Trust.

Maulden Wood, Bedfordshire	2001	Success Population stable. Ongoing woodland management by the Forestry Commission.
Bedford Purlieus, Northamptonshire	2001	Success Population increasing. Ongoing woodland management by the Forestry Commission.
Chambers Farm Wood, Lincolnshire	2002	Success Population stable. Animals have spread beyond the boundaries of the release woodlands. Ongoing woodland management by Lincs. Dormouse Group and the Forestry Commission.
Hamps Valley, Staffordshire	2002	Likely failure Population thought to be locally extinct due to lack of appropriate land management.
Leashaw Woods, Derbyshire	2003	Failure Population thought to be locally extinct. Land management agreement not obtained prior to release and no management implemented.
Heslett & Peter Woods, Yorkshire	2004	Likely failure Population thought to be locally extinct due to lack of appropriate land management. Animals originally spread beyond the boundaries of the release woodland, however no dormice are now thought to persist in the area.
Monsal Dale, Derbyshire	2005	Risk of failure Population declining due to lack of appropriate land management.
Bradfield Woods, Suffolk	2006	Success Population increasing. Animals have spread beyond the boundaries of the release woodlands. Ongoing woodland management by the Suffolk Wildlife Trust.
Freeholders, Yorkshire	2008	Success Dormice were recorded outside the wood within a year of release. Unclear whether this is due to a rapid rise in population or the small size of the wood (16 ha). Ongoing woodland management by Yorkshire Dales National Park Authority.
Windmill Naps, Warwickshire	2010	Success Population increasing within the woodland. Ongoing woodland management by the private owner.
Alne Woods, Warwickshire	2012	Failure Population decline possibly due to the wet summer of 2012 when dormouse breeding was lower than usual nationally: 39% fewer litters were recorded in 2012 than on average across all sites between 2008 and 2017. No breeding was ever recorded at this site.
Treswell Wood, Nottinghamshire	2013	Success Following improvements to land management and habitat suitability a repeat release event was undertaken alongside releases in the nearby Gamston and Eaton Woods to move towards a metapopulation. Population increasing. Work in ongoing with the Nottinghamshire Wildlife Trust and the Notts Dormouse Group to support landscape improvements to improve connectivity between the three sites.

Gamston Wood, Nottinghamshire	2014	Success Population increasing. Releases undertaken alongside releases in the nearby Treswell and Eaton Woods to move towards a metapopulation. Work in ongoing with the Nottinghamshire Wildlife Trust and the Notts Dormouse Group to support landscape improvements to improve connectivity between the three sites.
Eaton Wood, Nottinghamshire	2015	Success Population increasing. Releases undertaken alongside releases in the nearby Treswell and Gamston Woods to move towards a metapopulation. Work in ongoing with the Nottinghamshire Wildlife Trust and the Notts Dormouse Group to support landscape improvements to improve connectivity between the three sites.
Haw Bank Wood, Yorkshire	2016	Too early to assess This was a second reintroduction in Wensleydale in North Yorkshire to supplement the 2008 reintroduction at Freeholders Wood. A project officer has been hired through Peoples' Trust for Endangered Species (PTES) and Woodland Trust funding to support the development of landscape linkages between the two sites to encourage a dormouse metapopulation in the area.
Wappenbury Wood Warwickshire	2017	Too early to assess The first of two reintroductions in Warwickshire as part of the Dunsmore Living Landscape project.
Ryton Wood, Warwickshire	2018	Too early to assess The second reintroduction in Warwickshire as part of the Dunsmore Living Landscape project

Summary of assessment

The Dormouse Reintroduction Programme has had some successes; however, several reintroductions have been unsuccessful, largely where appropriate long-term management has not been secured in relocation sites prior to 2013 (when the IUCN/SSC (2013) Guidelines for Reintroductions and Other Conservation Translocations were published) (Goodwin *et al.* 2017). Consequently, an assessment of partial effectiveness to date has been made.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Chanin (2014) The Dormouse Reintroduction Programme: A review. Natural England

Commissioned Report NECR144. Available at:

<http://publications.naturalengland.org.uk/category/32020>.

Goodwin *et al.* (2017) Voluntary recording scheme reveals ongoing decline in the United Kingdom hazel dormouse *Muscardinus avellanarius* population. Mammal Review 47:183-197
doi:10.1111/mam.12091.

IUCN/SSC (2013) Guidelines for Reintroductions and Other Conservation Translocations. Version 1.0. Gland, Switzerland: IUCN Species Survival Commission, viiii + 57 pp.

Other relevant information, including case studies to illustrate how the measure taken has resulted in (or is expected to result in) outcomes that contribute to the implementation of the NBSAP

The hazel (or common) dormouse is the UK's only native species of dormouse. Once widespread, they are now more restricted in range and vulnerable to local extirpation as a result of habitat fragmentation, deterioration and loss together with changes in climate and unpredictable weather (Wembridge *et al.* 2017). The Dormouse Reintroduction Programme was initiated as part of Natural England's (then English Nature) Species Recovery Programme. It is part-funded and managed by the People's Trust for Endangered Species (PTES), and part-funded and overseen by Natural England. It also involves active participation by Paignton Zoo, the Zoological Society of London, the Common Dormouse Captive Breeders Group, site owners, local volunteers and non-governmental organisations. The original aim was to restore dormice to areas of England previously occupied by dormice. The first reintroduction took place in 1993 and, as of 2018, there have been 28 reintroductions to 24 sites in 12 counties in England with 977 animals released.

Each reintroduction undergoes the following 6 step process (updated from Chanin 2014) which is in line with the IUCN/SSC (2013) Guidelines for Reintroductions and Other Conservation Translocations:

1. *Site selection.*

Reintroduction efforts are targeted at counties (a) where dormice had become extinct, and (b) which were at the peripheral edge of current distribution. Sites are selected according to habitat suitability, size (>20 ha) and landscape connectivity. Following the publication of new IUCN guidelines in 2013, sites are now required to have appropriate land management in place to help dormice persist in the long-term. New sites are targeted within 5 km of existing sites where there is opportunity for connectivity amongst sites to promote metapopulations. For areas where reintroductions have not yet taken place or have failed but remain suitable, priority is given to sites where there are at least two suitably managed woodlands which have habitat connectivity present or where such connectivity can be reinstated, and concurrent releases are arranged. Finally, site selection also considers land ownership, willingness of the landowner to participate in the programme, and interest from the local volunteer network. Most releases have taken place in Warwickshire, Nottinghamshire and North Yorkshire.

2. *Captive breeding.*

The Common Dormouse Captive Breeders Group comprises about a dozen individuals and organisations. Breeding is from captive born individuals and supplemented by wild-caught animals obtained from animals 'rescued' by well-meaning members of the public or from Accredited Agents carrying out dormice surveys. Wild-caught animals are captured in autumn and usually a litter of appropriate age with the mother is brought into captivity as this seems to give the young dormice the best chance of survival. Note that capturing a dormouse requires a licence from Natural England as does transfer into the captive breeding programme.

3. *Veterinary procedures.*

Dormice are sent to the Zoological Society of London and Paignton Zoo Environmental Park when emerging from hibernation for pre-release veterinary checks. Dormice are kept in quarantine for c.6 weeks prior to release into a pre-selected woodland. Dormice found to have infections, injury, deformities, or are in poor condition are not used in the release programme. The protocol for these checks is updated annually. Since 2006 all dormice that are due for release are micro-chipped.

4. *Release of dormice.*

Dormice are taken to the release site and placed in pairs or trios in release cages within an area of c.4 ha. Dormice are kept confined in these cages for 10-14 days before release. Food and water is provided daily during this period. After about 10 days, the dormice are checked and weighed, and small openings are made in the release cages and the dormice are then free to disperse.

5. *Short term care of dormice.*

Dormice are fed from the cages for approximately 2 months with the frequency of feeding slowly decreasing. The aim is to encourage the dormice to move to a natural diet while still providing food if needed. Up to 200 nest boxes are installed in the area around the dormice release site to provide dormouse nesting sites and to allow monitoring. The first monitoring check takes place in September.

6. *Long term monitoring of dormouse population.*

Nest boxes are checked at least twice a year in May or June, and in September or October to attain an indication of the post hibernation population and the post breeding population. Results are submitted to People's Trust for Endangered Species and incorporated into the National Dormouse Monitoring Programme database which is used to monitor changes in population numbers.

An interested and active team of volunteers at the reintroduction site is also essential to help with the reintroduction itself (steps 4 & 5) and to continue long-term monitoring (step 6). Reintroduction is also underpinned by the promotion of appropriate land management through Agri-Environment Schemes, protected sites, and non-statutory management. Many conservation agencies are actively involved in the management of dormouse habitat and there are numerous local efforts to improve connectivity in the landscape that have the potential to benefit dormice recovery and range expansion.

Lessons learnt and implications for practice

- The Dormouse Reintroduction Programme has required a long-term approach with significant population and distribution level impacts taking many years to be observed.
- Pre-release veterinary screening has been essential for minimising risk of spreading parasites or bacteria to wild populations and for maximising the chances of successful reintroduction. For dormice, veterinary screening was only initiated in 1998 despite the programme beginning in 1993. This policy was reviewed and updated, and veterinary screening is now the case for all species reintroductions.
- Information dissemination, public engagement, and support have been critical for increasing public awareness to secure local support and foster greater understanding of the ecological and socio-economic value of reintroduced species, and of the actions that can be taken to support reintroduction/reinforcement programmes. The Dormouse Reintroduction Programme involves an extensive network of project partners and volunteer networks and an enormous amount of work is achieved through good will. Without these partners and volunteers, the Dormouse Reintroduction Programme would be unsustainable.
- Involvement of multiple partners and participants in reintroduction/reinforcement programmes is beneficial to facilitate information dissemination and education, as well as spreading the work load. Consistency in involvement is also beneficial.
- Species can be used as a driver for landscape improvement. For example, the Dormouse Reintroduction Programme has initiated landscape projects in Yorkshire, Nottinghamshire and Warwickshire. These aim to enhance connectivity amongst populations reintroduced to woodlands within around 4 miles (6 km) of each other through improvements to hedgerow and woodland corridors.
- Species reintroduction is thought to have been more successful on sites selected on the basis of habitat suitability and connectivity. The Dormouse Reintroduction Programme aims to release dormice into areas where at least two sites within 5 km of each other can be used as reintroduction sites. Where possible, the programme aims to drive improvements to hedgerow and woodland corridors amongst sites. However, opportunity has also played an important role. Land owners support has also been critical for successful reintroductions.

- Successful reintroduction has depended on the original causes of species decline being identified and removed, and on suitable habitat of high enough quality remaining for species survival. An appropriate long-term land management plan is necessary to maximise the chances of a successful reintroduction.
- The Dormouse Reintroduction Programme demonstrates the importance of work to ensure chosen habitats will remain suitable for the target species in the long-term. Monitoring of reintroduction/reinforcement programmes allows continuous adaptive management to improve success over the longer term.
- More broadly, the area over which appropriate management and public engagement is required is likely to be highly dependent upon the species of interest; the landscape for one species will be orders of magnitude smaller than the landscape for a highly migratory species.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information can be found)

Chanin (2014) The Dormouse Reintroduction Programme: A review. Natural England Commissioned Report NECR144. Available at:

<http://publications.naturalengland.org.uk/category/32020>.

IUCN/SSC (2013) Guidelines for Reintroductions and Other Conservation Translocations. Version 1.0. Gland, Switzerland: IUCN Species Survival Commission, viii + 57 pp.

White (2012) The National Dormouse Monitoring Programme in Britain. Peckiana 8:103-107 ISSN1618-1735. Available at:

http://www.senckenberg.de/files/content/forschung/publikationen/peckiana/volume_2012/issue_8/12_artikel_white_i.pdf.

Obstacles and scientific and technical needs related to the measure taken: Please describe what obstacles have been encountered and any scientific and technical needs for addressing these, including technical and scientific cooperation, capacity development activities or the need for guidance materials.

(1) Availability of suitable sites to achieve connectivity across populations.

At present, the distribution of sites for dormice is considered at a county scale but sites within counties are scattered and do not currently present substantial opportunity for connectivity amongst populations. Green infrastructure (hedgerows and woods) between sites do offer some potential for movement across a landscape. Increasing connectivity would reduce the risk of small populations susceptible to stochastic events and low genetic diversity. However, availability of sites is often a limiting factor with regards either habitat suitability, appropriate land and woodland management, or willingness of landowners and availability of volunteers. By necessity, opportunity therefore plays a role in site selection.

(2) Achieving an adequate volunteer monitoring network.

As the number of release sites increases, the number of volunteers or volunteer groups which need to be sustained for post-release care and monitoring also increases, as does the burden on partner organisation staff. Where an adequate volunteer monitoring network cannot be achieved, prioritisation of sites for reintroduction or continued monitoring may need to be undertaken.

(3) Time and resource for programme engagement.

Interactions with land owners and volunteers can be time-consuming - as the number of release sites increases, so does this commitment. Volunteers are critical to delivering the

Dormouse Reintroduction Programme and such effective partnerships require dedicated time to build and maintain.

(4) *Ensuring genetic diversity.*

Genetic diversity in released dormice is not currently very high. Wild-caught dormice can be used to supplement the breeding programme and increase genetic diversity, but are typically underweight and therefore unlikely to survive hibernation. The impact of using maladapted animals as the source population for reintroductions has not been determined.

(5) *Understanding the reasons for success or failure of reintroduction.*

Long-term monitoring of reintroduction sites for dormice is undertaken by volunteers. While the reintroduction of a rare species into an area can encourage people to volunteer to help with the programme, they may require licencing (which can take up to two years) to monitor dormice. Furthermore, they may start to lose interest as the dormouse population starts to disperse and fewer dormice are recorded or they may not be willing to engage with landowners to get permission to record dormouse dispersal. Hence it can be difficult to get an accurate picture of the status of the dormouse population at a reintroduction site. It is useful however that there is a standardised long-term survey methodology in the National Dormouse Monitoring Programme where results can be submitted and individual sites can be compared with records for other sites or regional or national averages.

(6) *Understanding the effects of climate change on target species.*

Weather events and changes in habitat structure and composition and phenology as a result of climate change are all likely to influence reintroduction success, particularly in the long-term. The precautionary principle should be adopted, and sites selected on the basis of those that are more centrally placed within a species range or which are assessed as being likely to remain suitable in the long-term to future proof reintroduction efforts.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to these obstacles and scientific and technical needs can be found).

Chanin (2014) The Dormouse Reintroduction Programme: A review. Natural England Commissioned Report NECR144. Available at:

<http://publications.naturalengland.org.uk/category/32020>.

White (2012) The National Dormouse Monitoring Programme in Britain. Peckiana 8:103-107 ISSN1618-1735. Available at:

http://www.senckenberg.de/files/content/forschung/publikationen/peckiana/volume_2012/issue_8/12_artikel_white_i.pdf.

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

The Natural Capital Asset Index: Highlighting the importance of the environment for human wellbeing in Scotland

Natural capital has gained increasing traction as a framework to demonstrate the benefits humans derive from the environment which aren't usually accounted for in traditional economic appraisals.

The Natural Capital Asset Index was developed to track changes in the potential of Scotland's terrestrial environment to provide these benefits by assessing the potential benefits derived from

the environment (B, Figure 1) and the changes in extent (quantity) (A, Figure 1) and quality of terrestrial habitats (D, Figure 1).

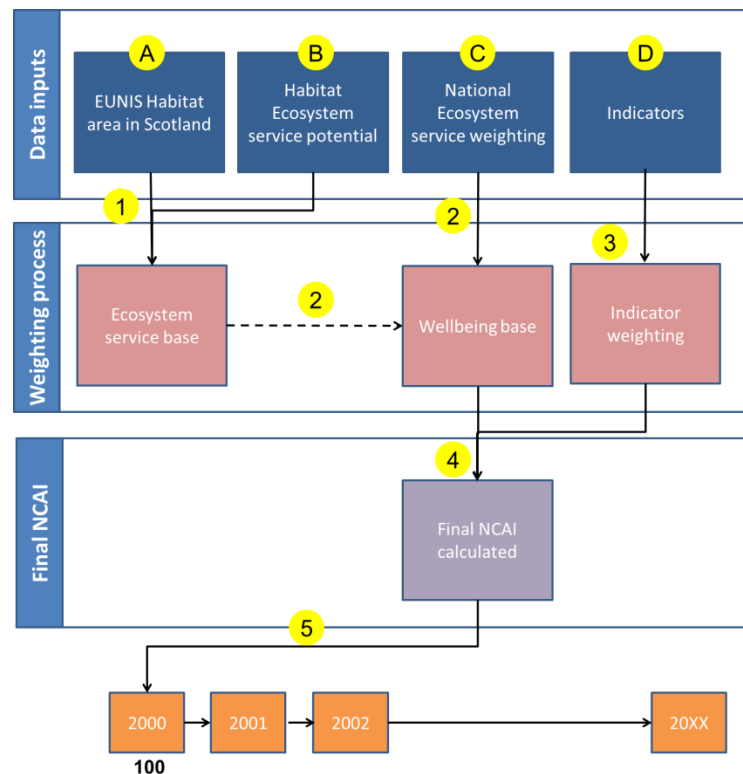


Figure 1: Inputs, weighting and calculation processes of the NCAI.

Many other national natural capital accounts are incomplete, rely heavily on monetisation of benefits or are not updated on a regular basis. The NCAI is a relative index, with all values being relative to the year 2000, where data became consistently and readily available. This has allowed for a more theoretical framework to incorporate a full suite of values (using the Common International Classification of Ecosystem Services (CICES) framework) based on the abilities of habitats to provide ecosystem services and thus contribute to wellbeing.

The index is updated on an annual basis, using data from 38 separate habitat quality indicators (D, figure 1). These indicators can be very specific (one ecosystem service for one habitat) or morebroad (several ecosystem services for several habitats). Changes in these indicators demonstrate changes in the quality of habitats and thus the potential for them to provide benefits through ecosystem services (figure 2).

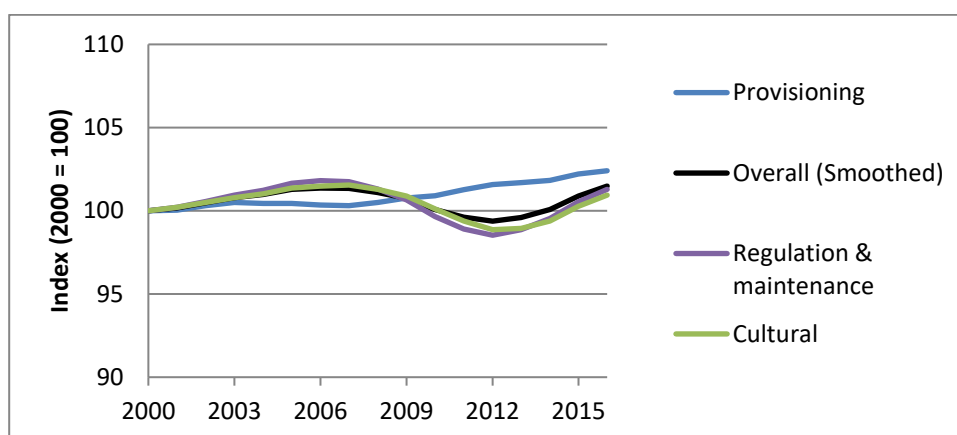


Figure 2: NCAI to 2016 by type of ecosystem service.

A simplified version of the indicator, with fewer habitat types and indicators, was backdated to 1950 (Figure 3). The backdated indicator demonstrates the drastic decline in habitat quality since 1950 and sets a more realistic historical baseline.

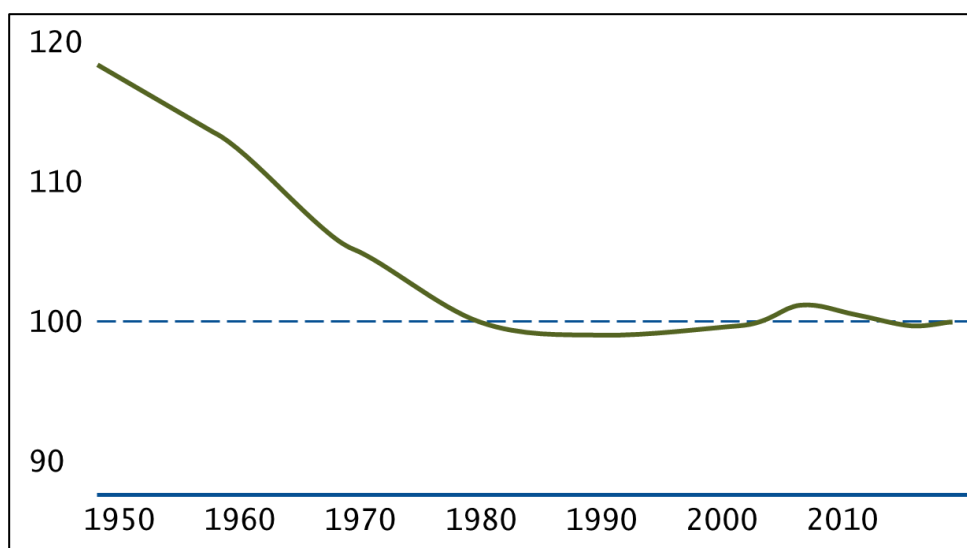


Figure 3: Historical trends of natural capital backdated to 1950.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

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 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 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.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

- ☒ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

In Scotland, Natural Capital is now widely recognised as being important for the wellbeing of its citizens. Investment in Natural Capital is seen as part of the four priorities laid out in the national economic strategy (Scottish Government, 2015). The Natural Capital Asset Index has been incorporated into the National Performance Framework (NPF) as the designated indicator for 'Increasing Natural Capital'. Following the 2016 refresh the NCAI is now classed as an economic indicator as opposed to an environmental indicator. The NCAI is used as an indicator of sustainable development.

Summary of assessment:

Whilst it is hard to directly measure improvements in Natural Capital the fact the Scottish Government are giving weight to the indicator, which is underpinned by ecological data, means that these values are now being considered during decision making processes.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Scottish Government National Economic Strategy <https://beta.gov.scot/publications/scotlands-economic-strategy/pages/5/>.

Other relevant information, including case studies to illustrate how the measure taken has resulted in (or is expected to result in) outcomes that contribute to the implementation of the NBSAP

One of the greatest strength of the NCAI lies in the model itself. The theoretical underpinnings make it possible to break down and extract data on the condition of habitats (figure 4). This has allowed a wider understanding of the habitats that are in functional decline, such as agriculture and cultivated land and those that are improving, such as inland surface waters. Figure 4 indicates that the total benefits being derived from woodlands have increased by 10% between 2000 and 2016. However, since the extent of woodland has increased by 20%, it suggests that potential benefits have not yet been fully realised.

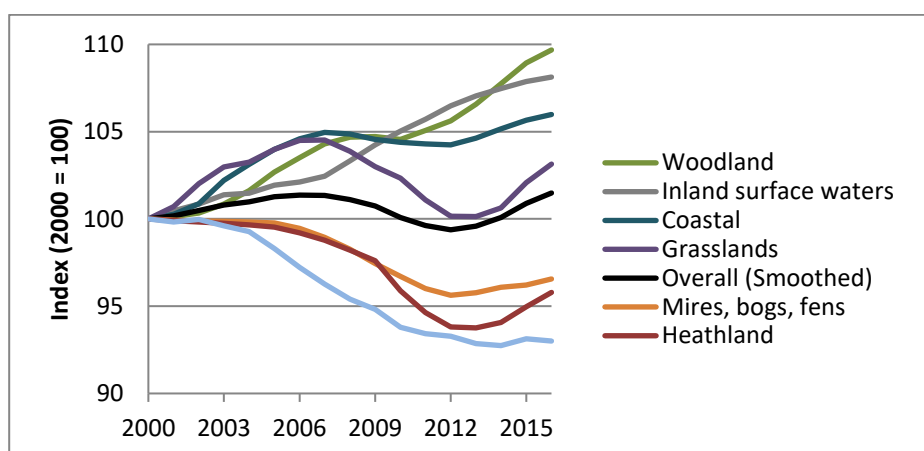


Figure 4: NCAI broken down into broad habitat types

There is potential to use the NCAI model to predict the impacts of future policies or land-use decisions. For example, the impacts of land use changes set out in the Scottish climate change strategy.

Lessons learnt and implications for practice

Communication

- Communication of key points is essential. It's important to have a clear accessible methodology so that the model does not appear to be a 'black box'. Results of the model should be presented in such a way that results are accessible and clear to avoid misinterpretation of results.

Peer review

- In order for confidence to be held in the model, there should be regular peer review on varying aspects of the model to ensure its ongoing robustness; these include statistical reviews, indicator review, and review of the methodology.

Possible improvements

- More regular habitat extent updates.
- Revisit the ecosystem services for which some of the indicators are used, as this may be causing issues with internal weighting.

Economics vs habitat quality

- Habitat quality has been used alongside habitat quantity in the NCAI to track the wellbeing benefits derived from Scotland's environment. Whilst the NCAI does not use monetary values, the benefits derived from nature are valued and from this a broad economic impact can be inferred.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information can be found)

Obstacles and scientific and technical needs related to the measure taken: Please describe what obstacles have been encountered and any scientific and technical needs for addressing these, including technical and scientific cooperation, capacity development activities or the need for guidance materials.

Given the complexity of the NCAI model, the design and mechanisms of the NCAI are often hard to simplify for easy communication. Several documents are updated or released at the same time as annual index updates. These include a two-page summary, technical guidance, information note and a copy of the latest model which are all available from the SNH website (nature.scot). Work to publicise the NCAI has been undertaken by SNH, including a presentation at the World Forum for Natural Capital in 2015 and other UK government agencies since then. A forthcoming journal article hopes to make the methodology more widely accessible for other nations to create a similar index if they wish.

The NCAI is heavily reliant on data for modelling. Much of these data comes from other organisations: Scottish Environmental Protection Agency (SEPA), British Trust for Ornithology (BTO) and the Scottish Government are three major data providers.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to these obstacles and scientific and technical needs can be found).

Scottish Natural Heritage: <https://www.nature.scot/scotlands-natural-capital-asset-index-0>.

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Enacting legislation to promote the sustainable management of natural resources to maintain and enhance biodiversity, the resilience of ecosystems and the benefits they provide in Wales.

For Wales to develop sustainably, the law has been changed to put in place the key elements that will enable it to happen.

The Well-being of Future Generations (Wales) Act 2015 is about improving the social, economic, environmental and cultural well-being of Wales. It makes the public bodies listed in the Act think more about the long-term, work better with people, communities and each other, looking to prevent problems and take a more joined-up approach.

Part 1 of the Environment (Wales) Act 2016 sets out the 'sustainable management of natural resources' – an approach to managing Wales' natural resources and ecosystems to ensure that the benefits they provide for our social, economic, environmental and cultural well-being are available now and for future generations.

Welsh Minister for Environment Statement 17th April 2018

"As a Government, we are absolutely committed to full implementation of the Environment (Wales) Act 2016. The evidence from Wales's first 'State of Natural Resources' report is clear that the environmental challenges we face require transformational action. Evidence locally and globally shows that taking small, incremental steps will no longer do. The continued decline in terrestrial biodiversity brings this home in abundance. In Wales's first natural resources policy, we set out that reversing the decline in biodiversity and improving ecosystem resilience is a challenge on a par with climate change. This is why reversing this decline will be central to my approach."

The Environment (Wales) Act 2016

Part 1 of the Environment (Wales) Act 2016 sets out the legislative framework to ensure natural resources and ecosystems are resilient and able to provide benefits now, and for the future, through the ‘sustainable management of natural resources’ (SMNR). The legislation is based on international best practice, the Ecosystem Approach, drawing on the 12 principles established by the CBD¹.

The legislative framework in the Environment (Wales) Act sets out:

- Sections 1 and 2 – the purpose of Part 1 and the definition of natural resources, including animals, plants and other organisms
- Section 3 - The definition of sustainable management of natural resources (SMNR) and its objective to maintain and enhance the resilience of ecosystems and the benefits they provide
- Section 4 - Ways of working (principles of SMNR) to work towards achieving the objective. These are adapted from the 12 principles of the CBD’s Ecosystem Approach.

Together, these sections are about the process of improving the economic, social, environmental and cultural well-being of Wales in accordance with the sustainable development principle by ensuring the long-term provision of high quality natural resources and healthy, resilient ecosystems, which underpin well-being.

- Sections 8, 9 and 11 – defines the adaptive delivery framework for embedding the ecosystem approach through SMNR across government.
 - **The State of Natural Resources Report (SoNaRR)** produced by Wales’s environmental body Natural Resources Wales (NRW) sets out the national evidence base for the sustainable management of natural resources. It shows that no ecosystem in Wales is currently showing all the attributes of resilience, which is impacting on the ability of our ecosystems to provide benefits for to the well-being of the people of Wales. It also sets out how Wales’ natural resources contribute to the well-being of the people of Wales. More information on the report can be found here. <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en>.
 - The Welsh Minister’s **Natural Resources Policy** sets out the national priorities for the sustainable management of natural resources drawing from the national evidence base in the State of Natural Resources Report. The national priorities are the key ways in which Wales’ natural resources contribute across all the well-being goals. They have been developed to both address the challenges to our natural resources and realise the opportunities from them.

The national priorities are:

- Delivering nature-based solutions.
- Increasing resource efficiency and renewable energy.
- Taking a place-based approach.

More information can be found here: <https://gov.wales/docs/desh/publications/170821-natural-resources-policy-en.PDF>.

¹ The UN Convention of Biological Diversity (CBD) describes the ecosystem approach as ‘a strategy on the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way’ and is widely recognised as international best practice for addressing the decline in biodiversity.

- Natural Resources Wales' Area Statements contribute to implementing the Natural Resources Policy in a local context, taking a place-based approach which focuses on collaborative working to deliver better results at a local level. Communities are best placed to shape local priorities and opportunities linked to the national priorities and find practical solutions that bring the widest possible benefits, ensuring local people benefit fully from the natural resources in their locality. Further information can be found here: <https://naturalresources.wales/about-us/area-statements/?lang=enA>.

These sections are about the evidence base and the delivery framework to embed the sustainable management of natural resources and biodiversity across public service delivery both locally and nationally.

- Sections 6 and 7 – recognises the essential contribution biodiversity makes to the sustainable management of natural resources and to our well-being by putting in place the section 6 biodiversity and resilience of ecosystems duty. This duty requires public authorities to seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions.

Section 7 of the Environment (Wales) Act also requires that the Welsh Ministers prepare and publish a list of species and habitats of principal importance for Wales and take all reasonable steps to maintain and enhance those species and habitats, and encourage others to take such steps.

These sections are about ensuring that biodiversity is considered as an essential element contributing to the resilience of ecosystems across Welsh Government and the wider public sector in Wales.

This legislation is the cornerstone of our delivery against international commitments to the Convention on Biological Diversity and the Aichi targets, set out in our national biodiversity strategy and action plan, the **Nature Recovery Action Plan (NRAP) for Wales**, published in 2015. <https://gov.wales/topics/environmentcountryside/consmanagement/conservationbiodiversity/?lang=en>.

Integration across Welsh Government

The Welsh Natural Resources Policy highlights the need to align policies to deliver the national priorities identified in it and sets out how Welsh Government will do this in key policy areas.

This process is ongoing and can be illustrated by: the approach to land use planning policy, **Planning Policy Wales**, which has been reworked into policy themes around the well-being goals; work on the 20-year land use framework for Wales, the **National Development Framework**; and the consultation on new policy for land management in Wales, **Brexit and our land**, which alongside an Economic Resilience scheme, proposes a Public Goods scheme which will provide support to deliver more public goods from the land. In return, it will provide a new income stream for land managers and make a significant contribution to addressing some of Wales's most pressing challenges such as climate change, biodiversity decline, adverse air quality and poor water quality.

<https://gov.wales/topics/planning/policy/ppw/?lang=en>.

<https://beta.gov.wales/national-development-framework-issues-options-and-preferred-option>.

https://beta.gov.wales/sites/default/files/consultations/2018-07/brexit-and-our-land-consultation-document_0.pdf.

For internal policy development, Welsh Government has recently introduced an **Integrated Impact Assessment (IIA)** for the development of **all of its policies**. This seeks to integrate social, economic, cultural and environmental aspects into policy development from the start. This is organised around the well-being goals set out in the Well-being of Future Generations (Wales) Act 2015 and includes biodiversity and natural resources, alongside economic, equalities and welsh language issues.

Welsh Government's core environment grant funding programmes have also fully integrated the Environment Act and NRP into their call for action. The **Sustainable Management Scheme (SMS)** is part of the Welsh Government Rural Communities - Rural Development Programme 2014-2020. This requires applicants to demonstrate delivery of national priorities and use the principles of the sustainable management of natural resources to solve local ecosystem and natural resource management problems across landscapes in Wales.

The **Enabling Natural Resources and Well-being in Wales Grant** aims to further develop co-operation, supporting the development and delivery of cross sector, co-operative projects, at the right scale, that focus on activity to support improvements in local environment quality, green infrastructure and ecological resilience.

https://beta.gov.wales/sites/default/files/publications/2018-09/sustainable-management-scheme-guidance_0.pdf.

<https://gov.wales/topics/environmentcountryside/environment-grants/enabling-natural-resources-and-well-being-in-wales-2019-2023-call-for-grant-proposals/?lang=en>.

Integration across the public sector

Natural Resources Wales' **area statements** will support place-based approaches linked to the challenges, opportunities and national priorities in the Natural Resources Policy. They will set out a local evidence base for the sustainable management of natural resources and identify the opportunities where working together can help deliver the national priorities, build ecosystem resilience and make the most of the benefits Wales' natural resources and ecosystems provide for well-being. These are linked to wider public services delivery through the Well-being Plans delivered by Public Service Boards and Local Development Plans, National Park and AONB plans must have regard to this evidence. Public bodies must provide Natural Resources Wales with information it requires for both the State of Natural Resources Report and Area Statements. Natural Resources Wales can also ask public bodies to assist in addressing the priorities, risks and opportunities for the sustainable management of natural resources identified in Area Statements.

The **section 6 duty** aims to ensure that the consideration of biodiversity becomes an integral part of the decision making and actions that public authorities take in relation to Wales. Public authorities can take action to reverse the decline in biodiversity as they carry out all of their functions. Public authorities include public bodies listed within the Well-being of Future Generations Act. Complying with the S6 duty requires those public bodies to maintain and enhance biodiversity, which in turn supports the sustainable management of natural resources and the well-being goals.

The section 6 plan, required under the Act, can be a key means of demonstrating and reporting on the steps being taken by a public body or public service board to meet well-being objectives and plans. Natural Resources Wales' State of Natural Resources Report and Area Statements provide national and local evidence bases on biodiversity and ecosystem resilience, for public authorities to draw from when discharging the section 6 duty.

Public authorities are also required to report on how they have complied with the duty every three years.

<https://gov.wales/topics/environmentcountryside/consmanagement/natural-resources-management/environment-act/guidance-for-section-6/?lang=en>.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

As an embedding approach to integrate biodiversity and the ecosystem approach across government and society the implementation measure contributes to most of the Aichi targets.

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.

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 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 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.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

- ☐ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☒ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

The legislative and policy framework in Wales is very new and these are early days with much still to do. The unique **Well-being of Future Generations (Wales) Act 2015** provides a framework for Wales to be globally responsible and make a positive contribution to the global sustainable development goals. It puts in place well-being goals, addressing many of the global challenges that are felt by people and communities across Wales.

The seven well-being goals will be measured through **46 national indicators**. This includes Emissions of greenhouse gases within Wales; Emissions of greenhouse gases attributed to the consumption of global goods and services in Wales; Areas of healthy ecosystems in Wales; Status of Biological diversity in Wales; Percentage of surface water bodies, and groundwater bodies, achieving good or high overall status.

<https://gov.wales/topics/people-and-communities/people/future-generations-act/national-indicators/?lang=en>

WNRW are currently developing a monitoring framework for the first **State of Natural Resources Report** produced in 2016, ready for its second iteration due in 2021.

<https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en>

In developing SoNaRR NRW are keen to measure and monitor:

- Stocks of natural resources (renewable, and non-renewable) in relation to current, and anticipated future demand
- The attributes of the resilience of ecosystems (including biodiversity)
- The range of services that we are getting from ecosystems
- The distribution of ecosystem benefits across the needs of society now and in the future.

- The contribution of Wales' stocks of natural resources and ecosystem services across the Well-being goals.

Aligned with the SoNaRR monitoring framework our Natural Resources Policy will also have its own outcome based monitoring approach.

Wales are currently looking at some of the section 6 plans produced by public authorities, such as this one produced by Welsh Water. See <https://www.dwrcymru.com/en/Environment.aspx>.

In addition, Wales have recently established a new **Environment & Rural Affairs Monitoring and Modelling Programme** with the Centre for Ecology and Hydrology. During 2016 the Welsh Government, working in partnership with Natural Resources Wales and a wide range of stakeholders, undertook a review to explore and consult on what a new approach to environmental monitoring in Wales may look like.

The project developed a consensus and identified a set of key recommendations for a new environmental monitoring framework for Wales:

- Make better use of resources (financial and social) across the monitoring community;
- Better inform wider Welsh Government policy beyond Environment and Rural Affairs portfolios;
- Enable more adaptive, responsive and targeted management of natural resources and ecosystems;
- Be a key evidence source for National Natural Resource Policy, including the State of Natural Resources Report and a wider range of legislative requirements including international commitments;
- Provide more accurate, timely and efficient delivery of data, evidence and information;
- Explore the application of new technologies and environmental modelling;
- Deliver integration and sharing of expertise, data and technologies;
- Put Wales at the forefront of collaborative and innovative working reflecting its bold legislative agenda

Summary of assessment

Wales has made substantial progress in embedding biodiversity and natural resource management across its public and NGO sectors by taking forward the ecosystem approach into Welsh legislation through the Environment (Wales) Act and aligning that with ground breaking Welsh sustainable development legislation. With this framework in place Welsh Government believe they have 'hard wired' pro-active biodiversity and ecosystem action more strongly across Welsh society and set in place many of the processes and levers for our public sector and wider society to get to grips with reversing biodiversity loss with a strong narrative about why this is important, tying ecosystem service delivery to wellbeing and potential new stakeholder and funding opportunities.

These are still very early days with much to do in terms of buy in and capacity building, but Welsh Government believe the monitoring frameworks they are building around our adaptive natural resources management framework should start reporting how well this is working and what still need to be done or changed.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Key ones provided below. Others are embedded in the text above and below

State of Natural Resources Report

<https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en>.

Natural Resources Policy

<https://gov.wales/topics/environmentcountryside/consmanagement/natural-resources-management/natural-resources-policy/?lang=en>.

Area Statements

<https://naturalresources.wales/about-us/area-statements/area-statements-overview/?lang=en>.

Nature Recovery Action Plan

<https://gov.wales/topics/environmentcountryside/consmanagement/conservationbiodiversity/?lang=en>.

S6 guidance

<https://gov.wales/topics/environmentcountryside/consmanagement/natural-resources-management/environment-act/guidance-for-section-6/?lang=en>.

Other relevant information, including case studies to illustrate how the measure taken has resulted in (or is expected to result in) outcomes that contribute to the implementation of the NBSAP

The following links are to projects implemented through WG Rural Development Programme Sustainable Management Scheme and Nature Funds which are underpinned by our new legislation and policy

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information can be found)

<http://www.blackmountains.wales/>.

<http://jncc.defra.gov.uk/pdf/LIFE>.

<http://www.planed.org.uk/brics/>.

<http://www.iucn-uk-peatlandprogramme.org/projects/welsh-peatlands-project-sustainable-management-scheme>.

<https://www.bbc.co.uk/news/uk-wales-41517438>.

Obstacles and scientific and technical needs related to the measure taken: Please describe what obstacles have been encountered and any scientific and technical needs for addressing these, including technical and scientific cooperation, capacity development activities or the need for guidance materials.

The implementation of the Environment (Wales) Act, Natural Resources Policy and Nature Recovery Action Plans require significant capacity building from technical and scientific knowledge through to behaviour change and winning hearts and minds. Ensuring our actions are informed by the right evidence, from all sources – scientific and local knowledge, and the use of adaptive management are central to our approach in Wales.

Under the Nature Recovery Implementation Group Welsh Government have established an **Ecosystem Resilience and Restoration** working group and a **Biodiversity and Ecosystem Evidence and Research Needs (BEERN) Programme** to help them to collaborate both within and outside Wales on their evidence needs and practical knowhow.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to these obstacles and scientific and technical needs can be found).

<https://www.biodiversitywales.org.uk/BEERN-Programme>.

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Control or Eradication of Invasive Non-Native Species: rodent eradication in South Georgia

Invasive non-native species can have a major impact on native biodiversity and may be costly to control or eradicate. Key to preventing the spread of INNS are biosecurity measures targeting identified pathways of entry, monitoring surveys targeting INNS, control or eradication programmes.

In addition to numbers of globally threatened species, the Overseas Territories also hold regionally or globally important concentrations or assemblages of species. Protecting and improving international biodiversity is a key part of the UK's 25 Year Environment Plan. The UK Government is committed to taking a number of actions, including to recover threatened, iconic or economically important species of animals, plants and fungi and, where possible, to prevent human-induced extinction or loss of known threatened species in the Overseas Territories. This includes tackling invasive non-native species, which continue to be one of the biggest threats to biodiversity in many of the Overseas Territories and which have a significant economic impact on tourism, agriculture and forestry.

Invasive non-native species represent a particularly significant problem in the Overseas Territories due to most comprising small isolated islands and archipelagos and their high levels of biodiversity, including rare and endemic species (Churchyard *et al.* 2016). A number of control and eradication programmes, particularly aimed at controlling the spread of lionfish (*Pterois* spp) in the Caribbean Overseas Territories and eradicating mammalian predators (e.g. rats, cats) have been or are running across the South Atlantic territories of Ascension Island, St Helena and Tristan da Cunha (Gough Island), and South Georgia & the South Sandwich Islands, as well as the Falkland Islands.

Across the Overseas Territories a variety of local, UK and internationally based organisations are working to address invasive species. Funding provided by the European Union Biodiversity and Ecosystem Services in Territories of European overseas (BEST) programme and the Darwin Plus

fund are crucial to these efforts. Further resources are being targeted by the UK government to help equip Overseas Territories with a comprehensive biosecurity strategy to enable them to deal with future threats posed by invasive species.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

Target 9: By 2020, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

- ☒ Measure taken has been effective
- ☐ Measure taken has been partially effective
- ☐ Measure taken has been ineffective
- ☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

This case study focuses on rodent eradication on South Georgia. The rodent eradication programme lead by the South Georgia Heritage Trust (SGHT) was successfully completed in 2018 after monitoring since 2015 showed the island to be rat free. Assessment has been undertaken based on the impact of baiting operations on (1) non-target mortality, (2) disturbance to native fauna, and (3) recovery of bird populations.

Non-target mortality: Birds were the only non-target vertebrates at risk from the baiting operations. 7 bird carcasses were discovered with evidence that poison consumption was the cause of death, however many individuals were unlikely to be located due to the scale and remote nature of much of the island. Uncertainty regarding the number of birds at risk and the proportion of carcasses discovered prevent estimation of non-target mortality, however mortality of South Georgia pintails (*Anas georgica georgica*) and pipits (*Anthus antarcticus*) suggest a mortality of around 60%. For all bird species it was estimated that it would take less than 5 years to full population recovery and numbers of brown skuas (*Stercorarius antarcticus*), pintails, and snowy sheathbill (*Chionis albus*) were at or above pre-baiting levels within 2-4 years (Martin & Richardson 2017).

Disturbance of native fauna from helicopter flights: No significant impacts were identified for seals or birds. Adult flighted birds took to the air when a helicopter was in line of sight and remained airborne until it moved out of sight. Baiting operations took place after the chicks of all species were large enough not to require brooding. No injuries or loss of eggs or chicks were observed for penguins (Martin & Richardson 2017).

Early signs of recovering bird populations are positive (Neil 2016; Martin & Richardson 2017). For example, the South Georgia pipit and Wilson's storm petrel (*Oceanites oceanicus*), previously heavily predated by rats, quickly recolonised formally rat-infested areas and numbers of the Wilson's storm petrel have increased steadily since baiting finished. Monitoring is ongoing to document recovery.

Summary of assessment

Following international best practice, two years after the last distribution of rodenticide (March 2015), surveys were undertaken in 2017/18 to evaluate whether or not rodents had remained on the island. Comprehensive surveys were undertaken over a 6-month period using a combination of passive monitoring devices such as wax tags, chew sticks and tracking tunnels, as well as a team of rodent detector dogs and their handlers. No evidence to indicate the presence of rodents was found. In May 2018, SGHT officially declared that rodents have been successfully eradicated from South Georgia (Neil 2018). At more than 100,000 ha in size, South Georgia is currently the largest island ever cleared of rodents.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Churchyard *et al.* (2016) The biodiversity of the United Kingdom's Overseas Territories: a stock-take of species occurrence and assessment of key knowledge gaps. Biodiversity and Conservation 25:1677 doi: 10.1007/s10531-016-1149-z.

Darwin Plus: environment funding for the UK Overseas Territories:

<https://www.gov.uk/guidance/darwin-plus-applying-for-projects-in-uk-overseas-territories>

Defra (2015) The Great Britain Invasive Non-native Species Framework Strategy. Department for Environment Food and Rural Affairs, The Scottish Government and the Welsh Government. PB14324.

Defra (2017) Pest Specific Contingency Plan Asian Hornet (*Vespa velutina nigrithorax*). PB14493.

EU BEST initiative: http://ec.europa.eu/environment/nature/biodiversity/best/funding/index_en.htm.

HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment.

Department of Environment Food and Rural Affairs.

Martin & Richardson (2017) Rodent eradication scaled up: clearing rats and mice from South Georgia. Oryx 1-9 doi: 10.1017/S003060531700028X.

Neil (2016) A force of nature. Project News. Newsletter of the South Georgia Habitat Restoration Project 28:3. Available at: <http://www.sght.org/wp-content/uploads/2016/05/SGHT-Newsletter-Nov-2016.pdf>.

Neil (2018) We did it! Newsletter of the South Georgia Heritage Trust and Friends of South Georgia Island, May 2018. Available at: http://www.sght.org/wp-content/uploads/2018/05/sght_fosgi_newsletter_may_2018.pdf.

South Georgia Heritage Trust: <https://www.sght.org>.

Other relevant information, including case studies to illustrate how the measure taken has resulted in (or is expected to result in) outcomes that contribute to the implementation of the NBSAP

The sub-Antarctic island of South Georgia, a UK Overseas Territory governed by the Government of South Georgia and South Sandwich Islands, is home to more than 30 different species of birds. This includes endemics such as the South Georgia pipit (*Anthus antarcticus*), the world's most southerly songbird; and the South Georgia pintail (*Anas georgica georgica*).

Brown rats (*Rattus norvegicus*) and house mice (*Mus musculus*) were introduced to South Georgia by sealers and whalers in the late 18th Century (Martin & Richardson 2017). The ground nesting or burrowing behaviour of birds left them exposed to predation from the invasive rats, and in recent decades bird populations, such as the South Georgia pipit (red list status: Near Threatened), became restricted to rodent-free offshore islands and refuges protected by glaciers. Overall, rodents occupied all of the land area favoured by native wildlife apart from parts of the south coast and 30% of the total land area of South Georgia.

The South Georgia Heritage Trust was established in 2005 to help efforts to conserve and protect indigenous fauna and flora, preserve the historical heritage of the island, and raise awareness of South Georgia's threatened species. In 2007, SGHT initiated a c.£7.5 million campaign to eradicate rodents from South Georgia (Martin & Richardson 2017).

The eradication project was set up in 2011 with the aim of eradicating rodents by 2015. The project was supported by the UK Government which included funding provided by Defra; and through the Darwin Plus Initiative, co-funded by the Foreign and Commonwealth Office. A total of £885k was contributed.

Learning from experiences elsewhere, helicopters were used to systematically drop poison across the Island's coastal fringes in three phases in 2011, 2013 and 2015. In total 302 tonnes of rodenticide bait was distributed by three helicopters across 107,000 ha of ice-free terrain.

The eradication programme required: (1) all rodents to be killed; (2) native wildlife mortality to be low; and (3) human wellbeing to be maintained (Martin & Richardson 2017). The rodent eradication strategy was developed based on experience gained elsewhere. In order to minimise the risk to breeding birds, and to ensure maximum bait uptake by rodents, baiting commenced in late summer and went on into Autumn. In areas of favourable rodent habitat (vegetated areas at low elevations), a greater density of poison was spread. Prior to baiting, a detailed risk assessment and environmental impact assessments were carried out by the Government of South Georgia & the South Sandwich Islands (GSGSSI) in collaboration with SGHT, and mitigation measures were developed. Risk assessments were reviewed and updated between baiting phases. For example, following the first baiting in 2011, concern was raised over the impact of poison on brown skuas (*Stercorarius antarcticus*) and the South Georgia pintail leading to specific mitigation actions being incorporated to subsequent baitings. A monitoring plan was also developed for the entire project programme.

Lessons learnt and implications for practice

- Some non-target mortality is inevitable in any large-scale eradication. For South Georgia, non-target mortality over the short-term project programme was considered preferable to greater mortality in perpetuity from rodent predation. Appropriate risk assessments and mitigation measures were put in place and were continually reviewed, allowing non-target mortality to be minimised and securing on-going buy-in for the programme.
- Rodent eradication campaigns are expensive and logistically demanding. Historically they have been tackled by governments and large non-governmental organisations. The South Georgia Heritage Trust is a small, Scottish-based charity that fundraised for the rodent eradication programme securing donations and grants alongside its US counterpart, Friends of South Georgia Island. Lessons learnt by the South Georgia Heritage Trust both for rodent eradication and delivery of logistically demanding conservation projects could be applied to future programmes undertaken by other small NGOs as well as their larger counterparts and government organisations.
- Information dissemination through avenues, such as the Newsletter of the South Georgia Heritage Trust and Friends of South Georgia Island, were valuable for raising awareness and charitable donations to support the project.
- Lower density bait was used in South Georgia compared with elsewhere suggesting it is possible to reduce costs and non-target mortality by deploying reduced amounts of bait. However, enough bait must be deployed to achieve 100% mortality of the target species and the baiting density should be determined in consideration of local contexts (such as the number of non-target animals that may remove the bait, rodent abundance and density, longevity of bait).

- This successful large-scale rodent eradication required a high degree of preparation, significant funds, leadership from a strong organisation, involvement of all relevant stakeholders, well-trained and experienced staff and volunteers, and appropriate bait and equipment.
- This example has provided such useful detail it is being used to inform eradication protocols in the nearby Falkland Islands where eradications are predominantly focused on the smaller islands.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information can be found)

Martin & Richardson (2017) Rodent eradication scaled up: clearing rats and mice from South Georgia. Oryx 1-9 doi: 10.1017/S003060531700028X.
South Georgia Heritage Trust: <https://www.sght.org>.

Obstacles and scientific and technical needs related to the measure taken: Please describe what obstacles have been encountered and any scientific and technical needs for addressing these, including technical and scientific cooperation, capacity development activities or the need for guidance materials.

(1) *Climate change.*

Glaciers in South Georgia are in rapid retreat as a consequence of climate change. Eradication was aided by the glaciers as rats are unwilling to cross ice-fields and the glaciers divided the island into discrete units that could be targeted. Without the ice barriers aiding eradication, it will be difficult to tackle future invasions should they happen.

(2) *Biosecurity.*

In 2014, evidence of a single rat was observed 3.5 years after baiting. In the preceding days two ships had come alongside to undertake cargo operations suggesting the rodent came ashore from one of the vessels. Bait was spread following detection and no further rat activity was been detected. Effective biosecurity measures are key to prevent future invasions. Fishing vessels and cruise ships are not allowed to come alongside (passengers and crew must come ashore via zodiac) Only government vessels and vessels undertaking cargo operations are usually permitted alongside. All vessels must have rodent monitoring boxes on board, and the Master must declare their vessel rodent free before entering the South Georgia Maritime Zone. Following a successful trial to use rodent detector dogs to ensure vessels are rodent free, GSGSSI is investigating options to embark on a permanent rodent detector dog programme.

(3) *Monitoring.*

Plans are now being developed for long-term monitoring to document the impact of rodent eradication on the native fauna and flora. Such monitoring can be costly and time consuming and may require the support of both experts and volunteers.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to these obstacles and scientific and technical needs can be found).

Section III. Assessment of progress towards each national target

Using the template below, please assess the level of progress made towards each of your country's national targets or similar commitments. The template should be replicated for each national target. If your country has not set national targets please use the Aichi Biodiversity Targets.

Aichi Biodiversity 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.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
- ☐ On track to achieve target
- ☒ Progress towards target but at an insufficient rate
- ☐ No significant change
- ☐ Moving away from target
- ☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target sets out two main *outcomes*. People in the UK should be *aware* of values of biodiversity, and of the *actions* they can take to conserve and use it sustainably. In this assessment, it has been assumed that either the majority of or an increasing proportion of the population should be aware of these issues.

Across the UK, there is limited trend data and specific information on people's awareness of the values of biodiversity. However, there is information from Government surveys collecting data from approximately 10,000 individuals across the four countries of the UK to evaluate the public's awareness of the threats to biodiversity and also on whether people are taking action; for example, through volunteering. As data are collected across the countries via separate surveys with differing regularity, data from all four countries are only available for 2014. These data indicate approximately half of the UK population (48%) report at least some awareness of the threats to biodiversity. The data also indicates that 31% of the population report taking at least some action. Levels of volunteering have increased slightly over the period since 2010. There have also been a number of successful campaigns across the four countries of the UK, operated by Government, academic bodies and the voluntary sector. These have generated valuable data, created new habitat and established a range of community conservation projects. Taken together, this evidence suggests progress towards the target.

Progress is assessed as insufficient, as there is clearly more that we can do to raise awareness. As of 2014, data combined from surveys in each of the four countries shows more than half (52%) of the UK public report no awareness of the threats to biodiversity. Where there is information on trends over time, for example within individual countries for the UK, these show there has been no significant increase in awareness amongst UK public since 2009.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes a range of innovative projects for improving public awareness and engagement in biodiversity issues in the UK are provided, from large scale citizen science projects to focused species specific research. Although this is an outcome target, and the indicators show data related to these outcomes, additional information on public awareness campaigns across the UK and each of the four countries is provided to supplement the indicators and identify areas of particular progress. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK initiatives

There have been a range of successful voluntary-organisation led initiatives to raise awareness of the value of nature and the steps people can take to conserve it in the UK. Some examples are given below:

The Open Air Laboratories Network

The Open Air Laboratories (OPAL) network <https://www.opalexplorenature.org/>, is a UK citizen science initiative that allows people of all ages and backgrounds to get hands-on with nature has been operating since 2008. OPAL has established a network of science educators and researchers who work directly with the public, and have developed relationships with thousands of schools, and community and voluntary organisations. Across the UK there have been more than 930,000 participants who have surveyed over 23,000 sites. This in turn has led to the publication of 21 scientific papers. More than 3,500 schools have taken part, many from areas of high deprivation. Funding for the project came from the Big Lottery Fund in England, and a range of University and agency funders across Scotland, Wales and Northern Ireland.

Seasearch

Seasearch <http://seasearch.org.uk/> is a volunteer project for sports divers who have an interest in what they're seeing under water, want to learn more and want to help protect the marine environment around the coasts of the UK and Ireland. It is co-ordinated by The Marine Conservation Society on behalf of the Seasearch Supporters, stakeholder organisations which include several Government agencies. To date, over 300 surveys have been undertaken by volunteers. The Seasearch training programme provides courses and survey skills at three levels, Observer, Surveyor and Specialist. These training courses are well attended; for example, over 200 divers undertook the observer course in 2016 (Seasearch, 2017). Seasearch data have been used to help with conservation efforts in the UK, including the designation of Marine Conservation Zones in England.

Grow Wild

Outreach and biodiversity awareness related to UK native plants and fungi is also carried by the Royal Botanic Gardens Kew through their community driven initiative Grow Wild <https://www.growwilduk.com/>. Each year Grow Wild funds about 50 community group projects across the UK that engage hundreds of people with the plants and fungi in their local area (Grow Wild, 2018). So far Grow Wild have funded over 250 community-led projects with training, support and up to £4,000 each.

Country initiatives*England*

Funded by Natural England with support from Defra, the Monitor of Engagement with the Natural Environment (MENE) survey is conducted to evaluate engagement with the natural environment. The natural environment is understood as all green, blue and open spaces in and around towns and cities as well as the wider countryside and coastline. The main focus of the survey is people's experiences of nature, including time spent on visits to the outdoors in the natural environment, away from home. The data collected also includes other ways people engage with the natural environment. This includes activities such as time spent in private and communal gardens, watching nature programmes on television and undertaking pro-environmental activities.

Data from the MENE survey are analysed in the England Biodiversity Indicators to provide an overview of public awareness about the threats to biodiversity. Interim results for 2015 suggest that 48% of the public in England have some awareness of the threats to biodiversity; these data also suggest that 31% of the public are taking some action to conserve it (Defra, 2018). More broadly than biodiversity, the MENE survey reports that in England, 86% of people are concerned about damage to the natural environment. The MENE results also indicate that more people are 'frequently visiting nature' (a significant increase was observed in the proportion of adults taking visits at least once a week, from 54% in 2009/10 to 62% in 2017/18) (Natural England, 2018). However, there has been no significant increase in trends observed across areas such as 'concern for the state of the natural environment', 'engagement with the natural environment' and 'taking steps to protect it'. Moreover, trends in these areas have remained relatively stable over recent years.

The Government has partnered with voluntary organisations and academic institutions to encourage action for nature in England. For example, since 2014, there have been week-long events to raise the profile of pollinators ([Bees' Needs Week](#)) or to celebrate and promote local Government, community and university sector projects to conserve pollinating insects ([Bees Champions](#)).

In 2018, the Department for Environment, Food and Rural Affairs in England pledged to support the 'I Will' campaign to encourage more young people from all backgrounds to participate in social action and in caring for the natural world.

The UK Government in England has committed to making 2019 a year of action for the environment (HM Government, 2018). The year of action will provide a focal-point for organisations that run environmental projects and will encourage participation from diverse backgrounds and young people. As part of the initiative the government will support schools and Alternative Providers, including Pupil Referral Units, in the most disadvantaged areas with funding to transform their grounds and to design and run

activities to support pupil's health and wellbeing through contact with nature. This will be complemented by a second programme that will support schools and Alternative Providers in the most disadvantaged areas that wish to establish a progressive programme of visits to natural spaces, such as city farms, local nature reserves or a National Park. This programme will be open to schools from autumn 2019. The government wants to encourage more pupil contact with local natural spaces, with a focus on disadvantaged areas. Through the new, funded Nature Friendly Schools programme, school visits and expansion of community forests schools outreach, eligible schools will be able to decide whether a forest school offering could support their pupils' contact with natural spaces. It will not be an obligatory part of the programme.

Scotland

In Scotland, awareness of the values of biodiversity is measured using a number of methods. Since 2009, the Scottish Nature Omnibus Survey (SNO) has provided an insight into public awareness and engagement with SNH and its work. The SNO includes a number of questions about the public's views on biodiversity and their participation in activities which help look after the natural environment. Figures from the latest survey (2017) revealed around 68% of people were concerned about biodiversity (<https://www.nature.scot/snh-research-report-1004-scottish-nature-omnibus-2017>).

People throughout Scotland take part in a range of environmental activities, from large scale citizen science projects to focused species specific research. Figures from Scottish Environment LINK show that around 554,000 people were members of environmental organisations in 2017. Due to the complexities surrounding the membership figures, no allowance can be made for double counting across the 35 organisations that make up the LINK partnership.

Wales

The Wales Biodiversity Partnership (WBP) brings together key players from the public, private and voluntary sectors to promote and monitor biodiversity and ecosystem action in Wales. The WBP website (<https://www.biodiversitywales.org.uk/>) provides the context for the partnership's work both globally and locally and is a central resource for partners and the general public. On the site, visitors can explore ongoing initiatives and participate in projects and plans to further the enhancement of biodiversity and ecosystems in Wales.

Projects include Wales Nature Week which was established in 2002 and is an annual week of wildlife-themed events coordinated by WBP. Events bring together the knowledge and enthusiasm of local wildlife experts to raise public awareness of nature conservation.

In 2018, Wales Nature Week ran from 2-10 June. Thousands of people joined more than 60 local wildlife-themed events across Wales ranging from exploring the natural wonders of Kenfig; discovering Conwy's Top 50 wild flowers; celebrating World Oceans Day at Pensarn; hunting for nature's treasures in the spectacular setting of Ynyslas; and many more fun, family events. As well as educating, nature-themed events bring people together, provide inspiration and contact with the outdoors and above all are fun! In addition to raising the profile of nature focus during Wales Nature Week, WBP features nature events throughout the year as publicised on their website and social media channels.

WBP has helped organise a range of collaborative biodiversity projects around Wales, which help raise awareness of biodiversity issues amongst local communities and deliver conservation and sustainability goals. Further examples of such projects can be found at <https://www.biodiversitywales.org.uk/File/60/en-GB>.

Overseas Territories and Crown Dependencies initiatives

Community initiatives and action groups exist across the UKOTs and CDs, many driven by locally based NGOs, in conjunction with UK or other NGOs. Some are emerging; others are well established. In some territories, these are the primary means of tackling biodiversity issues such as marine waste and control of invasive plant species. One recent example, which was part-supported for a time by the UK's Darwin Initiative, includes *Adopt a Home for Wildlife* on Montserrat, an initiative established by the Montserrat National Trust and UK-partner, UK Overseas Territories Conservation Forum. The project promotes partnership working between individuals, organizations, community groups or businesses to maintain specific areas for the benefit of biodiversity for a year at a time. This work both informs local communities about biodiversity importance and empowers them as the best way at present of replacing invasive plants by natives. It has already shown positive signs for biodiversity including both forest ecosystems and wetlands re-created for migratory birds.

A variety of media forms are being used to promote public awareness of the UK OT's unique biodiversity. Independent film-maker, Stewart McPherson, with the support of UK Overseas Territories Conservation Forum and Royal Botanic Gardens Kew, produced a series of TV programmes (broadcast by BBC 4 several times and by other networks worldwide), a series of freely available short videos and a book (McPherson, S., M. Pienkowski, A. Robinson, C. Wensink, C. Clubbe, V. Coules & R. Irving. 2016. *Britain's Treasure Islands*. Redfern Natural History Publications. ISBN 978-1908787217) to bring the importance of this biodiversity to a wide audience.

Indicators used in this assessment

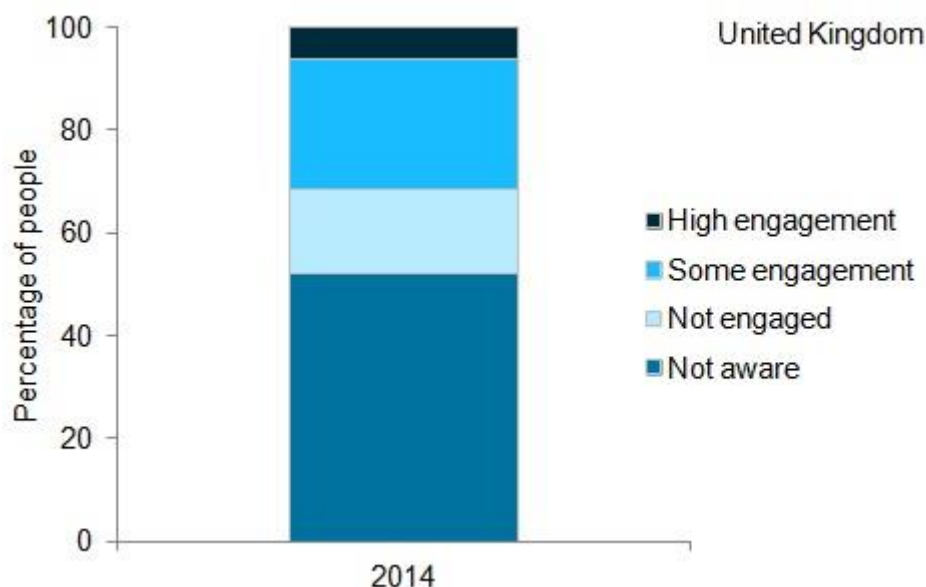
UK Biodiversity Indicator **A1: Awareness, understanding and support for conservation** <http://jncc.defra.gov.uk/page-6069>.

In 2014, 6% of people in the UK were highly engaged with the issue of biodiversity loss. These are people who are aware of the threat to biodiversity in the UK, are concerned about the loss of biodiversity, and take actions to support and protect biodiversity, including requiring some higher effort.

In 2014, 25% of people in the UK showed some engagement with the issue of biodiversity loss. These are people who are aware of the threat to biodiversity in the UK, are concerned about the loss of biodiversity and take some 'day-to-day' actions to support and protect biodiversity.

16% of people are aware of the threat to biodiversity, but are not concerned about it. 52% of survey respondents stated that they were not aware of the threat to biodiversity in the UK.

Figure A1i. Public engagement with biodiversity loss: awareness, concern and action, 2014.

**Notes:**

1. Groups are defined as: 'not aware'; 'not engaged'; 'some engagement'; and 'high engagement', according to responses to survey questions concerning engagement with biodiversity loss, as described in the indicator technical documentation.
2. Data are weighted based on the relative population size of each country.

Source: Department of the Environment Northern Ireland, Natural England, Natural Resources Wales, Scottish Natural Heritage.

Table A1i. Unweighted percentage of people in England, Scotland, Wales and Northern Ireland engaged in action to combat biodiversity loss, 2014.

	England	Scotland	Wales	Northern Ireland
High engagement	6	12	10	4
Some engagement	25	31	13	46
Not engaged	17	13	2	19
Not aware	52	43	74	32

Notes:

1. Groups are defined as: 'not aware'; 'not engaged'; 'some engagement'; and 'high engagement', according to responses to survey questions concerning engagement with biodiversity loss, as described in the indicator technical documentation.

Source: Department of the Environment Northern Ireland, Natural England, Natural Resources Wales, Scottish Natural Heritage.

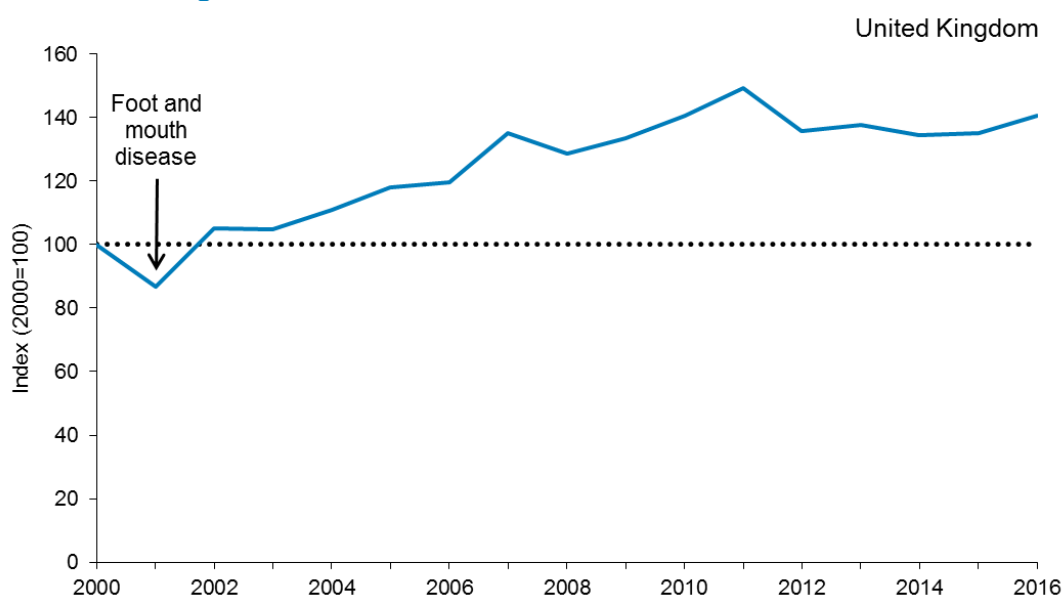
UK Biodiversity Indicator **A2: Taking action for nature: volunteer time spent in conservation** <http://jncc.defra.gov.uk/page-4253>.

The amount of time people spend volunteering to assist in conservation in part reflects society's interest in and commitment to biodiversity.

Between 2000 and 2016, the amount of time contributed by volunteers in the UK has increased by 40%. It decreased by 6% in the 5 years to 2016, but in the most recent year available, the amount of time spent volunteering has increased by 4%.

The indicator is assessed as increasing over the long term and showing no change over the short term.

Figure A2i. Index of volunteer time spent in selected UK conservation organisations, 2000 to 2016.



Notes:

1. The index is calculated using a non-weighted aggregation across organisations. It is therefore strongly dependent on the trends reported by the organisations recording large amounts for total volunteer hours.
2. Historical data were not available for all organisations in all years. To make best use of available data and to allow a combined index to be compiled, interpolation estimates have been used to fill gaps. Further details are given in the background section of the online fiche.
3. Data provided by The Conservation Volunteers, Loch Lomond & The Trossachs National Park Authority, Natural England, the Canal & River Trust (formerly British Waterways), National Parks England, RSPB and The Wildlife Trusts were for financial years rather than calendar years. Financial year data have been assigned to the first calendar year (e.g. 2016/17 data were allocated to 2016).
4. The data series has been revised since the 2017 publication due to some organisations, most notably The Wildlife Trusts, providing updated figures for previous years (see the full online fiche for further details).
5. The methodology used to calculate the interpolated estimates was also revised in 2018. This chart is therefore not comparable to those presented in previous publications of this indicator.

Source: Bat Conservation Trust, Botanical Society of Britain & Ireland (formerly Botanical Society of the British Isles), British Trust for Ornithology, Butterfly Conservation, Canal & River Trust (formerly British Waterways), The Conservation Volunteers, Loch Lomond & The Trossachs National Park Authority, Natural England, National Parks England, Plantlife, RSPB, The Wildlife Trusts, Woodland Trust.

Union for Ethical Biotrade Biodiversity Barometer Assessment

Between 2009 and 2018, ten thousand members of the public were interviewed in the UK as part of the Union for Ethical Biotrade Biodiversity Barometer Assessment (UEBT,

2018). Questions covered their awareness and understanding of biodiversity, their expectations on brands' respect for people and biodiversity, and their purchasing decisions. 66% of UK respondents have heard of biodiversity in 2017, up from 59% in 2009. Even though the UK ranks third in biodiversity awareness among the 5 countries surveyed in 2018, the level of biodiversity awareness has not increased significantly over the past nine years (+7%). Furthermore, only 22% are able to define biodiversity correctly.

In total, between 2009 and 2018, the Union for Ethical Biotrade Biodiversity Barometer has assessed public awareness and understanding of biodiversity in 16 countries worldwide. The UK is currently 11th out of the 16 countries for the proportion of people that have heard of biodiversity (UK = 66%, top 10 countries range from 95-73%) and 14th for those that are able to correctly define biodiversity (UK = 22%, top 13 range from 25% to 72%).

Please describe any other tools or means used for assessing progress

UK Biodiversity Indicator **A5: Integration of biodiversity considerations into business activity** <http://jncc.defra.gov.uk/page-6072>.

UK Biodiversity Indicator **B1a: Area of land in agri-environment schemes** <http://jncc.defra.gov.uk/page-4242>.

UK Biodiversity Indicator **B1b: Area of forestry land certified as sustainably managed** <http://jncc.defra.gov.uk/page-4243>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Defra, 2018. Biodiversity 2020: A strategy for England's wildlife and ecosystem services. Indicators. Accessed from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726851/England_biodiversity_indicators_2018_final.pdf.

Grow Wild. 2018. What it means to Grow Wild [viewed 25 June 2018]. Accessed from: <https://www.growwilduk.com/content/What-it-means-to-Grow-Wild>.

HM Government. 2018. A Green Future: Our 25 Year Plan to Improve the Environment. Accessed from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf.

Natural England, 2018. MENE Headline Report 2017-2018. Accessed from: <https://www.gov.uk/government/statistics/monitor-of-engagement-with-the-natural-environment-headline-reports-and-technical-reports-2016-2017-to-2017-2018>.

Seasearch. 2017. Seasearch Annual Report 2016. Accessed from: <http://www.seasearch.org.uk/downloads/SeasearchAnnualReport2016.pdf>.

Union for Ethical Biotrade (UEBT). 2018. Union for Ethical Biotrade Biodiversity Barometer Assessment. Accessed from:

<https://static1.squarespace.com/static/577e0feae4fcb502316dc547/t/5b296f4303ce646e89dfb50a/1529442211066/UEBT+2018-Biodiversitybarometer.pdf>.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:
<http://jncc.defra.gov.uk/page-1824>.
<http://jncc.defra.gov.uk/page-4229>.
<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity Target 2



By 2020, at the latest, the 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.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target

- ☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target sets out two main *actions*: that biodiversity should, firstly, be integrated into national and local planning processes and secondly, incorporated into national accounting and reporting systems relevant policies. Integration into poverty reduction strategies for Overseas Development Assistance is considered in section IV. This assessment is based on whether the relevant *actions* have been taken. *Outcomes* of such biodiversity mainstreaming initiatives are considered in other target assessments.

In the UK biodiversity values have been integrated into a range of planning, accounting and reporting systems, including:

- National natural capital asset and ecosystem service accounts published by the Office of National Statistics;
- Infrastructure development plans;
- Planning policies at the national and local level on land and at sea;
- Scotland's Natural Capital Asset Index; and,
- Well-being of Future Generations (Wales) Act 2015.

Progress is therefore assessed as on track to reflect the fact that action is in place across the various plans and policies. The UK Government and Devolved Administrations acknowledge however that these policies should be kept under review and have set ambitions to go further, for example, in England, by embedding net gain policies across local and infrastructure planning.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available. Evidence used includes key policies, processes and systems within which biodiversity values have been integrated, such as planning and natural capital initiatives.

A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK initiatives

Biodiversity embedded within UK public bodies

The UK Government and Devolved Administrations have passed both primary and secondary legislation under which competent authorities have duties to have regard for biodiversity when conducting their functions and decision making. Biodiversity is a devolved matter in the UK. Across the four countries of the UK, specific legislation is in place to embed biodiversity across public bodies.

The UK Government and Devolved Administrations have passed both primary and secondary legislation under which competent authorities have duties to have regard for biodiversity when conducting their functions and decision making. These include the Natural Environment and Rural Communities (NERC) Act 2006, the Conservation of Habitats and Species Regulation 2017, Wildlife and Countryside Act 1981, the Environment (Wales) Act 2016, the Wildlife and Natural Environment Act (Northern Ireland) 2011, Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environments (Scotland) Act (2011).

Incorporation of natural capital into the UK Environmental Accounts

As a result of the UK Government's Natural Environment White Paper in 2011, the Office of National Statistics (ONS) and Department for Environment, Food & Rural Affairs (Defra) jointly committed to work to incorporate natural capital into the UK Environmental Accounts by 2020 (the "2020 Roadmap"). This partnership and the support of the Natural Capital Committee provides a strong institutional basis for making progress in getting the value of nature on the UK's balance sheet. The 25 Year Environment Plan re-committed the Government to working with the ONS to develop a full set of natural capital accounts for the UK that are widely understood. The UK is on track to develop a full set of Broad habitat accounts by the end of 2020, although more developmental work is envisaged beyond that. Further information on the different account categories being developed is provided in the assessment of Target 14 in Section III of the report.

The Green Book, HM Treasury

Revised HM Treasury appraisal guidance ("The Green Book") was published in March 2018. This is UK Government guidance on how to develop evidence-based appraisals of new spending or regulatory policies. The revised guidance brings new emphasis on the importance of environmental and natural capital impacts, and provides guidance on how to assess those impacts, including monetary valuation where possible. Biodiversity is considered a core part of natural capital along with the various benefits that natural capital provides. Specific guidance is also provided on valuation of biodiversity impacts.

Marine Spatial Planning

The Marine and Coastal Access Act 2009 (hereafter Marine Act) establishes a statutory system for marine spatial planning in the UK's seas. Further legislation has been introduced by the UK's Devolved Administrations for marine spatial planning within their own marine areas, including the Marine Scotland Act 2010 and the Marine Act (Northern Ireland) 2013. Marine plans support the delivery of the UK Government and Devolved Administration's shared vision for 'clean, healthy, safe, productive and biologically diverse oceans and seas'. The UK Marine Policy Statement (MPS), adopted in March 2011, sets out further detail on the long-term strategy for managing sustainable development in the UK marine area, including the policy framework for developing marine plans. In response the UK Government and the Devolved Administrations have started to identify and implement marine plans in inshore and offshore waters. Marine plans in UK seas are due to be in place by 2021.

Under the MPS marine plans will be delivered locally and provide guidance on how the marine activities and resources in the areas will be managed. The plans provide area-based spatial guidance setting out where consent for different activities is most likely to be given. Under the Marine Act, plans need to be evidence-based and provide stakeholders with as much certainty as possible, whilst recognising that they will need to adapt over time to respond to the changing environment. The drafting of plans is also expected to take into account the potential cumulative impacts of different activities and should involve relevant stakeholders.

Once marine plans are adopted, public authorities taking enforcement, consenting and licensing decisions that will affect the marine environment are required to do so in line with the relevant marine plan. The Marine Act places a duty on the marine planning authority to keep under review a number of matters, such as, the efficacy of the plan's policies in securing the plan's objectives. Furthermore, the marine planning authority must periodically report on the monitoring and implementation of the plan, with a report to be published between 3 and 6 years from the expiration of the plan.

Country initiatives

England

In England, through the NERC Act, public authorities are required to have regard for biodiversity in their activities. Government departments, such as the Ministry of Defence and Ministry of Justice have published strategies outlining how they will safeguard biodiversity on their estates. Furthermore, through the NERC Act, other public bodies such as infrastructure and utilities companies have embedded biodiversity values within their operations.

Biodiversity values have been embedded across the transport infrastructure in England. For instance, across the strategic roads network, Highways England have a biodiversity strategy and have committed to implement biodiversity net gain by 2040. Across the UK Network Rail has a long-term vision to achieve a net positive contribution to biodiversity by 2024 and is currently trialling this approach on a number of major infrastructure projects, including Thameslink, Crossrail, the East-West Rail Alliance and the Greater West Programme. Through the Thameslink Programme which achieved net gain on biodiversity of over 50 percent - working with the Wildlife Trust, the programme offset its impact through a number of projects including creating new habitats with shrub and tree planting. To further assess the contribution of transport infrastructure in the UK, in May 2018 the Government launched an independent review into Network Rail and its vegetation management practices. The review was published in November 2018 and the Department for Transport and Network Rail are looking at how the recommendations can be delivered.

National Planning Policy Framework, England

The UK Government first published their National Planning Policy Framework in 2012, which sets out their ambition for embedding sustainable development in planning policy in England. The framework acknowledges the role of the planning system in contributing and enhancing the natural environmental and halting the overall decline in biodiversity. It sets out how the planning system can contribute to the achievement of sustainable development and the restrictions to development regarding designated sites across various legislation.

In 2018, the National Planning Policy Framework was amended to strengthen both the protection for irreplaceable habitats - such as ancient woodlands, ancient and veteran trees - and to make clear that developments should provide biodiversity net gain. The revised framework sets out that habitats should not just be protected, but that plans should promote the conservation, restoration and re-creation of priority habitats. The framework states plans should recognise the wider value of ecosystem services; that development should improve local environmental conditions including water and air quality; and references the new Nature Recovery Network, in line with the 25 Year Environment Plan.

The UK Government are committed to embedding an 'environmental net gain' principle into housing and infrastructure development in England and are considering what further measures may be necessary to ensure delivery of net gain. In December 2019, the Government launched a consultation on mandating net gain for biodiversity through the planning system.

Natural Capital Asset Index, Scotland

In 2011 Scotland became "the first country in the world to publish a detailed attempt to measure annual changes in its natural capital, based on an evaluation of ecosystem service potential." (Hambrey & Armstrong 2011, Albon *et al.* 2014). The Natural Capital Asset Index (NCAI) has been published annually in Scotland since 2011 and is one of the Scottish Government's Key Performance Indicators. The NCAI measures the quality and quantity of habitats in Scotland, according to their potential to deliver different ecosystem services now and into the future. The NCAI covers terrestrial habitats, but a further Index for marine habitats is being developed. The NCAI was 101.5 in 2016 and generally appears to have remained relatively stable since 2000. The NCAI in 2016 is 0.6 percentage points higher than 2015, 0.1 percentage points higher than the base year 2006 and is the highest since detailed monitoring began in 2000. For more detailed information on Scotland's NCAI see the case study in Section II of the report.

Biodiversity mainstreaming within the Welsh public sector

The Well-being of Future Generations (Wales) Act 2015 brings biodiversity into the central decision-making process for public bodies in Wales – influencing biodiversity action and resourcing and the consideration of long-term impacts. Along with six other well-being goals, the Act puts in place the 'Resilient Wales' goal:

'A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).'

All public bodies in Wales are required to work towards this and all the goals as required under the Act and adopt the principles outlined in the Act.

In addition, The Environment (Wales) Act enshrines the principles of the UN's Convention on Biological Diversity in law, requiring the environmental body Natural Resources Wales to pursue the ecosystem approach through the sustainable management of natural resources as its purpose across its functions. It also introduces an enhanced Biodiversity and Resilience of Ecosystems Duty for public authorities to ensure that biodiversity is an integral part of decision making. Public authorities are now required to report on the actions they are taking to maintain and enhance biodiversity and the resilience of ecosystems.

Complying with the biodiversity and resilience of ecosystems duty will help public bodies subject to the Well-being of Future Generations (Wales) Act 2015 to maximise their contributions to the Well-being goals and their own objectives. For more information see the case study in Section II of this report.

Overseas Territories and Crown Dependencies initiatives

Natural Capital in the Caribbean and South Atlantic Overseas Territories

The UK Caribbean Overseas Territories (Anguilla, British Virgin Islands, Cayman Islands, Montserrat and Turks and Caicos) and South Atlantic Overseas Territories (Falkland Islands, St Helena, Ascension, Tristan and South George and the South Sandwich Islands) are highly dependent on the natural environment for their economic and social wellbeing. The environment provides goods and services of significant cultural and economic value and provides a key role in protecting manmade assets and protecting human life. The natural environment is susceptible to damage from human activities resulting in significant loss of value to the economies of the Territories and an increased risk from natural disasters such as hurricane generated storm surges and flooding.

The UK's Joint Nature Conservation Committee embarked on the 'Natural Capital in the Caribbean and South Atlantic Overseas Territories' project in late 2016, with expected outputs by March 2019 (<http://jncc.defra.gov.uk/page-7443-theme=textonly>). The project will provide an assessment of natural capital in six of the UK's Caribbean and South Atlantic Overseas Territories and will build capacity to monitor environmental change and to integrate environmental evidence into marine and terrestrial spatial planning, economic planning and environmental protection. The work builds on a body of existing work and techniques supported and pioneered by the UK Government in the two regions, including natural capital, environmental mainstreaming and Earth Observation projects.

Recovering from the Volcano - Montserrat

Biodiversity mainstreaming has also occurred within OT planning processes. This has been particularly important in Montserrat, where major development is needed to replace elsewhere on this small island the capital which was destroyed in 1997 by volcanic action. The UK Overseas Territories Conservation Forum and Treweek Environment Consultants, on behalf of the Governments of Montserrat and UK, organised a workshop on Environment Impact Assessment on the island and further consultations. A series of recommendations were provided by technical independent experts.

Indicators used in this assessment

None.

Please describe any other tools or means used for assessing progress

UK Biodiversity Indicator **A1: Awareness, understanding and support for conservation** <http://jncc.defra.gov.uk/page-6069>.

UK Biodiversity Indicator **A2: Taking action for nature: volunteer time spent in conservation** <http://jncc.defra.gov.uk/page-4253>.

UK Biodiversity Indicator **A5: Integration of biodiversity considerations into business activity** <http://jncc.defra.gov.uk/page-6072>.

UK Biodiversity Indicator **B1a: Area of land in agri-environment schemes** <http://jncc.defra.gov.uk/page-4242>.

UK Biodiversity Indicator **B1b: Area of forestry land certified as sustainably managed** <http://jncc.defra.gov.uk/page-4243>.

UK Biodiversity Indicator **E2: Expenditure on UK and international biodiversity** <http://jncc.defra.gov.uk/page-4251>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Albon, S., Balana, B., Brooker, R. & Eastwood, A. 2014. A systematic evaluation of Scotland's Natural Capital Asset Index. Scottish Natural Heritage Commissioned Report No. 751.

Hambrey, J. & Armstrong, A. 2010. Piloting a Natural Capital Asset Index. Scottish Natural Heritage Commissioned Report No. 750.

HM Government. 2018. A Green Future: Our 25 Year Plan to Improve the Environment. Accessed from:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf.

National Planning Policy Framework (2018)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740441/National_Planning_Policy_Framework_web_accessible_version.pdf.

Net gain consultation proposals:
https://consult.defra.gov.uk/land-use/net-gain/supporting_documents/netgainconsultationdocument.pdf.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only be "indicators" of a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

Work in the UK is underway to create a monitoring system through natural capital accounts.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

<Add link> <Add file>

Aichi Biodiversity 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.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target sets out two main *actions*: the elimination, phasing out or reform of *harmful incentives*; and the development and application of *positive incentives*. This assessment is based on whether the relevant *actions* have been taken. *Outcomes* of such biodiversity mainstreaming initiatives are considered in other target assessments under Targets 5, 6, 7 and 12.

The UK, in common with other countries across the European Union, has made significant progress with reforming harmful subsidies – particularly with those subsidies that incentivised over-production or overharvesting in agriculture, forestry and fisheries. In particular, the introduction of greening measures in 2013 (which built on the decoupling of agricultural support from production in 2003), along with the measures proposed in the Clean Air Strategy published in January 2019, will reduce ammonia emissions from the agricultural sector to deliver key atmospheric pollutant emission reduction targets under the National Emissions Ceiling Directive. In addition, a range of incentives have been developed and implemented to achieve biodiversity outcomes and promote sustainable management. These include agri-environment measures, sustainable woodland management payments and the introduction in 2014 of the European Maritime and Fisheries Fund. There has therefore been progress across both elements of this target.

Progress is assessed as insufficient because the countries of the UK recognise some ongoing declines of woodland, farmland and marine biodiversity and that there have been some recent reductions in areas under agri-environment schemes which could impact the target if land of high biodiversity value comes out of those schemes, suggesting that there is scope to improve or target uptake of positive incentives more effectively.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available. Evidence used includes examples of reforms to harmful incentives and additional positive incentive programmes developed and applied in the UK.

A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK initiatives

Common Agricultural Policy

The Common Agricultural Policy is the EU's agricultural policy. It implements a system of subsidies and other programmes to promote agricultural productivity and sustainability within Member State countries.

The UK, along with other EU member states, has implemented incentives under the Common Agricultural and Common Fisheries Policies (CAP and CFP).

There have been three major reforms of the CAP 1992, in 2003 and in 2013 to remove incentives for over-production which were potentially harmful for biodiversity:

- 1992: The 'MacSharry' reform started the shift from product support (through prices) to producer support (through income support and direct payments).
- 2003: Introduction of a single payment scheme not linked to production of any particular product ('decoupled') and introduced the 'cross compliance' concept, linking payments to respect of food safety, environmental protection and animal health and welfare standards.
- 2013: This reform underpinned producer support, integrating a more land-based approach and sustainable agriculture with 'green' direct payments. This reform came into action in 2015. Approximately 30% of the total payments under pillar 1 of the CAP are "green" direct payments based on meeting one of three criteria: crop

diversification, maintaining a percentage of permanent grassland and maintaining a percentage of Ecological Focus Areas on farmland.

Further information on the implementation of the Common Agricultural Policy in the UK is provided within the assessment of Target 7 in Section III of the report.

Common Fisheries Policy

The Common Fisheries Policy is the EU's fisheries policy that manages European fishing fleets and the conservation of fish stocks.

The reformed Common Fisheries Policy, through the European Maritime and Fisheries Fund (EMFF) has made a commitment to support and invest in selective gears and fishing techniques (see <https://www.gov.uk/government/publications/european-maritime-and-fisheries-fund-emff-implementation-reports>). This incentive will have a positive impact on conservation and sustainable use of biodiversity as gear improvements increase efficiency meaning less time fishing – resulting in less fuel consumption and less overall impact on the seafloor. Increased selectivity also decreases unwanted catch/bycatch, again decreasing the negative footprint left by fishing practices. In addition, incentives (specifically financial support for the scrappage of old vessels) which supported increase in fleet capacity have been removed, which has halted growth and begun to tackle issues of overcapacity in the EU fleet.

Further information on the implementation of the Common Fisheries Policy in the UK is provided within the assessment of Target 6 in Section III of the report.

UK aquaculture industry and sustainability

The aquaculture industry is growing (particularly in Scotland). The recent *Future of the seas: trends in aquaculture* report published in 2017 states a total aquaculture production value in excess of £590 million with £542 million attributed to the Scottish industry. However, there are questions about the environmental sustainability of salmon farming. Most recently the *Future of the sea* (2018) foresight report suggests that by 2030, driven by growing global resource demand, new technologies and other trends, many marine industries will have the potential to outperform the growth of the global economy as a whole. The Scottish Government and its agencies are working with the sector and with others to develop a policy and regulatory framework that enables sustainable growth while maintaining the right balance across our economic, environmental and social responsibilities. Honouring a Programme for Government commitment, Scotland's 10 year Farmed Fish Health Framework, developed with industry, launched in May 2018 and aims to significantly improve the health of farmed fish in Scotland. Work plans and milestones for each work stream of the Framework document will shortly be compiled to ensure progress is made and the priorities of the Framework are delivered. In June 2018, industry began publishing site level sea lice data and this month fulfilled a commitment made under the framework to move to pro-active and open reporting of mortality information – a pioneering approach in the farming sector. Establishment of an Interactions Working Group to look at the potential impacts of finfish aquaculture on wild fisheries, and where evidenced to determine what action might be taken to address these challenges.

The UK, through the Stirling Institute of Aquaculture, The Collaborative Centre for Sustainable Aquaculture Futures, Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Scottish Aquaculture Innovation Centre, Marine Stewardship Council and other institutions are working to ensure that the key challenges facing sustainable

growth of the aquaculture industry are better understood and that appropriate sustainable growth is facilitated. By supporting the work of these institutions and by building on many initiatives already in place (e.g. the CEFAS New Indonesia-UK Partnership to Strengthen Marine and Fisheries Co-operation (2016)) the UK can identify actions on how to encourage sustainable practices. The UK Government's 25 Year Environment Plan recommends an ecosystem/natural capital approach to help build a new environmental management system which values the benefits of the environment and uses the most effective incentives.

Marine Stewardship Council certification

The Marine Stewardship Council (MSC) certification for sustainable fisheries is a certification and labelling program for wild-capture fisheries that meet best practice guidelines set by both the United Nations Food & Agriculture Organization and ISEAL, the global membership association for sustainability standards. To become certified, fisheries are assessed by independent certification bodies. The fish and seafood from certified fisheries can carry the blue MSC label, assuring customers that what they're buying is sustainable. MSC certification can provide enhanced reputation, and visibility as well as access to new and niche markets making it a positive incentive to fishers, with added benefits to the ecosystem through sustainable fishing practice. To be awarded a certificate, fisheries must demonstrate that their fishery is sustainable, with minimal environmental impacts and has effective management (see the MSC website for more detail). Several large-scale fisheries have been certified around the UK including the UK Fisheries Ltd/ Deutsche Fischfang Union/Doggerbank Northeast Arctic cod, haddock and saithe fishery and the Scottish Fisheries Sustainable Accreditation Group North Sea Haddock fishery. In addition, amongst the UK Overseas Territories the Falkland Islands Toothfish Longline fishery is also MSC accredited.

Forestry Stewardship Council certification

The Forest Stewardship Council (FSC) provide a sustainable forestry certification scheme in the UK. Certification is voluntary and involves an inspection of the forest management by an independent organisation to check that it conforms to internationally agreed principles of responsible forest management. The timber can then carry the FSC label, guaranteeing that it comes from a well-managed forest. FSC also offer Chain of Custody (CoC) certification which ensures that FSC materials and products have been checked at every stage of processing, so customers purchasing products sold with FSC claims can be confident that they are genuinely FSC certified. There is currently 1,603,877 ha of FSC certified forest in the UK and 2,333 CoC certificates have been issued (FSC 2018).

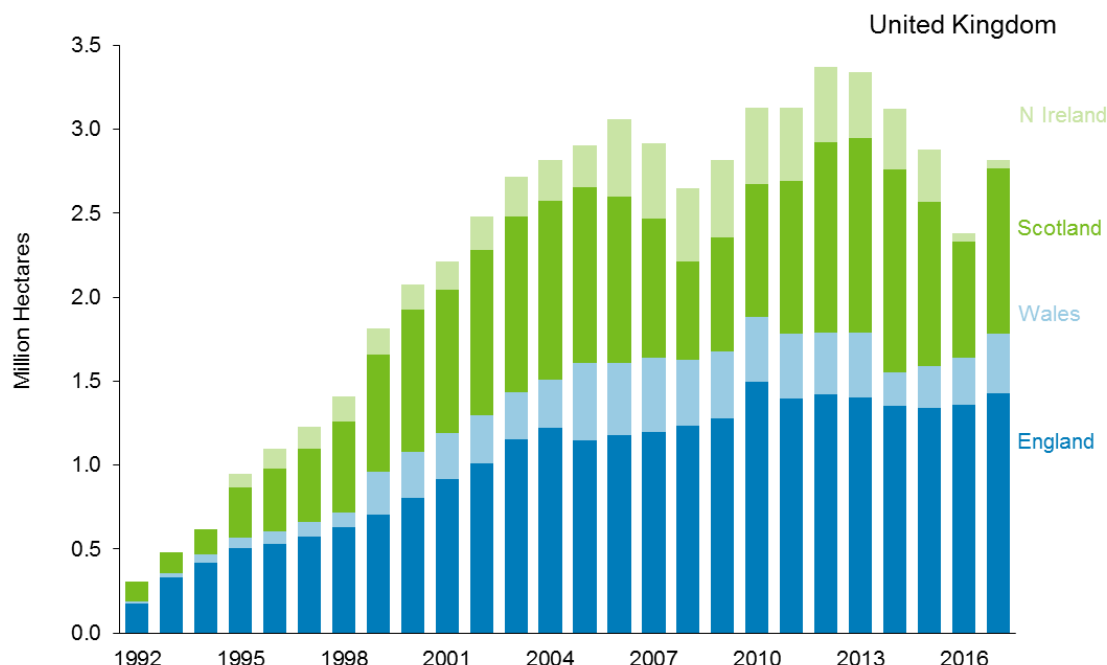
Indicators used in this assessment

UK Biodiversity Indicator **B1a: Area of land in agri-environment schemes**
<http://jncc.defra.gov.uk/page-4242>.

In 2017, the total area of land in higher-level or targeted agri-environment agreements in the UK was 2.8 million hectares: 1.4 million hectares in England; 0.4 million hectares in Wales; just under 1.0 million hectares in Scotland; and 0.1 million hectares in Northern Ireland.

Fluctuations in areas of land under agri-environment agreements over time can occur as a result of the introduction of new schemes and the ending of previous scheme agreements. Existing agreements will continue until they expire.

Figure B1ai. Area of land covered by higher-level or targeted agri-environment schemes, 1992 to 2017.



Notes:

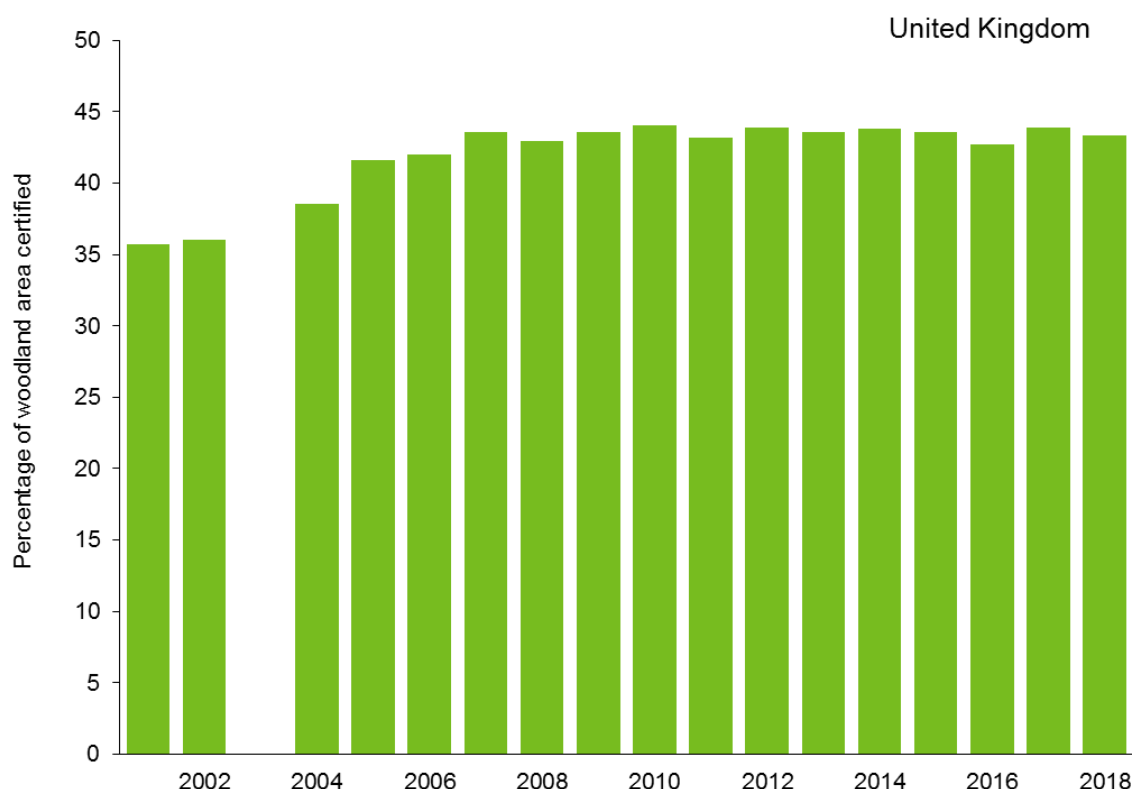
- The following schemes have been included as higher-level or targeted agri-environment schemes:
 England: Environmentally Sensitive Areas (ESA), Countryside Stewardship, Higher Level Stewardship (which includes ELS linked to HLS) and from 2016 new Countryside Stewardship (Higher Tier and Mid Tier). England Mid Tier and Higher Tier schemes of the new Countryside Stewardship both contribute to B1ai.
 Scotland: ESA, Countryside Premium, and Rural Stewardship, Rural Priorities, and from 2016 Agri-Environment Climate Scheme.
 Wales: ESA, Tir Cymen, Tir Gofal, Glastir Advanced and Decoupled Advanced (from 2016).
 N Ireland: ESA, Countryside Management, and Environmental Farming Scheme (from 2017).
- Higher level schemes have stricter criteria for qualification than other agri-environment schemes.

Source: Department of Agriculture, Environment and Rural Affairs - Northern Ireland, Defra, Natural England, Scottish Government, Welsh Government.

UK Biodiversity Indicator **B1b: Area of forestry land certified as sustainably managed**
<http://jncc.defra.gov.uk/page-4243>.

In March 2018, there were 1.38 million hectares of certified woodland across the UK, representing 43% of the total woodland area. The proportion of woodland certified as sustainably managed has remained stable at either 43% or 44% since 2007.

Figure B1bi. Percentage of woodland area certified as sustainably managed, 2001 to 2018.



Notes: All figures relate to data at 31 March, apart from 2001 (31 December) and 2002 (30 September).

Source: Forestry Commission.

Certification of woodlands promotes responsible forest management to safeguard forests' natural heritage and protect threatened species. Since 2001, the percentage of woodland certified as sustainably managed in the UK has increased from 36% to 43% in 2018. The percentage of woodland certified as sustainably managed in the UK remains relatively stable with a slight decrease in the latest year.

The total area certified can change if new woodlands are certified, if existing certificates are not renewed, or if there is a time lag in renewal of an existing certificate.

Please describe any other tools or means used for assessing progress

UK Biodiversity Indicator **A5: Integration of biodiversity considerations into business activity** <http://jncc.defra.gov.uk/page-6072>.

UK Biodiversity Indicator **B2: Sustainable fisheries** <http://jncc.defra.gov.uk/page-4244>.

UK Biodiversity Indicator **E2: Expenditure on UK and international biodiversity** <http://jncc.defra.gov.uk/page-4251>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

FSC. 2018. Latest Facts & Figures – UK [viewed on 16/072018]. Accessed from: <http://www.fsc-uk.org/en-uk>.

Defra. 2019. Clean Air Strategy. <https://www.gov.uk/government/publications/clean-air-strategy-2019>.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:
<http://jncc.defra.gov.uk/page-1824>.
<http://jncc.defra.gov.uk/page-4229>.
<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity 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.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
- ☐ On track to achieve target
- ☒ Progress towards target but at an insufficient rate
- ☐ No significant change
- ☐ Moving away from target
- ☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target sets out one main *action* and one main *outcome*. It requires plans for sustainable consumption and production to be in place, and that implementation of these plans keeps the UK's natural resource use within safe ecological limits. 'Safe ecological limits' are not well defined for UK production and consumption, and the assessment is based here on the potential to further reduce the UK's consumption of natural resources, improvements in the rate of reuse and recycling of resources used, and whether the impact of the use of resources on the natural environment has substantially reduced.

Across the UK, the Government and the Devolved Administrations have developed and are implementing a number of plans for sustainable production and consumption. For example, the Industrial Strategy and Clean Growth Strategy. The UK is committed to becoming a low carbon economy and has made significant reductions in greenhouse gas emissions already; the Climate Change Act sets legally binding targets for emissions. The UK is on track to exceed targets leading up to 2022 - though acknowledges that further action is required to replicate progress in the energy sector across the wider economy, including emissions from soil ecosystems. The UK continues to develop its circular economy by increasing recycling and reducing waste and has strategies in place to support further progress. Evidence also indicates that over 90% of large companies in UK consider environmental issues in their supply chain and the majority have a form of environmental management system in place. It is therefore assessed that progress has been made.

The target also requires that plans for sustainable production and consumption keep the use of natural resources within safe ecological limits. Such plans need action by a variety of organisations, including governments, NGOs and businesses. Although 'safe ecological limits' are not fully understood, the UK's global material footprint (raw material consumption, accounting for imports and exports of materials) fell 26% from a peak of 890 million tonnes in 2001 to around 659 million tonnes in 2013.

The progress to this target is assessed as insufficient to reflect the fact that the UK Government has acknowledged in its 25 Year Environment Plan that more can be done to reduce the impact of UK consumption on the rest of the world. Evidence indicates that there are further opportunities for businesses to generate substantial financial savings by increasing resource efficiency. A 2017 study found that a series of no or low-cost interventions by businesses could deliver business savings of around £3 billion per year through a more resource efficient use of materials and waste.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available. Evidence used includes action on key government strategies and legislation, and evidence for progress towards sustainability goals.

A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK initiatives

UK biomass consumption and environmental impact

Under current production and consumption conditions the United Kingdom cannot produce sufficient biomass to meet the national demand for food, timber products or bioenergy. Analysis of the flow of biomass through the UK economy indicates that one third of the biomass material utilised by the UK is imported (Weighell 2011).

The UK economy has shown long term growth since 1990 with a corresponding increase in imports (ONS 2015). UK economic growth is dependent on imported raw materials and the environmental impact of continued economic growth is likely to be felt overseas. The high volume of biomass imports for food, construction and bioenergy use makes it clear that the UK is drawing on significant amounts of primary production from overseas ecosystems.

Forecasts for the future use of biomass for food, biofuels and the production of heat and power suggest this dependence may continue to increase, and the UK will continue to contribute to global pressures on overseas ecosystems. The UK Government's 25 Year Environment Plan (25 YEP) highlights the government's commitment to "*leave a lighter footprint on the global environment by enhancing sustainability and supporting zero deforestation supply chains,*" in a way which "*avoids improving our domestic environment at the expense of the environment globally.*" In order to fulfil this commitment, a greater understanding of the global environmental impacts of UK consumption is required – research is underway to identify possible means of measuring what commodities have an impact elsewhere in the world, and how the impact of them might be measured.

UK recycling and waste reduction

The UK recycling rate for Waste from Households (WfH; including metal recovered from Incinerator Bottom Ash) was 45.2% in 2016, increasing from 44.6% in 2015 (Defra 2018). There is a European Union target for the UK to recycle at least 50% of household waste by 2020. The recycling rate for WfH increased in all UK countries in 2016. The recycling rate for England was 44.9%, compared with 43.0% in Northern Ireland, 42.8% in Scotland and 57.3% in Wales.

In 2016, 71.4% of UK packaging waste was either recycled or recovered compared to 64.7% in 2015. This exceeds the EU target to recycle or recover at least 60% of packaging waste.

UK biodegradable municipal waste (BMW) sent to landfill in 2016 was similar to that in 2015, remaining at approximately 7.7 million tonnes or 22% of the 1995 baseline value. The UK is therefore still on track to meet the EU target to restrict BMW landfilled to 35% of the 1995 baseline by 2020.

Revised figures estimate UK generation of commercial and industrial (C&I) waste at 40.0 million tonnes in 2014, of which 31.7 million tonnes (around 80%) was generated in England. The latest estimates for England only indicate that waste generation was around 31.9 million tonnes in 2015 and 33.1 million tonnes in 2016.

Climate Change Act 2008

The Climate Change Act introduced the UK's legally binding 2050 target to reduce greenhouse gas (GHG) emissions by at least 80% relative to 1990 levels. The Act requires carbon budgets are set which cap emissions over successive five-year periods and must be set twelve years in advance. In addition, the Act established the Committee on Climate Change (the CCC), an independent, statutory body that advises the UK Government and Devolved Administrations on emissions targets and reports to Parliament on progress made in reducing greenhouse gas emissions and preparing for climate change.

The UK has currently set carbon budgets up until 2032 and is in the third carbon budget period (2018 to 2022). The UK has met its first carbon budget (2008 – 2012) and is on track to outperform the second (2013 – 2017) and third (2018 – 2022) and could deliver over 90% of the fourth and fifth carbon budgets, even before many of the policies and proposals in the Clean Growth Strategy are taken into account (BEIS, 2017). Figure 4.1 and table 4.1 show that overall between 1990 and 2016 the UK reduced emissions by 42%, while growing the economy by more than two thirds.

The Energy and Clean Growth Minister wrote to the Climate Change Committee in October 2018 asking for advice on: setting a date for achieving net zero greenhouse gas emissions from across the economy, including from transport, industry and agriculture; whether the UK needs to review our 2050 target of cutting emissions by at least 80% relative to 1990 levels to meet international climate targets set out in Paris Agreement; how emissions reductions might be achieved in industry, homes, transport and agriculture; and the expected costs and benefits in comparison to current targets.

As well as being covered by the Climate Change Act, Scotland, Wales and Northern Ireland have their own separate climate change policies. For example:

- The Climate Change (Scotland) Act 2009 commits Scotland to a 42% reduction in emissions by 2020 and annual reductions between 2010 and 2050. The Scottish Government has committed to introduce a new, more ambitious Climate Change Bill. In June 2017, the Cabinet Secretary for Environment, Climate Change and Land Reform announced proposed new emission reduction targets of 56% by 2020 and 90% by 2050 (compared with 1990 levels). There is also a requirement to produce a Scottish Climate Change Adaptation Programme.
- Wales passed the Environment (Wales) Act in 2016, which provides for the setting of emission reduction targets to 2050, including at least an 80% reduction (compared with 1990 levels) in 2050, and five-yearly carbon budgets. The first two carbon budgets (from 2016-2020 and 2021-2025) are due to be set in 2018.

- The Northern Ireland Executive, in its Programme for Government (2011-2015), has set a target of continuing to work towards reducing its greenhouse gas emissions by at least 35% (compared with 1990 levels) by 2025.

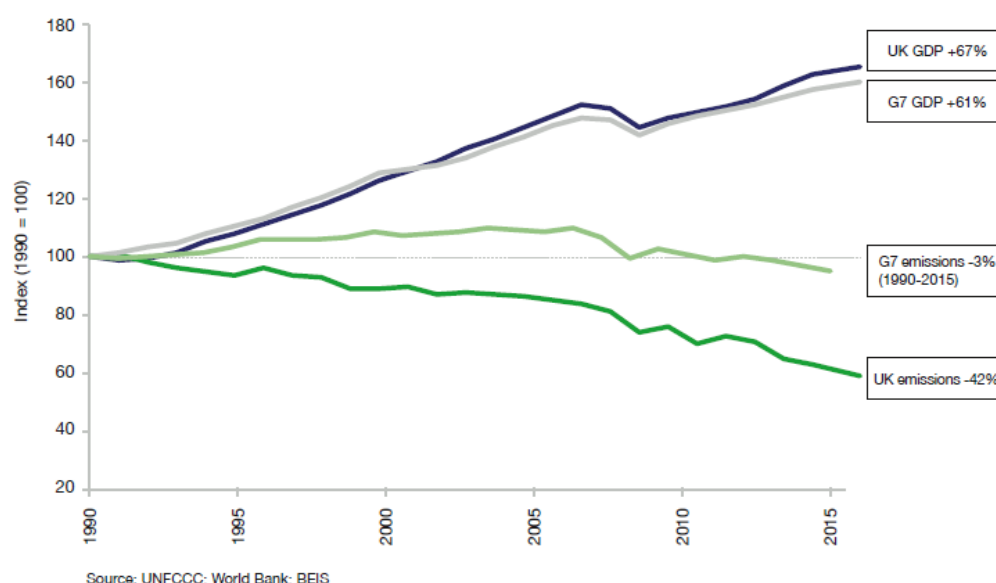


Figure 4.1: UK and G7 economic growth and emissions reductions (HM Government 2017, data sources: UNFCCC, World Bank, BEIS 2017).

Table 4.1: Greenhouse gas emissions by sector, 1990-2016 (Data source: BEIS 2018).

Sector	Emissions (MtCO ₂ e)		
	1990 Base Year	2016	Percentage change 1990 – 2016
Transport	128.1	125.8	-1.8%
Energy Supply	277.9	120.2	-56.7%
Business	114.7	81.5	-28.9%
Residential	80.2	69.8	-13.0%
Agriculture	55.3	46.5	-15.9%
Waste Management	66.7	19.9	-70.2%
Industrial Processes	59.9	10.5	-82.5%
Public	13.5	8.2	-39.3%
Total	796.3	482.4	-39.4%

Clean Growth Strategy

The Clean Growth Strategy was published in October 2017 and sets out the UK Government's proposals for decarbonising all sectors of the UK economy through the 2020s and beyond. The Strategy includes ambitious proposals on housing, business, transport, the natural environment and green finance. It explains how the whole country can benefit from low carbon opportunities, while meeting national and international commitments to tackle climate change.

The Strategy also outlines the UK's ambition of zero avoidable waste by 2050, maximising the value extracted from resources, and minimising the negative environment

and carbon impacts associated with their extraction, use and disposal. The Strategy sets out ambitious policies which work towards this vision.

Industrial Strategy: building a Britain fit for the future

The UK Government's *Industrial Strategy: building a Britain fit for the future* was published as a white paper in November 2017 and sets out a long-term plan to boost the productivity and earning power of people throughout the UK. The Industrial Strategy White Paper introduces the Clean Growth Grand Challenge, as one of four Grand Challenges for the UK Government and wider economy, to “*maximise the advantages for UK industry of the global shift to clean growth*” and highlights how sustainability is being embedded within the UK Government's approach and expectation of business.

Business Resource Efficiency

A 2014 study by Defra provides an estimate of financial savings available to UK economic sectors if resource efficiency interventions are made which have no or low cost. In the context of the study, ‘no-cost/low-cost’ interventions refer to ‘quick-win’ savings opportunities with a payback of less than one-year.

The focus of the study was on three key resources:

- Energy consumption.
- Raw material consumption or the generation of waste.
- Water consumption.

The study suggested that savings in the order of 5.7 to 7.2 billion pounds are possible, with significant variations between sectors. See Oakdene Hollins (2017) for details.

Green Government Commitments

The Greening Government Commitments set out the actions UK government departments and their agencies will take to reduce their impacts on the environment. Actions include reducing the public sector's emissions, improving its waste management, reducing its water use and buying “greener” products and services. This has had notable effects on the public sector's environmental impact, helping reduce emissions by 40% since 1990. As of 2015/16, the UK public sector succeeded and exceeded its target of 25% reduction in emissions on 2009/10 level with a reduction of 27%. New targets aim to achieve a reduction of 32% by 2019/20.

Country initiatives

Resources and Waste Strategy, England

In December 2018, the UK Government published the Resources and Waste Strategy outlining the actions and commitments over the coming years for how England will preserve material resources by minimising waste, promoting resource efficiency and moving towards a circular economy, while minimising the damage caused to the natural environment by reducing and managing waste safely and by tackling waste crime. The strategy is a blueprint for eliminating avoidable plastic waste over the lifetime of England's 25 Year Environment Plan, doubling resource productivity, and eliminating avoidable waste of all kinds by 2050.

The 25 Year Environment Plan commits the UK to further action to leave a lighter footprint on the global environment and to further use natural capital approaches to help

guide better uptake of natural capital reporting, standards and accounting across government and businesses. In addition, the Bioeconomic Strategy (BEIS 2018) has been published to maximise productivity and potential from existing UK bioeconomy assets.

Scottish Government National Performance Framework

The Scottish Government National Performance Framework includes five key measures of sustainable production and consumption

(<http://www.gov.scot/About/Performance/scotPerforms/outcome/envImpact>):

- Reduce Scotland's carbon footprint.
- Increase the proportion of journeys to work made by public or active transport.
- Reduce waste generated.
- Increase renewable electricity production.
- Improve the state of Scotland's marine environment.

There has been a reduction in Scotland's carbon footprint since a peak in 2007 when it was 115.3 million tonnes carbon dioxide equivalent (MtCO₂e). The latest figure of 94.8 MtCO₂e for 2013 represents a slight rise over the previous year. An estimate of the ecological footprint was undertaken in 2006

(<http://www.gov.scot/About/Performance/scotPerforms/indicators/ecologicalFootprint>).

This was stable but above the target value.

A number of policies help guide action towards ensuring sustainability goals are being met. These include the Climate Change (Scotland) Act (2009), the Zero Waste Plan (SG 2010), Low Carbon Scotland (SG 2013), Safeguarding Scotland's Resources (SG 2013), A Circular Economy Strategy for Scotland (2016) and Scotland's National Marine Plan (2015).

Sustainable production and consumption regulation in Wales

In Wales there is an established set of legislation which regulates activities that have the potential to impact adversely upon biological diversity in the forestry, agricultural, industrial, waste, water and other sectors. This regulation helps to ensure sustainable production and consumption of natural resources in Wales. Natural Resources Wales (NRW) is the primary environmental regulator in most cases. Recently the new Environment Act 2016 and the Wellbeing of Future Generations Act 2015 have provided a new integrated statutory framework, within which NRW is required to work.

Currently NRW is coordinating a programme to review and develop proposals to modernise elements of environmental regulation in Wales to streamline processes, maximise efficiency and environmental protection, focus on environmental priorities and ensure continuity of a high-quality service. The programme is supporting Welsh Government to use the powers in the Water Act 2014 to bring water abstraction activities into the Environmental Permitting Regulations, which will provide a more modern and consistent legal framework. It also includes a review of protected site regulation (Site of Special Scientific Interest Assents) and exploring improved and novel means of carrying out regulatory enforcement.

NRW's Future Regulation Group is also exploring innovative methods beyond the more traditional 'command and control' style of regulation, for example, through incentivising sustainable management and establishing markets for ecosystem services. This work

includes establishing standards and tools to enable the development of Payments for Ecosystem Services across Wales.

Indicators used in this assessment

UK Biodiversity Indicator **A5: Integration of biodiversity considerations into business activity** <http://jncc.defra.gov.uk/page-6072>.

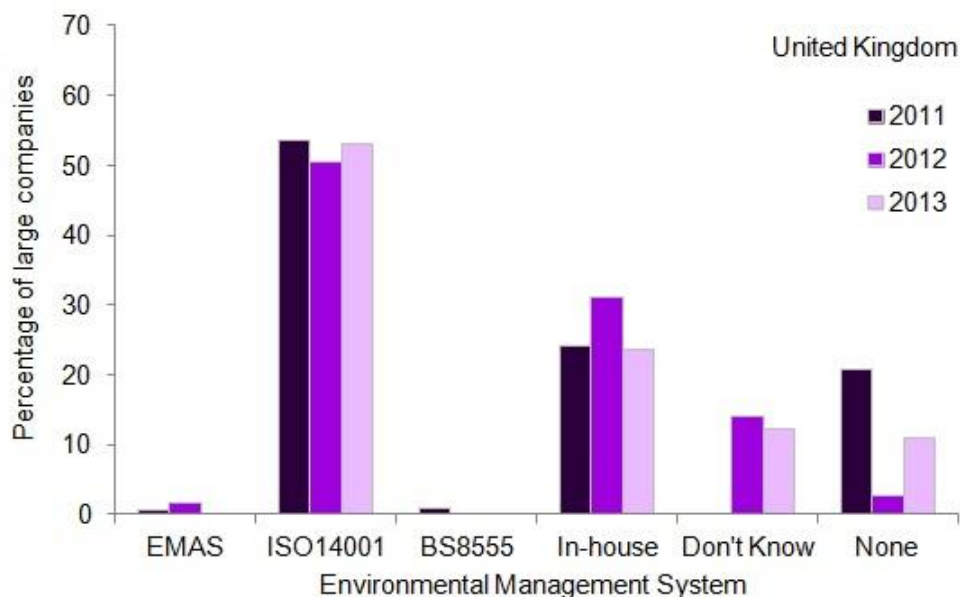
- a. Environmental Management Systems
- b. Environmental consideration in supply chains

In 2013, 77% of large companies that responded to the EPE Survey had an Environmental Management System (EMS) in place, compared with 83% of responding companies in 2012 and 79% in 2011.

In 2013, 53% of responding large companies had an EMS certified to ISO 14001. Overall, in 2013, 24% of respondents had an EMS in place which was not externally certified (i.e. it was developed and implemented to meet “in-house” needs). This compares to 31% of respondents in 2012 having an “in-house” EMS in 2012.

Overall, 92% of large companies considered environmental issues within their supply chain in 2013, up from 78% in 2012. Within the 2013 figure, 58% formally considered environmental issues, 34% considered them informally; and 8% did not consider environmental issues at all.

Figure A5ai. Percentage of large companies that use an Environmental Management System, 2011 to 2013.

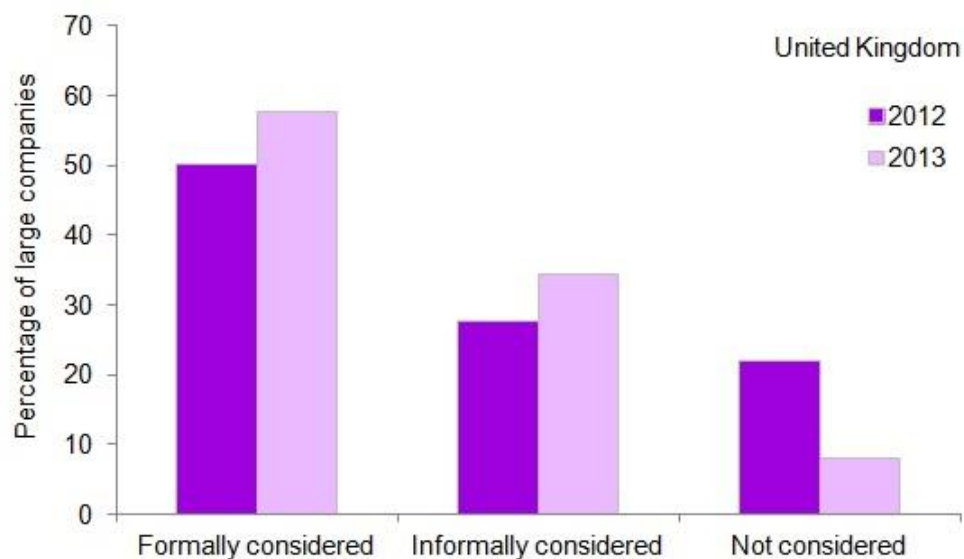


Notes:

1. As companies can have multiple systems in place, a hierarchy (EMAS > ISO 14001 > BS 8555 > In-house) has been applied to avoid double counting.
2. Based on responses from 121 large companies in 2011, 127 large companies in 2012, and 134 large companies in 2013.
3. 'Large companies' are those that employ at least 250 staff.
4. 'Don't know' was not given as a response option in the 2011 survey.

Source: Defra.

Figure A5bi. Percentage of large companies that consider environmental issues in their supply chain, 2012 to 2013.



Notes:

1. Based on responses from 120 large companies in 2012, and 133 large companies in 2013.
2. 'Large companies' are those that employ at least 250 staff.

Source: Defra.

Please describe any other tools or means used for assessing progress

UK Biodiversity Indicator **A1: Awareness, understanding and support for conservation** <http://jncc.defra.gov.uk/page-6069>.

UK Biodiversity Indicator **A2: Taking action for nature: volunteer time spent in conservation** <http://jncc.defra.gov.uk/page-4253>.

UK Biodiversity Indicator **B1a: Area of land in agri-environment schemes** <http://jncc.defra.gov.uk/page-4242>.

UK Biodiversity Indicator **B1b: Area of forestry land certified as sustainably managed** <http://jncc.defra.gov.uk/page-4243>.

UK Biodiversity Indicator **B2: Sustainable fisheries** <http://jncc.defra.gov.uk/page-4244>.

UK Biodiversity Indicator **D1a: Fish size classes in the North Sea** <http://jncc.defra.gov.uk/page-4248>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

BEIS (2017) UK Greenhouse Gas Inventory Provisional Statistics (1990-2016). Accessed from: <https://www.gov.uk/government/statistics/provisional-uk-greenhouse-gas-emissions-national-statistics-2016>.

- BEIS (2018) Bioeconomy strategy: 2018 to 2030, Accessed from <https://www.gov.uk/government/publications/bioeconomy-strategy-2018-to-2030>.
- BEIS (2018) 2016 UK Greenhouse Gas Emissions, Final Figures. Accessed from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/680473/2016_Final_Emissions_statistics.pdf.
- Oakedene Hollins (2017) Business Resource Efficiency – Quantification of the no cost/low cost resource efficiency opportunities in the UK economy in 2014 (EV0482), Defra research report. Available from: <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=19885&FromSearch=Y&Publisher=1&SearchText=EV0482&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>.
- Committee on Climate Change (2018) Reducing UK emissions, 2018 Progress Report to Parliament. Accessed from: <https://www.theccc.org.uk/wp-content/uploads/2018/06/CCC-2018-Progress-Report-to-Parliament.pdf>.
- Defra (2018) UK Statistics on Waste. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746642/UK_Statistics_on_Waste_statistical_notice_October_2018_FINAL.pdf.
- Defra (2018) Resources and waste strategy for England. Accessed from: <https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england>.
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- Scottish Government (SG) (2010) Zero Waste Plan. Available from: <https://www2.gov.scot/Topics/Environment/waste-and-pollution/Waste-1/wastestrategy>.
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- Scottish Government (SG) (2013) Zero Waste. Safeguarding Scotland's Resources: Blueprint for a more resource efficient and circular economy. Available from: <https://www2.gov.scot/Resource/0043/00435308.pdf>.
- Scottish Government (SG) (2016) Making Things Last: A Circular Economy Strategy for Scotland. Available from: <https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/>.
- Scottish Government (SG) (2015) Scotland's National Marine Plan A Single Framework for Managing Our Seas. Available from: <https://www.gov.scot/publications/scotlands-national-marine-plan/#res-1>.
- UNFCCC, Data Interface. Accessed from: http://di.unfccc.int/time_series.
- Weighell, T. (2011) JNCC Report, No. 452: The global land use impact of the United Kingdom's biomass consumption Part I: Biomass flows through the UK economy - an overview of biomass sources and overseas land requirements. Accessed from: http://jncc.defra.gov.uk/PDF/JNCC452_web.pdf.

World Bank, World Development Indicators. Accessed from:
<http://data.worldbank.org/indicator/NY.GDP.MKTP.PP.KD>.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:
<http://jncc.defra.gov.uk/page-1824>.
<http://jncc.defra.gov.uk/page-4229>.
<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity Target 5



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

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
☐ On track to achieve target

<input checked="" type="checkbox"/> Progress towards target but at an insufficient rate <input type="checkbox"/> No significant change <input type="checkbox"/> Moving away from target <input type="checkbox"/> Unknown
Date the assessment was done: 18 January 2019.
<p>Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).</p> <p>Assessment</p> <p>This target requires two <i>outcomes</i>: a reduction in the rate of loss and an improvement in condition and connectivity of natural habitats (and in this section, the UK has interpreted this as including both natural and semi-natural habitats).</p> <p>Evidence on the changes in extent and condition of natural and semi-natural habitats in the UK is incomplete. However, data on the condition of key protected habitats and recent trends in extent of terrestrial broad habitats show that the rate of loss and degradation of natural habitats in the UK has slowed or stabilised following extensive loss and fragmentation during the 20th century. Positive trends in the extent of some terrestrial broad habitats shows some evidence of recovery and positive results have also arisen from targeted restoration programmes such as the peatland examples referred to in this 6th National Report.</p> <p>There is evidence of improving condition and connectivity for some natural and semi-natural habitats. Data on protected areas in the UK show improving condition of the habitats they protect, but action over a considerable timescale will be needed to restore all of them to favourable condition. The area of the UK covered by broadleaved woodland is increasing and each of the countries of the UK has also taken action to restore and re-create habitat outside the protected site series. Set against these improvements, there have been some ongoing losses of natural and semi-natural habitat, for example through neglect or development, as well as ongoing declines of a number of species groups. In addition, a proportion of habitats remain in a degraded state, particularly those outside protected sites. While understanding of marine habitat condition continues to develop, there is evidence of widespread human disturbance of marine habitats in UK waters.</p> <p>There has been significant progress in reducing rates of loss and degradation in natural and semi-natural habitats, and some progress in improving condition and connectivity, for example in woodland habitats, but the target is assessed as insufficient, given the ongoing imperative to maintain action to further reduce past degradation and fragmentation.</p> <p>Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.</p>

Evidence used includes the condition and extent of natural habitats in the UK, and initiatives for their conservation. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

United Kingdom habitats

For a highly industrialized and populous country, with a temperate climate, the UK has a wide variety of natural habitats. The main factors that lead to this are the diversity of geology, landforms and sea floors, the long history of land management, the warming effect of the Gulf Stream, and a large tidal range. The UK has a productive and diverse marine environment that includes sandy and muddy seabeds, rocky reefs, maerl and seagrass beds and unique deep-sea habitats. The UK's extensive and dynamic coastline includes habitats such as high sea cliffs, estuaries, saltmarsh and dune systems, and machair. The UK's terrestrial environment is a patchwork of semi-natural habitats. It includes large tracts of upland and mountain areas with expanses of peat and heathland, sparse areas of native and plantation woodland, and lowland grass, heath and wetlands, with freshwater habitats throughout.

The UK experienced large-scale changes in land use in the second half of the 20th century, as urban settlements expanded, and the farming community rose to the challenge of increasing food production. This resulted in well-documented declines in the extent and condition of terrestrial and freshwater ecosystems. However, with the introduction of nature conservation initiatives throughout the 20th century, including positive incentive programmes and the designation of protected area networks throughout the UK, these losses have stabilised or slowed.

Systematic surveillance of UK terrestrial habitats is available from the 1980s onwards, allowing for broad trends in habitat extent and condition, including levels of degradation and fragmentation, to be assessed over time. Surveillance of the marine environment has historically lagged behind that of terrestrial, however, significant recent progress has been made establishing a baseline understanding of marine habitat condition within the UK's marine protected area (MPA) network.

Changes in the extent of habitats in the UK can be demonstrated at a UK level from 1998, when the first UK wide Countryside Survey was done. More recently, Land Cover Maps from 2007 and 2015 further demonstrate that changes to habitat extent have been positive for biodiversity conservation purposes.

The rate of loss and degradation of many natural or semi-natural habitats in the UK has slowed or stabilised over the period covered by the Global Plan, in comparison to the large rates of loss resulting from extensive land use change during the 20th century. Since 2010, there have been a number of positive improvements.

The UK's measure of connectivity is based on ability of butterflies to move between habitat patches. It is published as an experimental indicator and currently contains data up to 2012. Individual UK countries (see below) have been making further developments with connectivity.

Habitat condition

Areas/Sites of Special Scientific Interest (A/SSSIs) are designated to conserve specific biological or geological features in the terrestrial and coastal environment in the UK. The percentage of biological features (habitats and species together) of A/SSSIs in favourable or unfavourable-recovering condition increased from 67% in 2005, to 86% in

2013, and remained stable at 85% in 2018 (UK Biodiversity Indicator C1c). The proportion of features or area of land in unfavourable-recovering condition has increased from 14% in 2005 to 35% in 2018. These changes reflect improved management of sites but may also be affected by a greater number of sites/features having been assessed over time.

The condition of habitats outside of protected areas in the UK is less well-known. However, Article 17 of the European Union Habitats Directive requires Member States to report every 6 years on progress made with maintaining and/or restoring favourable conservation status for habitat types and species of European importance. The assessment of conservation status takes account of the whole resource of a feature of interest, both within Special Areas of Conservation designated for their protection, and beyond those sites.

Between 2007 and 2013 (the latest published assessment), the conservation status of 45% of UK habitats of European importance had improved or remained favourable, but 51% had declined or remained in unfavourable conservation status (UK Biodiversity Indicator C3a). Table 5.1 shows the 2013 conservation status of UK habitats of European importance categorised into 9 broad habitat groups. Six groups have habitats with declining statuses, with those with the largest proportion in decline being Coastal sand dunes and continental dunes, Forests and Raised bogs and mires and fens. Seven groups have habitats with improving statuses, with those with the largest proportion improving being Freshwater habitats and Rocky habitats and caves. Only two groups, Freshwater habitats and *Sclerophyllous* scrub (matorral), have habitats with a favourable conservation status.

The 2013 Article 17 assessment identified the following major pressures affecting terrestrial habitats of European importance:

- Afforestation and forest management;
- Air and water pollution, including eutrophication (nutrient enrichment);
- Climate change;
- Fire;
- Interference in natural hydraulic conditions (e.g. water abstraction and modification of flowing waters);
- Invasive non-native species and pathogens;
- Over- and under-grazing;
- Recreational damage (e.g. trampling);
- Renewable energy use, mainly wind turbines and associated infrastructure; and
- Unmanaged succession (e.g. scrub invasion and spread of bracken and gorse).

The next Article 17 assessment is due to be submitted by the UK in mid-2019.

UK Biodiversity Indicator C2 illustrates changes in the functional connectivity – the ability of species to move between patches of habitat – of 33 butterfly species in the UK. Between 1985 and 1995, the average functional connectivity of UK butterfly species was relatively stable, the index fell to a low of 48% in 2004, and then rose. The level of functional connectivity in 2012 is 10% greater than the level in the start year of 1985, suggesting a reduction in habitat fragmentation in the UK. UK Biodiversity Indicator C2 is an experimental statistic and its novel methods remain under consideration.

Table 5.1. 2013 EU Habitats Directive Article 17 reporting - Assessment of overall trends in Conservation Status qualifier for 51 terrestrial and coastal habitats grouped by category for European protect habitats within.

Habitat Group	Total	Favourable	Unfavourable			Unknown
			Improving	Stable	Declining	
Coastal sand dunes and continental dunes	11	0	2	4	5	0
Forests	10	0	0	6	4	0
Freshwater habitats	8	1	5	2	0	0
Marine, coastal and halophytic	15	0	4	8	2	1
Natural and semi-natural grassland formations	9	0	2	4	3	0
Raised bogs and mires and fens	9	0	5	0	4	0
Rocky habitats and caves	7	0	5	0	0	2
Sclerophyllous scrub (matorral)	2	1	0	1	0	0
Temperate heath and scrub	6	0	1	4	1	0

The OSPAR Intermediate Assessment (OSPAR 2017) reported on the condition of marine habitats using the 'extent of physical damage' indicator which assesses disturbance based on the overlap of habitats with fishing, and their level of sensitivity. Fishing was the only pressure considered due to data availability but is arguably the most significant human pressure on marine habitats. The assessment covers the period 2010–2015. Overall, 86% of the grid cells assessed in the Greater North Sea and Celtic Seas show evidence of some physical disturbance of the seafloor from bottom contacting fishing gears, of which 58% of areas show higher levels of disturbance. The indicator was also used to assess levels of disturbance for habitats on the OSPAR threatened and declining list. The habitat with the greatest disturbance is 'sea pen and burrowing megafauna communities' with half of this habitat in high disturbance categories. 'Seamounts' and 'Zostera beds' (seagrass) also had more the 20% of their mapped extent in the high disturbance categories. It should be noted that the full extent of habitats is often unknown due to patchy data availability, and so confidence in these results is low. It wasn't possible to identify trends in habitat disturbance.

Habitat extent

The Countryside Survey (CS) undertaken by the NERC Centre for Ecology and Hydrology (CEH) and its predecessor the Institute of Terrestrial Ecology currently provides the most comprehensive assessment of trends in terrestrial habitats across the UK. The Countryside Survey includes a systematic field survey of representative areas of habitat around the UK. The survey was first conducted in 1978 and it was developed and expanded every time it was repeated in 1984, 1990, 1998 and 2007.

The most recent 2007 Countryside Survey (Carey *et al.* 2008) estimated the area of 16 Broad Habitat types, recognised as the basis of a comprehensive framework for surveillance and reporting on the status of the wider UK countryside. Changes in these Broad Habitats are between survey years are summarised in Table 5.2. The area of

Broadleaved Woodland, Improved Grassland, Neutral Grassland, Acid Grassland and Standing Waters Broad Habitats increased between 1998 and 2007 in the UK. In contrast Arable and Bracken Broad Habitats decreased in area, while all others showed no change. A number of the changes were inter-related: Broadleaved Woodland expanded due to the conversion of former areas of coniferous woodland and afforestation of farmland and the decline in Bracken was partly reflected in the increase in Acid Grassland.

These changes in the extent of the Broad Habitats could be positive in biodiversity conservation terms. Conversion of arable and horticulture habitat to improved or neutral grassland and the increases in plant species richness within surviving arable habitats suggests that arable landscapes have generally become more diverse, with more agricultural land left unfarmed, cereal field margins and areas of neutral grassland. This should benefit farmland biodiversity. On the other hand, there is a continuing trend for 'managed' hedges to revert to relict hedges or lines of trees/shrubs, which have less value for wildlife.

Table 5.2. Estimated area ('000s ha) and percentage of land area of Broad Habitats in the UK from 1998 to 2007 and Great Britain from 1984 to 2007. Note, because of changes in definitions that have been applied retrospectively, the estimates from 1990 and more especially 1984 are not in all cases directly comparable with later surveys (Source: Carey *et al.* 2008).

Broad Habitats	Great Britain								UK			
	1984		1990		1998		2007		1998		2007	
	'000 s ha	% area of GB	'000 s ha	% area of GB	'000 s ha	% area of GB	'000 s ha	% area of GB	'000 s ha	% area of UK	'000 s ha	% area of UK
Broadleaved, Mixed and Yew Woodland	1,317	5.6	1,343	5.8	1,328	5.7	1,406	6.0	1,392	5.6	1,488	6.0
Coniferous Woodland	1,243	5.3	1,239	5.3	1,386	5.9	1,319	5.7	1,448	5.9	1,380	5.6
Linear Features	491	2.1	581	2.5	511	2.2	496	2.1	540	2.2	527	2.1
Arable and Horticulture	5,283	22.7	5,025	21.6	5,067	21.7	4,608	19.8	5,124	20.7	4,657	18.8
Improved Grassland	5,903	25.3	4,619	19.8	4,251	18.2	4,494	19.3	4,806	19.4	5,067	20.5
Neutral Grassland	467	2.0	1,669	7.2	2,007	8.6	2,176	9.3	2,271	9.2	2,407	9.7

Calcareous Grassland	75	0.3	78	0.3	61	0.3	57	0.2	63	0.3	59	0.2
Acid Grassland	1,476	6.3	1,821	7.8	1,502	6.4	1,589	6.8	1,516	6.1	1,599	6.5
Bracken	439	1.9	272	1.2	315	1.3	260	1.1	318	1.3	263	1.1
Dwarf Shrub Heath	1,388	6.0	1,436	6.2	1,299	5.6	1,343	5.8	1,313	5.3	1,360	5.5
Fen, Marsh, Swamp	428	1.8	427	1.8	425	1.8	392	1.7	479	1.9	439	1.8
Bog	2,303	9.9	2,050	8.8	2,222	9.5	2,232	9.6	2,386	9.6	2,393	9.7
Standing Open Waters	284	1.2	200	0.9	196	0.8	204	0.9	258	1.0	265	1.1
Rivers and Streams	70	0.3	70	0.3	65	0.3	58	0.2	70	0.3	64	0.3
Montane	41	0.2	na	na	41	0.2	42	0.2	41	0.2	42	0.2
Inland Rock	38	0.2	76	0.3	111	0.5	101	0.4	119	0.5	106	0.4
Built-up Areas and Gardens	1,268	5.4	1,266	5.4	1,279	5.5	1,323	5.7	1,336	5.4	1,397	5.6
Other land	na	na	659	2.8	762	3.3	731	3.1	na	na	na	na
Unsurveyed urban land	na	na	482	2.1	482	2.1	482	2.1	na	na	na	na
Total area	23,313		23,313		23,313		23,313		24,729		24,729	

Land Cover Maps (LCMs) are an additional output from the CS and provide land cover information for the UK derived from satellite images, digital cartography, ground reference data and ancillary datasets. A comparison between the 2007 LCM and most recent 2015 LCM is shown in Table 5.3 and gives a more recent indication of changes in the extent of Broad Habitats in the UK. The results are broadly consistent with trends observed in the 2007 CS discussed above with a decrease in the extent of arable and horticulture habitat accompanied by an increase in improved grassland. Nevertheless, it is noted that differences between land cover maps are a combination of real change and classification error, which is compounded by the thematic and spatial differences between the LCM products over time. Though the Countryside Survey data presented predates the Strategic Plan for Biodiversity 2011-2020, when combined with LCMs, presented below, the data provides an overview of the extent trends of broad habitat types.

Table 5.3. Estimated areas ('000s ha) of Broad Habitats in the UK from 2007 and 2015 LCMs, and their trajectories of change (+/-) between years. Habitat classes 'Montane' and 'Rough grassland' were removed from the 2015 LCM and therefore any changes in the area of corresponding 2015 habitat classes should be interpreted with caution. For further information on the interpretation of LCMs, see https://www.ceh.ac.uk/sites/default/files/LCM2015_Dataset_Documentation.pdf.

Broad Habitats	LCM 2007 Area (‘000s ha)	LCM 2015 Area (‘000s ha)	Change (+/-)
Broadleaved woodland	1,319	1,457	+
Coniferous Woodland	1,440	1,486	+
Arable and Horticulture	6,214	5,556	-
Improved Grassland	5,529	6,646	+
Rough grassland	1,284	n/a	n/a
Neutral Grassland	1,290	732	-
Calcareous Grassland	371	829	+
Acid grassland	1,626	2,097	+
Fen Marsh and Swamp	100	186	+
Heather	7,332	9,474	+
Heather grassland	1,306	1,480	+
Bog	1,007	871	-
Montane Habitats	4,910	n/a	n/a
Inland Rock	1,216	1,806	+
Saltwater	1,539	2,368	+
Freshwater	2,616	2,674	+
Supralittoral Rock	79	319	+
Supralittoral Sediment	466	560	+
Littoral Rock	493	321	-
Littoral sediment	2,081	2,297	+
Saltmarsh	442	797	+
Urban	3,120	3,937	+
Suburban	1,088	1,318	+

There is evidence of ongoing losses of some important habitats. For example, between 2006 and 2015 in England 0.02% of ancient woodland (c. 57ha) was lost, largely as a result land use change such as urban development (Forestry Commission 2016).

In the marine environment, the UKSeaMap has been generated by the Joint Nature Conservation Committee to provide a modelled baseline of broad-scale habitats in UK seas that can refined and improved as new data become available from surveys. The geographic coverage provided by UKSeaMap has helped inform the development of a UK MPA network, further marine monitoring programmes and marine planning initiatives. Nevertheless, the current spatial resolution and temporal cover of UKSeaMap is insufficient to assess trends in marine habitat extent over time.

The UK countries are undertaking a number of initiatives to improve their ability to effectively measure changes in the distribution of natural habitats over time. The Habitat Map of Scotland has integrated a range of data sources to produce a comprehensive

map of Scotland's main habitats (<https://www.environment.gov.scot/our-environment/habitats-and-species/habitat-map-of-scotland/>). In Wales, a map of semi-natural habitats has been produced as a baseline indicator against which progress towards the country's national Well-being goals can be measured (<https://naturalresources.wales/evidence-and-data/maps/extent-of-semi-natural-habitat-in-wales-indicator-43/?lang=en>). Similar baseline products are currently in production for England and Northern Ireland.

In addition, the UK is exploring the application of Earth Observation tools to monitor habitat changes, including using satellite imagery gathered by the European Union's (EU) Copernicus Programme. Data gathered by the Copernicus Programme have significant potential to improve the accuracy and effectiveness of habitat monitoring, and projects are currently underway in the UK countries trialling methods that utilise the data. Further information on the UK's Earth Observation work can be found in the Target 19 assessment of Section III of the report

Country initiatives

England

Through Biodiversity 2020, England's strategy to implement commitments under the Convention, England have committed to developing a coherent ecological network. Between 1999 and 2018 the extent of land and sea in England under protected area status has increased by 1.2 million to 2.7 million hectares. Outside of protected sites since 2011 approximately 130,000 hectares of new land has been brought into management to create wildlife-rich habitat. Twelve Nature Improvement Areas (NIAs) were established in April 2012 to create joined up and resilient ecological networks at a landscape scale. NIAs have maintained or improved 13,664 hectares of existing priority habitat; restored or created 4,625 hectares of new priority habitat; and restored, created or managed 225 kilometers of linear and boundary habitat, such as rivers and hedgerows. For further information on NIAs please see Target 14 of Section III of the report. These activities have delivered multiple benefits, such as: improved habitat connectivity; development of recreational corridors; creation of open spaces; and the enhancement of ecosystem services.

This commitment was reaffirmed in the 25 Year Environment Plan, the UK Government has committed to design and deliver a Nature Recovery Network in England – an expanding and increasingly-connected patchwork of wildlife-rich habitat that restores nature and delivers wider natural capital outcomes. It is a new approach for nature recovery that builds on previous habitat networks. It is distinct from protected area designations by its scale, integration and the depth of change being sought. The Nature Recovery Network will provide 500,000 hectares of additional wildlife habitat, more effectively linking existing protected sites and landscapes, as well as urban green and blue infrastructure.

The Government has also committed to supporting the development of a new Northern Forest. This project will see 500 million trees being planted over 25 years, roughly equating to 25,000 hectares of new woodland. The Government are providing £5.7 million to kick-start the project. The creation of the Northern Forest will help reduce habitat fragmentation and degradation, while also contributing to wider Aichi targets through: helping to adapt to and mitigate risks from projected climate change by sequestering large amounts of carbon, increasing opportunity for access and recreation, and enabling increases to biodiversity and providing ecological networks by reducing habitat fragmentation and link the wider landscape so that nature can thrive.

Scotland

The Scottish Biodiversity Strategy; 2020 Challenge for Scotland's Biodiversity identifies peatlands, native woodlands, freshwaters and the sea as priority habitats for restoration; to support carbon capture and adaptation to climate change. Restoration is best achieved by working in partnership. There are a number of companies, organisations, groups, individuals, charities and volunteers involved in restoration projects. These are critical to the success and the long-term survival of the priority habitats.

Scotland's peatlands are of international importance. The estimated total area of peatland in Scotland is 2 million hectares covering around 20% of the land area of Scotland. Degradation and fragmentation have historically affected 80% of peatland; with raised bog and blanket bog most damaged. By working with a range of stakeholders, efforts to restore these for the benefit of people and nature, and to help tackle the effects of climate change are underway.

Scotland has a very low percentage of woodland cover compared with other countries in Europe, although it has increased over the last century. In 1900 only 5% of Scotland was covered in forest, but cover now totals around 18% (1.4 million ha) for woodland of all types. The vision of the Scottish Forestry Strategy is that, by the second half of the 21st century, woodlands will have expanded to around 25% of Scotland's land area with native tree species comprising about 35% of the total wooded area.

Scotland has developed an Ecosystem Health Indicator for connectivity (<https://www.environment.gov.scot/our-environment/state-of-the-environment/ecosystem-health-indicators/function-indicators/indicator-8-connectivity/#>). This habitat connectivity indicator measures 'functional connectivity'. This refers to how well species can move from one habitat patch to another based upon their dispersal abilities and the nature of the intervening land cover, often referred to as the landscape matrix. The original method was developed by Saura and Torné (2009). As well as a Scotland-wide figure, the indicator is broken down by the ten catchment basins, so that people can compare regions. By 2017, connectivity indicators had been published for four habitat classes: woodland, heathland, grassland and fen/marsh/swamp. These habitat classes follow the European standard EUNIS Classification system and draw on detailed terrestrial Habitat Map of Scotland (HabMoS) (<https://www.environment.gov.scot/our-environment/habitats-and-species/habitat-map-of-scotland/>).

Indicators used in this assessment

UK Biodiversity Indicator **C2: Habitat connectivity** <http://jncc.defra.gov.uk/page-6891>. Experimental Statistic.

Between 1985 and 1995, the average functional connectivity of UK butterfly species was relatively stable, the index fell to a low of 48% in 2004, and then rose. The level of functional connectivity in 2012 is 10% greater than the level in the start year of 1985 (Figure C2i).

Assessing trends for individual species, between 1985 and 2000, 62% of species declined in connectivity with only 3% showing significant increases (Figure C2ii). In the latter half of the time series between 2000 and 2012, most species increased in connectivity (72%) with only 19% of species declining. The long-term trend from 1985 to

2012 masks mixed, individual species trends, with 33% of species increasing in functional connectivity, 19% decreasing, and 48% showing no significant change.

Figure C2i: Change in functional connectivity, 1985 to 2012, using a 10-year moving window.

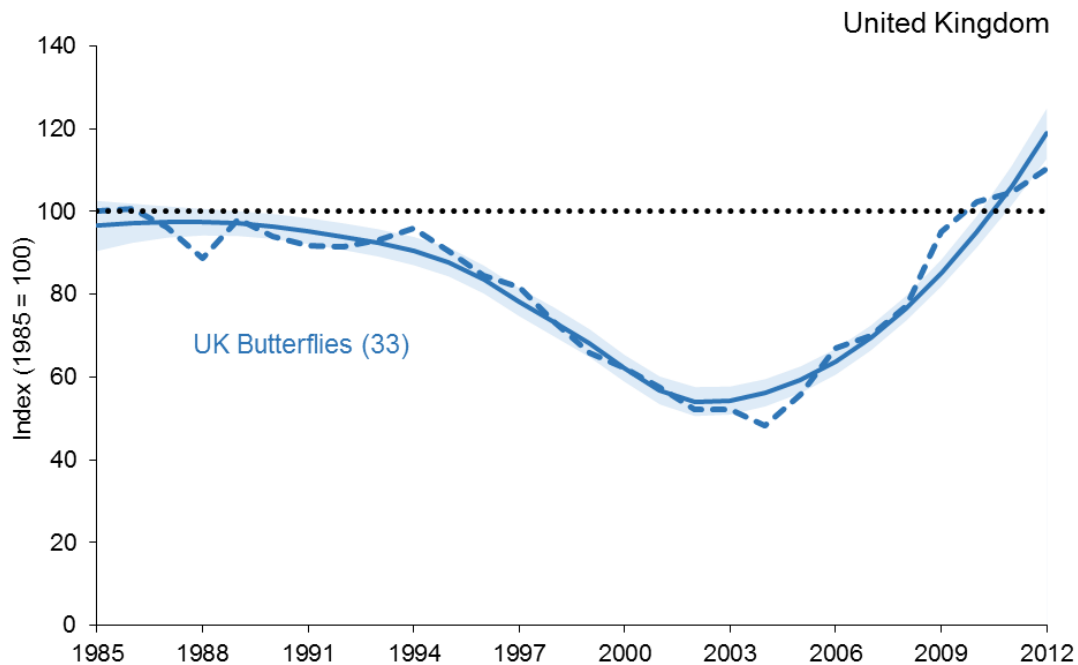
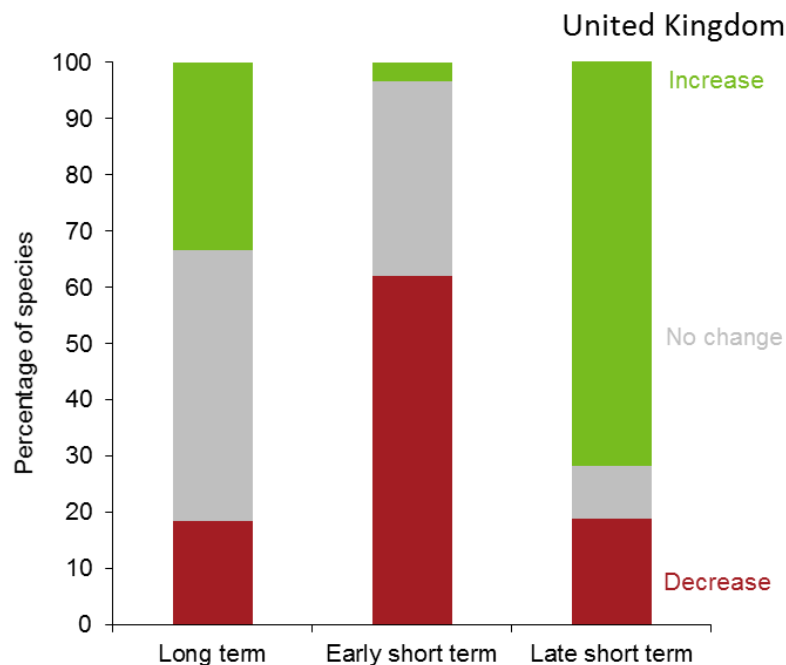


Figure C2ii: The percentage of species which have shown an increase, decrease or no change in functional connectivity over three time periods.



Notes:

1. The number of individual species included in each time period varies due to the availability of data: there were 27 species in the long-term period, 29 in the early short-

term period and 32 in the late short-term period. In all 33 species from three habitat types (woodland, grassland, and garden and hedgerows) are included in the indicator.

2. The connectivity index was calculated as the mean value of population synchrony using a 10-year moving window. The index values were extracted from a statistical (mixed effects) model which accounts for other factors known to influence population synchrony, therefore focusing the measure on functional connectivity.
3. The line graph (Figure C2i) shows the unsmoothed average trend (dashed line), and the smoothed average trend (using a LOESS regression function) (solid line) of functional connectivity over time across all 33 species. The shaded area represents the 95% confidence interval around the smoothed average trend.
4. The bar chart (Figure C2ii) shows the percentage of species within the indicator that have shown a statistically significant increase, statistically significant decrease, or no significant change in functional connectivity over three time periods (long term, 1985 to 2012; early short term, 1985 to 2000; and late short term, 2000 to 2012).

Source: UK Butterfly Monitoring Scheme.

UK Biodiversity Indicator **C3a: Status of UK habitats of European importance**

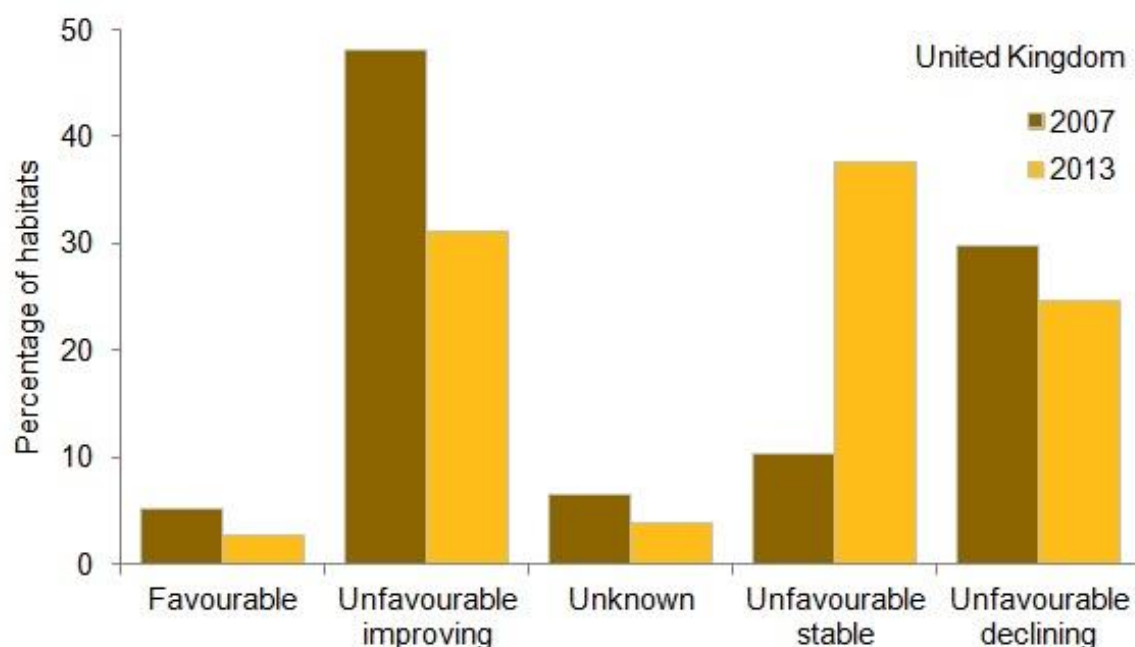
<http://jncc.defra.gov.uk/page-4239>.

In 2007, 5% of UK habitats listed on Annex I of the Habitats Directive were in favourable conservation status, decreasing to 3% in 2013.

The conservation status of 48% of habitats was unfavourable-improving in 2007, decreasing to 31% in 2013.

The conservation status of 30% of the habitats was unfavourable-declining in 2007, decreasing to 25% in 2013.

Figure C3ai. Percentage of UK habitats of European importance in improving or declining conservation status in 2007 and 2013.



Notes:

1. The chart is based on 77 habitats listed on Annex I of the Habitats Directive.
2. The aim of the Habitats Directive is to achieve favourable conservation status for the species and habitats listed in its Annexes. An assessment of status and trends for each

species and habitat is undertaken every 6 years. Trends in unfavourable conservation status allow identification of whether progress is being made, as it will take many years for some habitats and species to reach favourable conservation status.

Source: UK Habitats Directive (Article 17) reports 2007 and 2013.

The next assessment of conservation status of habitats of European importance will be published in 2019. Results are therefore not available in time for incorporation in this assessment.

Please describe any other tools or means used for assessing progress

UK Biodiversity Indicator **B1a: Area of land in agri-environment schemes**

<http://jncc.defra.gov.uk/page-4242>.

UK Biodiversity Indicator **B1b: Area of forestry land certified as sustainably managed**

<http://jncc.defra.gov.uk/page-4243>.

UK Biodiversity Indicator **B7: Surface water status** <http://jncc.defra.gov.uk/page-4250>.

UK Biodiversity Indicator **C1: Protected areas** <http://jncc.defra.gov.uk/page-4241>.

UK Biodiversity Indicator **C3b: Status of UK species of European importance**

<http://jncc.defra.gov.uk/page-6566>.

UK Biodiversity Indicator **C4a: Status of UK priority species - Relative abundance**

<http://jncc.defra.gov.uk/page-4238>.

UK Biodiversity Indicator **C4b: Status of UK priority species – Distribution**

<http://jncc.defra.gov.uk/page-6850>.

UK Biodiversity Indicator **C5: Birds of the wider countryside and at sea**

<http://jncc.defra.gov.uk/page-4235>.

UK Biodiversity Indicator **C6: Insects of the wider countryside (butterflies)**

<http://jncc.defra.gov.uk/page-4236>.

UK Biodiversity Indicator **C7: Plants of the wider countryside**

<http://jncc.defra.gov.uk/page-6886>.

UK Biodiversity Indicator **C8: Mammals of the wider countryside (bats)**

<http://jncc.defra.gov.uk/page-4271>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Nature Improvement Areas: Case Studies

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/487239/nia-case-studies.pdf.

Carey, P.D., Wallis, S., Chamberlain, P.M., Cooper, A., Emmett, B.A., Maskell, L.C., McCann, T., Murphy, J., Norton, L.R., Reynolds, B. and Scott, W.A., 2008. Countryside survey: UK results from 2007. Centre for Ecology & Hydrology.

Forestry Commission (2016) Preliminary estimates of the changes in canopy cover in British woodlands between 2006 and 2015. Available from: https://www.forestryresearch.gov.uk/documents/2716/Preliminary_estimatesofthechangesinacanopycoverinBritishwoodlandsbetween2006and2015.pdf.

OSPAR Intermediate Assessment 2017. Accessed from: <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/>.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:
<http://jncc.defra.gov.uk/page-1824>.
<http://jncc.defra.gov.uk/page-4229>.
<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity 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 impact on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
- ☐ On track to achieve target
- ☒ Progress towards target but at an insufficient rate
- ☐ No significant change
- ☐ Moving away from target
- ☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target requires *action* to ensure that fish stocks are harvested sustainably and threats to those stocks are addressed. Although the target also covers invertebrates and aquatic plants, the UK assessment is based solely on an assessment of the status of fish stock using information on progress towards achieving maximum sustainable yield (MSY).

The UK has made significant progress in introducing sustainable fisheries measures, including landing obligations, gear subsidies and incentives, accreditation schemes, and area-based management measures. UK fish stocks are now showing signs of recovery following their historic over-exploitation as the proportion of stocks fished at or below the level capable of producing MSY, and the proportion of stocks with biomass above the level capable of producing MSY, have increased significantly since 1990; both to around 50%. In addition, increases in the proportion of large fish in demersal fish populations have been recorded in UK regional seas.

Progress is assessed as insufficient because recovery of fish populations has not been consistent across all UK regional seas and ongoing action is required to ensure all stocks are fished at sustainable levels.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes examples of sustainable fishing initiatives that have been introduced in the UK and species-specific management to protect vulnerable fish stocks.

A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK initiatives

A range of sustainable fishing measures and incentives have been introduced in the UK including the following:

- *Landing obligation*: In 2014 the reformed Common Fisheries Policy brought in regulations (see https://ec.europa.eu/fisheries/cfp/fishing_rules/discards_en) to tackle discarding of unwanted catch. The obligation applies to commercial species, but has additional benefits to other bycaught species as the measures used to reduce unwanted catch also reduce bycatch, through improved targeting and selectivity.
- *Gear subsidies and incentives*: The reformed CFP, through the European Maritime and Fisheries Fund (EMFF) has made a commitment to support and invest in selective gears and fishing techniques which minimise unwanted catch, bycatch and environmental impact (see <https://www.gov.uk/government/publications/european-maritime-and-fisheries-fund-emff-implementation-reports>). This fund has also made commitments to tackle issues with Aquaculture and improve sustainability in this sector.
- *Marine Stewardship Council (MSC) certification for sustainable fisheries*: For further information on MCS certification please Target 3 in Section III of the report.
- *Fisheries management measures*: As of November 2018, 314 MPAs have been designated in the UK to protect threatened species and vulnerable ecosystems. Fisheries management measures have been developed or will be developed for each of these sites (where appropriate) to protect their features from the impacts of fishing. Additional area-based measures are also in place to manage fishing impacts to vulnerable stocks, such as the Scottish sandeel restriction (Article 1(10)), the herring restriction (Article 20) and the mackerel box (Article 22).

Country initiatives

Across the UK, sustainable management plans have been introduced to protect vulnerable fish stocks from over exploitation, such as the Atlantic salmon (*Salmo salar*) and European eel (*Anguilla anguilla*).

Atlantic salmon

Assessment of salmon stocks in Wales and England is undertaken annually at both the river stock level (the principal management unit) and the national level (Wales and England as one UK jurisdiction). These assessments evaluate stock status and the need for protective and remedial measures via fisheries regulation and environmental management. They operate at local, national and international levels – the latter through the work of International Council for the Exploration of the Seas (ICES) and North Atlantic Salmon Conservation Organisation (NASCO). The UK, as part of the EU, is a Contracting Party to NASCO and UK jurisdictions are involved in the work of both NASCO and ICES.

Assessments cover both adult and juvenile life-stages, utilising:

- direct and indirect estimates of adult return from traps, counters and catches in net and rod fisheries, and
- measures of juvenile abundance from electrofishing surveys.

Estimates of adult return are used to evaluate annual compliance with Conservation Limits set for individual river stocks on all principal salmon rivers (23 in Wales – including the cross-border rivers, and 40 in England). These assessments are required under Ministerial Direction (1998) and to meet international obligations.

Measures of juvenile abundance (fry and parr) are used to identify underperformance and environmental impacts at a site and sub-catchment level; this includes application to Water Framework Directive assessments of Water Body status.

National assessments indicate that numbers of salmon alive in the sea and destined to return to rivers in Wales and England (so called 'pre-fisheries abundance' or PFA) has declined by around 45% from the early 1970s to present. Similar declines are evident in salmon stocks across the North Atlantic and have been linked to reductions in survival at sea and adverse changes in the marine environment. The nature of these changes and their effects on sea survival are not fully understood and continue to be investigated. Particularly notable in recent years (~2010 onward) has been the sharp decline in numbers of 1-sea winter salmon returning to rivers in Wales and England (and other southern European rivers). The 1-sea winter component has dominated many river stocks in the last 30-40 years, and while there is evidence of a recent increase in the return of older (and larger) multi-sea winter salmon, in most cases this has not compensated for the loss in egg production.

In contrast to the long-term decline in PFA for salmon returning to rivers in Wales and England, estimates of numbers of fish surviving to spawn have been more stable as a result of marked reductions in levels of exploitation by homewater net and rod fisheries, including increasing use of angling catch-and-release (currently 83% across all rivers in Wales and England).

However, this national overview of spawning escapement masks the poor performance of many stocks at the river level where the latest (2017) assessment of Conservation Limit compliance indicates that 91% of river stocks in Wales and 79% in England are projected to be in the worst risk categories ('at risk' or 'probably at risk') in 2022. In response, additional fisheries regulatory measures have recently been proposed in both Wales and England – including mandatory catch-and-release on net and rod fisheries targeting the most depleted stocks (this includes all river stocks in Wales). These proposals are currently being considered by Ministers. Alongside tighter fishing controls, other measures are being progressed to improve environmental quality with the aim of seeking to maximise the production of juvenile salmon (ultimately outward migrating salmon smolts) from all river systems.

Starting in 2004 and running until mid-2008, with a budget of £3M, the Conservation of Atlantic Salmon in Scotland is the single most significant salmon conservation project ever undertaken in Scotland. The project is co-financed by the EU under the LIFE-Nature programme and includes partners from both the public (District Salmon Fisheries Boards, Fisheries Trusts, Scottish Natural Heritage, Scottish Executive, Forestry Commission, Crown Estate) and private sectors (Scottish Hydro Electric).

European eel

The European eel is distributed across the majority of coastal countries in Europe and North Africa and comprises a widely dispersed single stock which is genetically panmictic.

The quantity of glass eels arriving in continental waters declined dramatically in the early 1980s and has been very low in all years after 2000. The reasons for this decline are uncertain and vary with location but may include overexploitation, pollution, non-native parasites, diseases, migratory barriers and other habitat loss, mortality during passage through turbines or pumps, and/or oceanic-factors affecting migrations.

The latest assessments (e.g. based on annual fisheries returns, electrofishing and trap surveys) concludes that eel recruitment from the ocean remained low in 2017. Glass eel recruitment was only 1.6% of the 1960-1979 reference period in the North Sea and 8.7% for other locations in Europe. For yellow eel (the main 'in-river' stage), recruitment was 24% of the level during the reference period.

Exploitation of the stock is currently considered unsustainable. ICES have advised that all anthropogenic mortality (e.g. recreational and commercial fishing, hydropower, and pollution) affecting production and escapement of eels should be reduced to as close to zero as possible until there is clear evidence that both recruitment and the adult stock are increasing.

To address this, the EU have implemented Regulation (EC No. 1100/2007) for the recovery of the eel stock. This Regulation requires Member States to put in place approved Eel Management Plans (EMPs) and to monitor their implementation and outcomes. Eel has also been listed as critically endangered by IUCN and as an Annex II species under both the Convention on International Trade in Endangered Species (CITES), and the Convention on Migratory Species (CMS).

Eel Management Plans are submitted by EU Member States and their content and implementation are subject to scientific and technical scrutiny by ICES and the European Commission. Member States will next report progress with EMPs in 2018.

In the UK, EMPs (14 in total) are set at the River Basin District (RBD) level, as defined under the Water Framework Directive. EMPs for all RBDs can be found at <https://www.gov.uk/government/publications/2010-to-2015-government-policy-freshwater-fisheries/2010-to-2015-government-policy-freshwater-fisheries>. This includes EMPs for Wales and the border areas (Dee, West Wales and Severn). EMP actions implemented in England and Wales in the 2011-2013 period have delivered:

- 100% catch and release for eel by angling,
- Closed seasons for net and trap fishing for eel,
- Limits on the geographical extent of the eel fishery,
- Restrictions on eel fishing methods and gear,
- 328 new eel passes restoring access to over 4200ha of river habitat, and
- Continued progress in implementing the Eels (England & Wales) Regulations 2009 to install eel passes and screening to protect eel.

Indicators used in this assessment

UK Biodiversity Indicator **B2: Sustainable fisheries** <http://jncc.defra.gov.uk/page-4244>.

- a) Proportion of marine fish (quota) stocks of UK interest harvested sustainably
- b) Proportion of marine fish (quota) stocks of UK interest with biomass at levels that maintain full reproductive capacity

Changes have been made to the indicator since the previous publication; using quota-fish assessments for UK good environmental status (GES) developed to meet the needs of the Marine Strategy Framework Directive (MSFD). Data have been updated to 2015 for fishing pressure and to 2016 for spawning stock biomass. The maximum sustainable yield (MSY) for a given fish stock means the highest possible annual catch that can be sustained over time, by keeping the stock at the level producing maximum growth.

The percentage of fish stocks (including *Nephrops*) fished at or below levels capable of producing maximum sustainable yield (F_{MSY}) has increased from 12% in 1990 to 53% in 2015. To maintain the reproductive capacity of stocks, each stock's spawning biomass (SSB) should be at or above the level capable of producing maximum sustainable yield (i.e. $MSY B_{trigger}$). The proportion of stocks subject to quota management and achieving this goal increased from 28% in 1990 to 56% in 2016. In the final year (2016) there was a slight (3%) decrease in the proportion of stocks with $SSB > MSY B_{trigger}$ due to data availability and consequently more stocks classified as "unknown". Overall a positive trend towards a greater proportion of stocks fished sustainably is evident in both long and short term. There is also a positive trend for fish within safe biological limits in the long term, and no change in the short term.

Figure B2a. Proportion of marine fish (quota) stocks of UK interest harvested sustainably, 1990 to 2015.

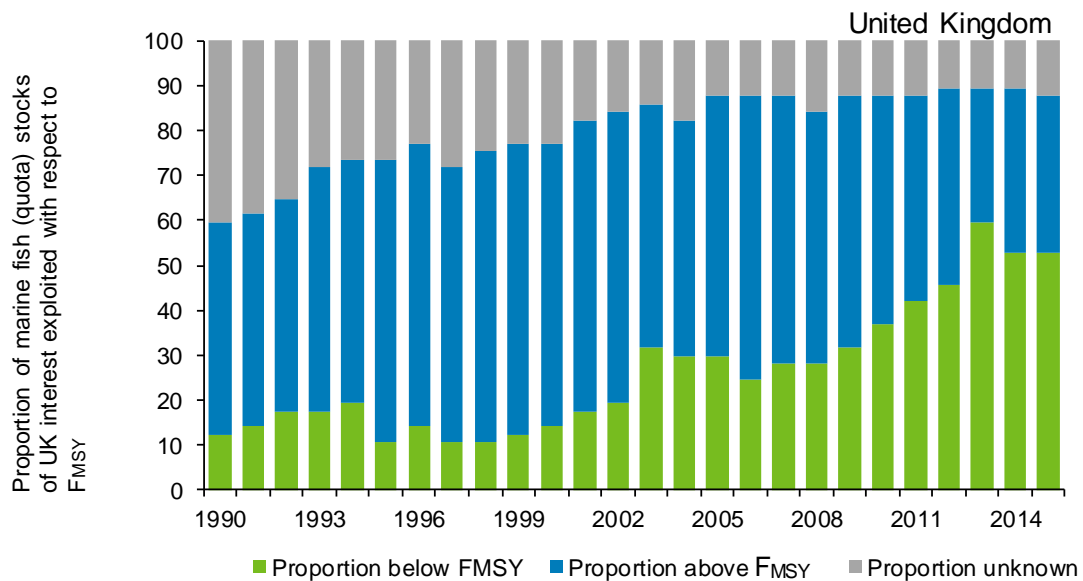
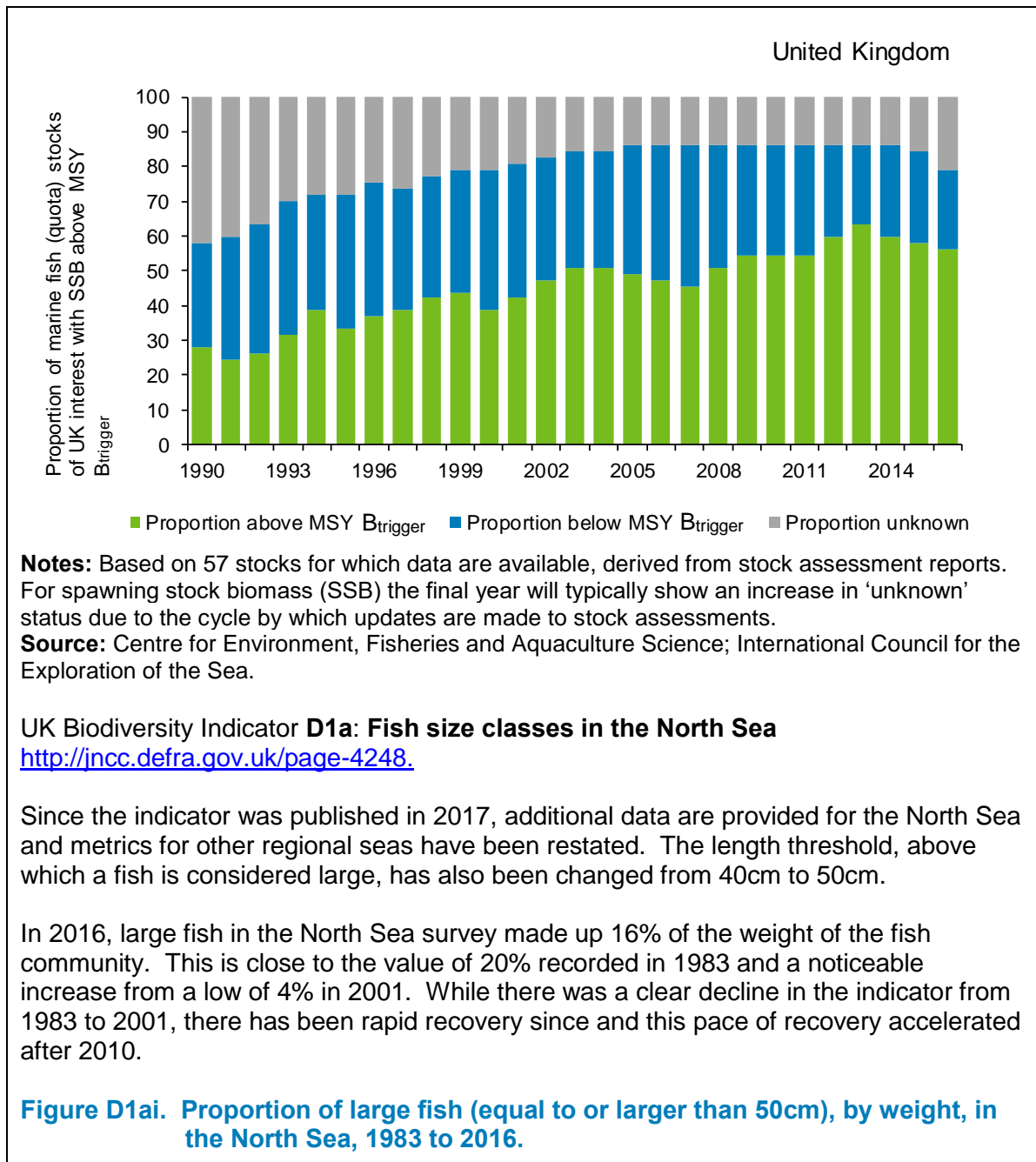
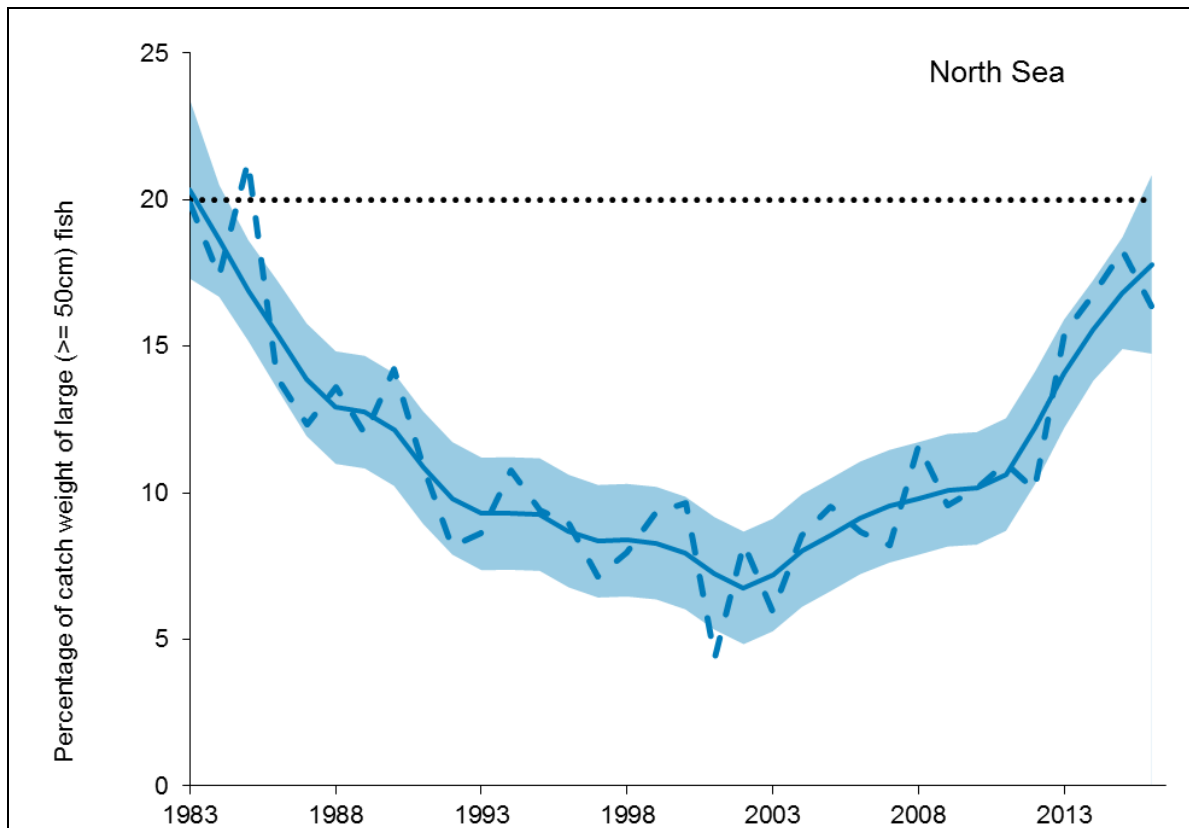


Figure B2b. Proportion of marine fish (quota) stocks of UK interest with biomass at levels that maintain full reproductive capacity, 1990 to 2016.





Notes: The line graph shows the unsmoothed trend (dashed line) and a LOESS smoothed trend (solid line) with the shaded area showing the 95 per cent confidence intervals around the smoothed trend. The horizontal dashed line shows the assessment threshold.

Source: Centre for Environment, Fisheries and Aquaculture Science; Marine Scotland.

OSPAR Intermediate Assessment 2017

The OSPAR Convention regulates international cooperation on environmental protection in the North-East Atlantic. OSPAR's Intermediate Assessment (IA) 2017 develops the current understanding of the North-East Atlantic's marine environment, ultimately assessing progress towards its vision of a clean, healthy and biologically diverse North-East Atlantic, used sustainably. The IA 2017 assesses a number of indicators relevant to sustainable fisheries which are presented below:

- Recovery in the population abundance of sensitive fish species**
When considering OSPAR regions individually, evidence of recovery was compelling in the Celtic Seas, but in the Greater North Sea the number of sensitive species increasing in abundance was insufficient to meet the assessment value.
- Proportion of large fish (Large Fish Index - LFI)**
The recovery in the proportion of large fish in the demersal fish community reported in the Greater North Sea in Quality Status Report (QSR) 2010 has continued in the period to 2015.
Recovery is also evident in the northern part of the Celtic Seas. Elsewhere assessment values could be achieved by 2022 if the current pressure levels are not increased. Exceptions were observed, notably in the south and west of the Celtic Seas region, where evidence of recovery is lacking, or the recovery rate was so low that it could take more than a decade before demersal fish size

composition achieves the assessment value, unless current levels of pressure are reduced.

- *Size composition in fish Communities (Mean Maximum Length – MML, Typical Length - TyL)*

Long-term decreases in Typical Length, between the 1980s and 2000s in the Greater North Sea and from the 1990s to 2005 in the Celtic Seas, imply that the size structure of fish communities deteriorated such that communities are now more dominated by small-bodied fish. In the Wider Atlantic an overall increase has been observed since 2010.

However, while the indicator in demersal fish assemblages is often still at a relatively low value, recovery since 2010 appears to be underway in the Typical Length of demersal fish and elasmobranchs in the Greater North Sea and Celtic Seas, overall or at least in some sub-divisions. The pelagic fish assemblage shows no long-term change in much of the OSPAR Maritime Area.

Please describe any other tools or means used for assessing progress

UK Biodiversity Indicator **C1: Protected areas** <http://jncc.defra.gov.uk/page-4241>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Cefas, Environment Agency and Natural Resources Wales. 2018. Assessment of Salmon Stocks and Fisheries in England and Wales, 2017. Accessed from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/709614/SalmonAssessmentReport-2017-final.pdf.

Marine Stewardship Council (2018) List of UK MSC certified fisheries [viewed on 02/08/2018]. Accessed from: https://fisheries.msc.org/en/fisheries/@_@search?q=UK&start=0&stop=10&_start=fishery_name%3Asequence&_end=fishery_name%3Asequence&_start=species%3Asequence&_end=species%3Asequence&_start=gear_types%3Asequence&_end=gear_types%3Asequence&_start=locations%3Asequence&_end=locations%3Asequence&_start=status%3Asequence&status=certified&status=certified+with+component%28s%29+in+assessment&_end=status%3Asequence.

North Atlantic Salmon Conservation Organisation (NASCO). 2017. Annual Progress Report on Actions taken [for Atlantic salmon] under the Implementation Plan for the Calendar Year 2016, EU-UK (England and Wales). Accessed from: http://www.nasco.int/pdf/2017%20papers/APRs/CNL_17_31rev_APR_EU_UK_EnglandWales.pdf.

ICES. 2018. Outputs from the ICES Working Group on eel (WGEEL) (viewed on 27/06/2018). Accessed from: <http://www.ices.dk/community/groups/Pages/WGEEL.aspx>.

OSPAR Intermediate Assessment 2017. Accessed from: <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/>.

Level of confidence of the above assessment

☐ Based on comprehensive evidence

- ☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity Target 7



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

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target requires management measures to be in place, and the assessment has interpreted 'ensuring conservation of biodiversity' by examining whether typical species populations associated with agricultural ecosystems, aquaculture and forestry are stable or increasing.

Progress has been made in regulation and incentives to improve the sustainability of agriculture, aquaculture and forestry in the UK. Monitoring, particularly of our agri-environment incentives has demonstrated a significant positive impact on biodiversity, particularly where they are targeted to areas of high existing value or potential, although such positive impacts are often localised. There has been a steady increase over the last 20 years both in the area of land in higher-level or targeted agri-environment agreements in the UK and in the proportion of woodland certified as being sustainably managed. The former, however, has started to fall in the last few years and the latter has been broadly stable at around 43% since 2010. Furthermore whilst indices of abundance for woodland birds show some stabilisation in recent years; and despite some targeted recovery for some farmland bird species the overall farmland bird index has continued to decline. Aquaculture in the UK is dominated by Scottish salmon production. The industry is strongly regulated, and plans are in place to manage potential issues such as sea lice, and to ensure the sustainability of the fishery.

Progress is assessed as insufficient due to recent falls in the area under targeted agri-environment schemes, and the continued decline of the farmland birds index.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Agriculture, aquaculture and forestry policy is a devolved responsibility in the UK. Evidence is therefore provided for each UK country under the appropriate sector. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes information on agri-environment schemes, aquaculture, and the extent of sustainable forestry. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

Agriculture

Agri-Environment Schemes

The United Kingdom was one of the first Member States of the European Union to introduce Agri-Environment Schemes (AES): Environmentally Sensitive Areas (ESA) in the UK; Countryside Stewardship (CS) in England; Tir Cymen (which became Tir Gofal) in Wales; Scottish Rural Development Programme (SRDP) in Scotland; and the Environmental Farming Scheme (EFS) in Northern Ireland.

There are two main types of agri-environment scheme in the UK:

- Entry-level type, have a simple set of prescriptions providing basic environmental protection and enhancement, where the whole farm area may contribute to the indicator.

- Higher-level or targeted schemes that protect or restore land, focusing on parts of the farm or land-holding that are of high environmental/biodiversity value or potential.

Since the mid-1990s there has been a steady increase in UK land under agri-environment scheme management 2012 (UK Biodiversity Indicator B1a). In 1992, there were 0.3 million hectares of land in the UK in higher-level agreements or targeted schemes, and by 2017 this had risen to just over 2.8 million hectares. During this period some of the original schemes closed to new applicants. The area of land covered by higher-level schemes fluctuates between years as a result of changes to schemes: expiry of agreements and uptake of new ones; and amendments to existing agreements or land transferring from one farmer to another. However, the total in 2017 of just over 2.8 million hectares is 16% lower than the extent of 3.4 million hectares in 2012. The higher-level scheme measure is therefore assessed as increasing in the long term, since 1992, but decreasing in the shorter term, between 2012 and 2017. The short-term decline is largely driven by scheme changes in Scotland and Northern Ireland. In 2017 farms with higher-level or targeted agri-environment agreements accounted for: 16% of area on agricultural holdings in England; 21% in Wales; 17% in Scotland; and 5% in Northern Ireland.

Entry-level schemes were introduced as a pilot in England in 2003, with 0.03 million hectares under agreement, and then rolled out in 2005. Similar entry-type schemes were also introduced in 2005 in Scotland, and in Wales (as Tir Cynnal), and the area in these whole-farm agreements rose rapidly to 7.4 million hectares in 2013, however decreased to 3.3 million hectares in 2017. The measure of entry-level schemes has been moved to the background in the 2018 UK Biodiversity Indicators publication as Environmental Stewardship in England closed to new agreements in 2014 and ELS only agreements have started to expire (existing agreements will continue to be honoured until their expiry date). In 2017, the total area of land in entry-level type schemes in England, Scotland and Wales was 3.3 million hectares: 2.8 million hectares in England; 0.5 million hectares in Wales; and 0.03 million hectares in Scotland. In 2017 farms with entry-level agri-environment agreements accounted for 31% of area on agricultural holdings in England; 27% in Wales; and 1% in Scotland.

Higher level agreements may be underpinned by an entry level scheme; therefore the areas of land in higher-level and entry-level schemes cannot be added to provide a grand total.

A case study on *Implementing Agri-Environment Schemes in reversing declines in farmland bird populations in England* can be found in Section II of the report. Further information on Agri-Environment Schemes in each UK country can be found below.

England

In England, Environmental Stewardship closed to new applicants in December 2014 and was replaced by a new agri-environment scheme, CS, for which agreements started in January 2016. Existing Higher Level and Entry Level agreements will continue until they expire. HLS agreements will continue, with the last agreements expiring in 2024. CS provides financial incentives for land managers to look after their environment through activities such as conserving and restoring wildlife habitats. It also provides incentives for:

- flood risk management,
- woodland creation and management,

- reducing widespread water pollution from agriculture,
- keeping the character of the countryside,
- preserving features important to the history of the rural landscape, and
- encouraging educational access.

The scheme is open to all eligible farmers, woodland owners, foresters and other land managers; and is suitable for many types of land use, for example conventional and organic farmland, coastal areas, uplands and woodlands. It is a competitive scheme and applications are scored against local priority targets to maximise environmental benefit. A new environmental land management system will be the cornerstone of England's agricultural policy after the UK leaves the European Union. The new system will reward farmers and land managers for delivering environmental outcomes such as the protection of habitats which will support our biodiversity goals.

Scotland

In Scotland, schemes are designed to encourage farmers, crofters and common grazing committees to adopt environmentally friendly practices and to maintain and enhance particular habitats and landscape features. The Land Management Contract Menu Scheme was introduced as an entry-level scheme under which land managers chose from a menu of options to put together a package for their farm. With the introduction of the Scotland Rural Development Programme (2007–2013), this became Rural Development Contracts (RDC) – Land Managers Options, sitting alongside RDC – Rural Priorities. They provide contracts between land managers and the government to implement measures designed to deliver environmental, social and economic benefits from farming and crofting. This has been succeeded by SRDP (2014-2020). After extensive negotiations the SRDP 2014 - 2020 was formally approved by the European Commission on 26 May 2015. The key purpose of the SRDP (2014-2020) is to help to achieve sustainable economic growth in Scotland's rural areas and the priorities remains broadly the same as the previous programme.

SRDP (2014-2020) is subject to a thorough monitoring and evaluation programme. As part of the measures of support for SRDP, Cross Compliance is a mandatory set of requirements and standards that land managers have to meet in order to receive support payments. With the reforms to the Common Agricultural Policy (CAP), all areas under receipt of payments have to meet mandatory criteria to ensure good agricultural and environmental condition (GAEC) is being maintained. However, positive and direct payment for agri-environment activity is a limited element within overall farm support.

Although the GAEC criteria should ensure no adverse impacts, particularly for soils, habitats and landscape features on agricultural land, there are anomalies in the current system of funding. To claim funding for any farm, land managers are required to submit details of their land that is eligible for funding. Exclusions exist within this for some natural habitats such as marsh, rocks and scree, gorse, and bracken. As a result of these exclusions, areas of natural habitat supporting biodiversity may be at risk of loss.

Wales

In Wales, the Welsh Government introduced an entry-level agri-environment scheme known as Tir Cynnal in 2005. Tir Cynnal supplemented Tir Gofal, a higher-level agri-environment scheme which had been available throughout Wales since April 1999. Tir Gofal aimed to encourage agricultural practices which protect and enhance the landscapes of Wales, their cultural features and associated wildlife, and replaced the

previous Environmentally Sensitive Areas and Tir Cymen schemes. A new sustainable land management scheme, Glastir, was introduced in 2012 which replaces five existing agri-environment schemes; Tir Cynnal, Tir Gofal, Tir Mynydd, the Organic Farming Scheme/Organic Farming Conversion Scheme, and Better Woodland for Wales. The scheme has an entry-level component – Glastir Entry (previously the All Wales Element) – and a higher-level component – Glastir Advanced (previously the Targeted Element). The first agreements for the entry-level components commenced on 1 January 2012; the first higher-level scheme agreements began on 1 January 2013. In addition, there is a component specifically for common land, Glastir Commons. However, this is not included in the UK Biodiversity Indicator B1a. In 2017 Glastir Commons covered 120,000 hectares, an increase from 119,000 hectares in 2016. In 2017, Glastir Small Grants (GSG) was introduced. GSG is a capital works-only scheme, which addresses one of three themes in each round, namely Carbon, Water and Landscape & Pollinators. Selected applicants are spatially targeted where they can deliver the greatest outcomes for the given theme.

Northern Ireland

In Northern Ireland, the Countryside Management Scheme closed to new applicants in 2013 although a small number of agreements commenced on 1 January 2013, resulting from applications made prior to 2013. All agreements in the Environmentally Sensitive Areas Scheme expired in 2016. As a result, the area under agri-environment schemes has declined since 2013 due to agreements ending. A new Environmental Farming Scheme was launched in 2017; existing agreements in closed schemes continue to be honoured until they expire.

In Northern Ireland Tranche 1 of the EFS opened in 2017. It has three levels:

- A Wider Level to deliver benefits across the countryside outside of environmentally designated areas;
- A Higher Level, primarily for environmentally designated sites;
- A Group Level to support co-operative action by farmers in specific areas such as priority habitats or river catchments.

1,103 Wider Level agreements and 232 Higher Level agreements are currently in place. Five Group Level Pilot Projects are being progressed.

Tranche 2 of Higher Level opened and closed in early 2018. Tranche 2 of Wider Level is planned to open in August 2018. A third application Tranche is envisaged in 2019 for both Higher and Wider levels.

Forestry

The UK Forestry Standard

The UK Forestry Standard (UKFS) (Forestry Commission 2017) was introduced in 2017 and is the reference standard for sustainable forest management in the UK. It outlines the context for forestry, sets out the approach of the UK governments to sustainable forest management, defines standards and requirements, and provides a basis for regulation and monitoring – including national and international reporting. Guidelines on how to meet the UKFS requirements are set out in sub-sections covering Biodiversity, Climate Change, Historic Environment, Landscape, People, Soil and Water.

The UKFS applies to England, Scotland, Wales and Northern Ireland. It applies to all woodland, irrespective of who owns or manages it. The Standard ensures that

international agreements and conventions on areas such as sustainable forest management, climate change, biodiversity and the protection of water resources are robustly applied here in the UK.

Welsh Government Woodland Estate

Approximately 16,309 hectares (13%) of the Welsh Government's Woodland Estate (WGWE) is classified as 'high conservation value forest' which means it is managed primarily for conservation objectives. This includes forest areas designated as SSSIs, SACs and SPAs, and also Ancient Semi Natural Woodland (ASNW), Semi Natural Woodlands (SNW), Plantation on Ancient Woodland Site (PAWS) or Nature Reserves (NRs). In support of their Woodlands for Wales strategy, and in accordance with the UK Forestry Standard, The Welsh Government have various programmes in place to manage these areas of the WGWE, to conserve and enhance their biodiversity and improve their ecological resilience, including:

- The prioritised restoration of PAWS to a more natural state, gradually removing the conifers and allowing them to return to predominantly broadleaves, supporting relict indigenous flora and fauna that still survive. A good example of this is the work in Wentwood forest near Newport which has just been accredited under The Queen's Commonwealth Canopy initiative.
- Targeted management interventions to proactively target biodiversity conservation. For example, in Clocaenog forest, the Welsh Government manage the forest in partnership with others to support the ongoing conservation of red squirrel, the small pearl-bordered fritillary butterfly and black grouse. In Coed y Brenin, the Government has undertaken habitat improvement work as part of the Pearls in Peril project to safeguard the future of freshwater pearl mussels which are found within the Afon Eden SAC.
- The removal of invasive non-native species including rhododendron and western hemlock. For example, in Cwm Clettwr forest, we have removed over 20 hectares of western hemlock since the late 1990's. Cwm Clettwr is part of a network of ancient woodland site restoration work in the Dyfi Valley. Initially there was some replanting with locally sourced and grown native trees to help maintain woodland soil condition, but thereafter natural regeneration has occurred there.

Aquaculture

Aquaculture policy is fully devolved within the UK. Each Fisheries Administration operates comprehensive regulatory frameworks which provide a balance between aquaculture growth and protection of the environment, driven and supported by specific policies/targets and dominated by differing species and production systems.

Total UK production of finfish and shellfish is around 200,000 tonnes which is dominated by Scottish salmon production. In England aquaculture is mostly made up of small and medium enterprises and micro-businesses, producing just under 5,000 tonnes of trout, 1,000 tonnes of mussels and 1,000 tonnes of oysters or around 12% of total UK shellfish production; and around 3% of the total UK finfish production,

The UK approach to managing sustainable aquaculture is set out its Multi-Annual National Plan.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/480928/sustainable-aquaculture-manp-uk-2015.pdf.

The UK Government have further focused on support for aquaculture enterprises which are innovative, environmentally sustainable and socially responsible through the European

Maritime and Fisheries Fund (EMFF). Approximately £6.7m aquaculture ventures meeting these criteria had been approved for EMFF funding by the end of 2017.

England

Following the publication of the 2011 Marine Policy Statement the Marine Management Organisation have produced a suite of marine plans covering England's marine area. Each adopted and draft plan translates the broad aquaculture policies contained in the Marine Policy Statement into more detailed, regionally-specific policies. Included in each plan are policies which support sustainable aquaculture growth and help to mitigate against conflicts that may arise due to the existence of finite space within that marine plan area. This does not remove the need for the appropriate licences and environmental assessments but any such licences/assessments are required to have regard to the aquaculture policies within the relevant marine plan.

The regulatory framework which applies to aquaculture operations in England endeavours to provide a balance between aquaculture growth and protection of the environment. New applications for aquaculture businesses are screened by the relevant regulators to see if any form of environmental assessment is required (e.g. EIA or HRA) and regulators follow a strict regulators code with the aim to ensure that businesses are not unnecessarily burdened and growth is not impeded whilst consulting each other to ensure consistency of approach. To clarify this regulatory framework for new businesses and help ensure compliance Cefas have produced a Regulatory Toolbox for both new operators and regulators. The Toolbox has been made available on the Seafish website: <http://www.seafish.org/industry-support/aquaculture/aquaculture-regulatory-toolbox-for-england>. Discharge and abstraction consenting for aquaculture is controlled by the Environment agency.

With aquaculture as a key pillar, the Seafood 2040 Strategy, developed by a broad range of stakeholders, sets out an 'all sector-roadmap' to a thriving seafood industry within England. The Strategy calls for the formation of an Industry-led Aquaculture Leadership Group to drive sustainable growth with the key task of creating an English Aquaculture Growth Strategy. This group was formed in 2018. Its first meeting is expected to be in early 2019.

A number of research programmes continue to support the sustainable growth of the aquaculture industry. Cefas & Exeter University have set up a collaborative centre - Sustainable Aquaculture Futures (SAF) with an aim of providing cutting edge research, and the translation of this research into practical solutions, to address challenges faced by the industry in the UK and globally: <https://www.exeter.ac.uk/saf/>. Innovate UK have funded a range of aquaculture projects that seek to innovate and develop sustainable aquaculture systems that produce food in novel increasingly sustainable ways.

Private shellfisheries have formed part of England's coastal production of commercial shellfish species for centuries. The purpose for granting these fisheries has always been to support the long-term and sustainable harvesting of food species, and the long-standing process of granting Regulating Orders continues to support these aims into the 21st Century. Examples of effective, and sustainable fisheries for wild shellfish can be found in the Wash, The Thames, The Fal, and The Blackwater in England.

Scotland

A report by Marine Scotland highlighted the benefits of aquaculture to Scotland (Alexander *et al.* 2014). The report discussed the impacts of aquaculture production on

the seabed and disease levels, and also considered climate and carbon footprint measures. Salmon farming requires harvest of some lower trophic level fish from various parts of the world to manufacture aquafeeds, however, the composition of salmon feed today is dominated by protein and oil from plants rather than fishmeal and fish oil from forage fisheries. Work is ongoing to ensure the sustainable management of these fisheries, including the Peruvian anchoveta (Shepard *et al.* 2015).

Scotland's National Marine Plan (NMP) (<http://www.gov.scot/Publications/2015/03/6517>) lays out Scotland's objectives and policies for aquaculture. The NMP details industry targets to grow marine finfish and farmed shellfish by 2020 with due regard to the marine environment. Alongside existing regulatory controls including Environmental Impact Assessment, the NMP provides a framework which aims to minimise and mitigate the environmental impacts of developments through, among other things, appropriate siting of farms in relation to protected species and wider biodiversity interests.

Scotland has a legislative and regulatory framework in place that seeks to balance aquaculture growth and protecting the environment on which the sector depends. Marine and freshwater fish farms (both shellfish and fin fish) are authorised by local authorities who will give regard to the National Marine Plan (NMP) when considering applications. Prior to determining an application, the local authority will conduct a detailed assessment of the potential impacts of the proposal on the environment, including marine protected areas, and will seek advice from statutory consultees (including SEPA, SNH, the local district salmon fishery board and Marine Scotland). Operation of marine cage fish farms, in respect of emissions and the use of fish farm medicines is regulated through licences issued and enforced by SEPA.

In May 2018, the Scottish Government published the '10 Year Farmed Fish Health Framework' (<https://beta.gov.scot/publications/scotlands-10-year-farmed-fish-health-framework/documents/00535697.pdf?inline=true>). Developed by the aquaculture sector and Scottish Government and its agencies, it includes measures to improve fish health, protect the marine environment, and ensure Scotland's number one food export grows sustainably. The strategic plan outlines several key areas of activity, including managing sea lice, ensuring better information flow and transparency, and tackling issues around climate change.

Sustainability certification schemes

A range of agricultural, aquaculture and forestry certification schemes exist in the UK to help promote sustainable practices, including: The Forest Stewardship Council (FSC), Programme for the Endorsement of Forest Certification (PEFC), Aquaculture Sustainability Council (ASC), Soil Association and Marine Stewardship Council's (MSC) certification schemes. Further information is provided in Target 3's assessment in Section III of the report.

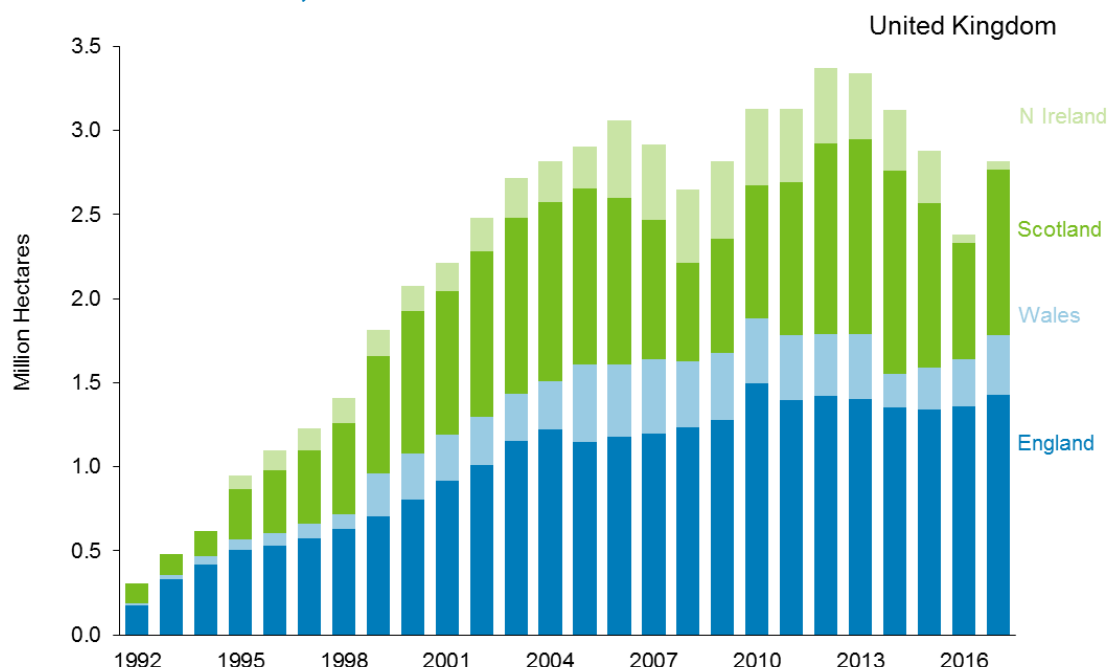
Indicators used in this assessment

UK Biodiversity Indicator **B1a: Area of land in agri-environment schemes**
<http://jncc.defra.gov.uk/page-4242>.

In 2017, the total area of land in higher-level or targeted agri-environment agreements in the UK was 2.8 million hectares: 1.4 million hectares in England; 0.4 million hectares in Wales; just under 1.0 million hectares in Scotland; and 0.1 million hectares in Northern Ireland.

Fluctuations in areas of land under agri-environment agreements over time can occur as a result of the introduction of new schemes and the ending of previous scheme agreements. Existing agreements will continue until they expire.

Figure B1ai. Area of land covered by higher-level or targeted agri-environment schemes, 1992 to 2017.



Notes:

1. The following schemes have been included as higher-level or targeted agri-environment schemes:

England: Environmentally Sensitive Areas (ESA), Countryside Stewardship, Higher Level Stewardship (which includes ELS linked to HLS) and from 2016 new Countryside Stewardship (Higher Tier and Mid Tier). England Mid Tier and Higher Tier schemes of the new Countryside Stewardship both contribute to B1ai.

Scotland: ESA, Countryside Premium, and Rural Stewardship, Rural Priorities, and from 2016 Agri-Environment Climate Scheme.

Wales: ESA, Tir Cymen, Tir Gofal, Glastir Advanced and Decoupled Advanced (from 2016).

N Ireland: ESA, Countryside Management, and Environmental Farming Scheme (from 2017).

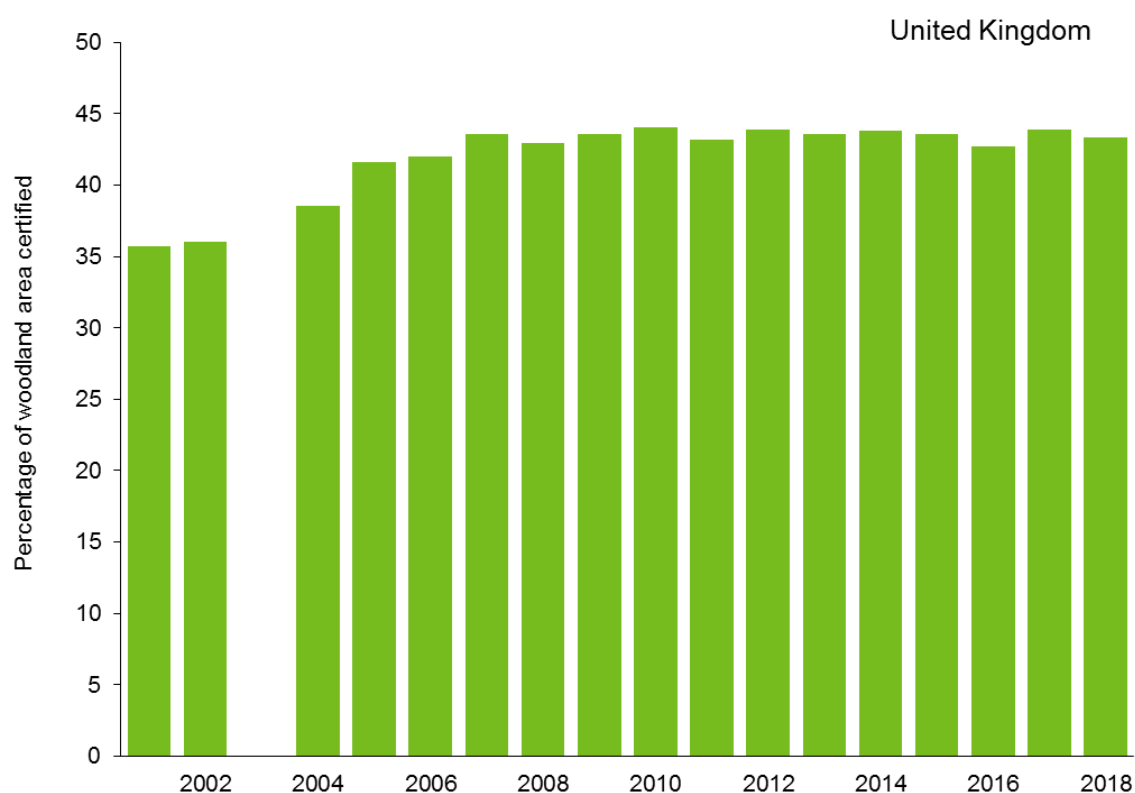
2. Higher level schemes have stricter criteria for qualification than other agri-environment schemes.

Source: Department of Agriculture, Environment and Rural Affairs - Northern Ireland, Defra, Natural England, Scottish Government, Welsh Government

UK Biodiversity Indicator **B1b: Area of forestry land certified as sustainably managed**
<http://jncc.defra.gov.uk/page-4243>.

In March 2018, there were 1.38 million hectares of certified woodland across the UK, representing 43% of the total woodland area. The proportion of woodland certified as sustainably managed has remained stable at either 43% or 44% since 2007.

Figure B1bi. Percentage of woodland area certified as sustainably managed, 2001 to 2018.



Notes: All figures relate to data at 31 March, apart from 2001 (31 December) and 2002 (30 September).

Source: Forestry Commission.

UK Biodiversity Indicator C5: Birds of the wider countryside and at sea

<http://jncc.defra.gov.uk/page-4235>.

- a. Farmland birds
- b. Woodland birds

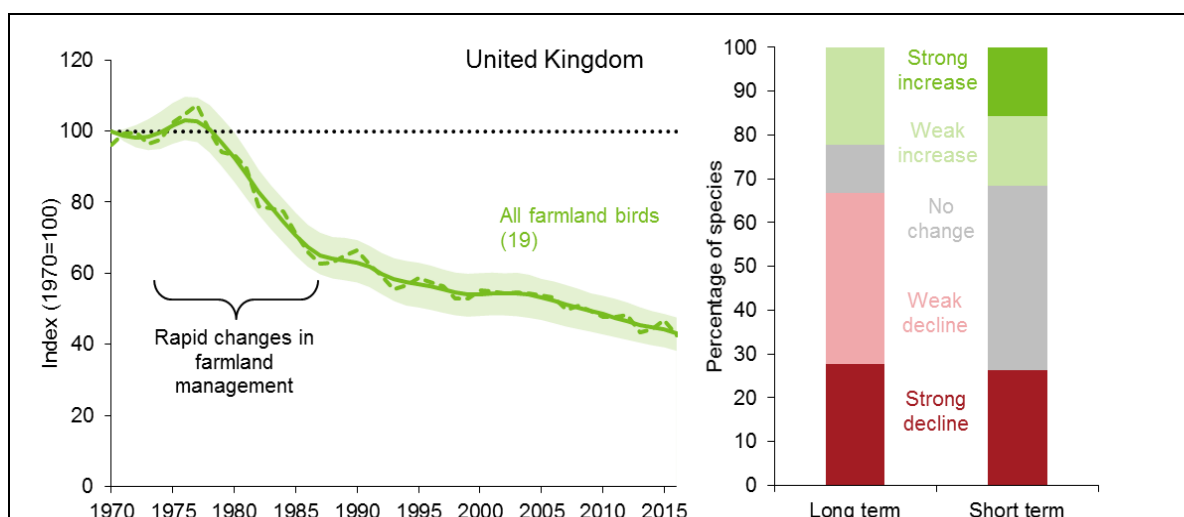


In 2016 the farmland bird index was less than half its 1970 value. Short term, between 2010 and 2015, the smoothed index decreased by 9%.



The woodland bird index was 23% less than its 1970 value in 2016. Short term, between 2010 and 2015, the smoothed index showed no significant change.

Figure C5ai. Breeding farmland birds in the UK, 1970 to 2016.

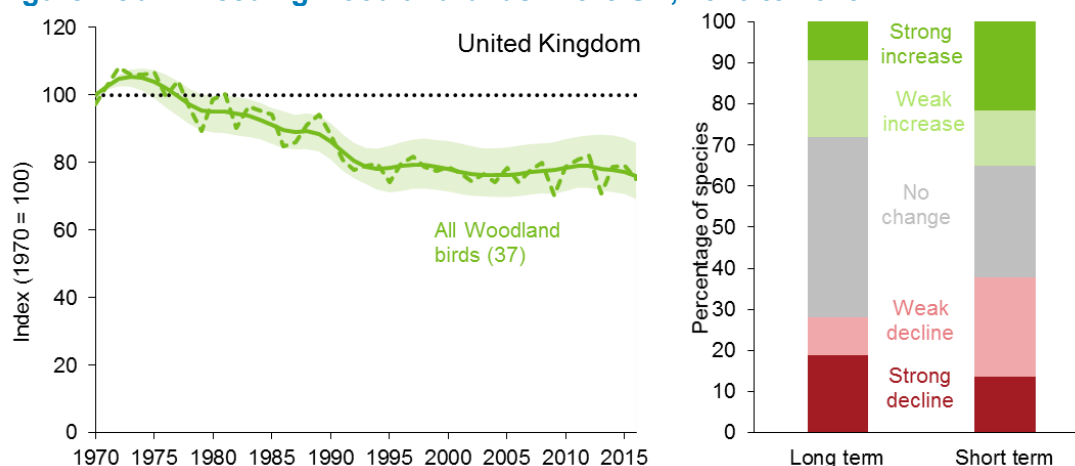


Notes:

1. The figure in brackets shows the number of species.
2. The line graph shows the unsmoothed trend (dashed line) and smoothed trend (solid line) with its 95% confidence intervals.
3. The bar chart shows the percentage of species within the indicator that have increased, decreased, or shown no change, based on set thresholds of annual change.

Source: British Trust for Ornithology, Defra, Joint Nature Conservation Committee, Royal Society for the Protection of Birds.

Figure C5bi. Breeding woodland birds in the UK, 1970 to 2016.



Notes:

1. The figure in brackets shows the number of species.
2. The line graph shows the unsmoothed trend (dashed line) and smoothed trend (solid line) with its 95% confidence intervals.
3. The bar chart shows the percentage of species within the indicator that have increased, decreased, or shown no change, based on set thresholds of annual change.

Source: British Trust for Ornithology, Defra, Joint Nature Conservation Committee, Royal Society for the Protection of Birds.

Please describe any other tools or means used for assessing progress

UK Biodiversity Indicator **B2: Sustainable fisheries** <http://jncc.defra.gov.uk/page-4244>.

UK Biodiversity Indicator **C2: Habitat connectivity** <http://jncc.defra.gov.uk/page-6891>.

UK Biodiversity Indicator **C7: Plants of the wider countryside**

<http://jncc.defra.gov.uk/page-6886>.

UK Biodiversity Indicator **D1b: Removal of greenhouse gases by UK forests**

<http://jncc.defra.gov.uk/page-6058>.

UK Biodiversity Indicator **D1c: Status of pollinating insects**

<http://jncc.defra.gov.uk/page-6851>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Forestry Commission (2017) The UK Forestry Standard. Forestry Commission, Edinburgh. Available from:

[https://www.forestry.gov.uk/pdf/FCFC001.pdf/\\$FILE/FCFC001.pdf](https://www.forestry.gov.uk/pdf/FCFC001.pdf/$FILE/FCFC001.pdf)

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity Target 8



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

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
- ☐ On track to achieve target
- ☒ Progress towards target but at an insufficient rate
- ☐ No significant change
- ☐ Moving away from target
- ☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

The target requires *action* to reduce pollution from all sources, with a particular focus on nutrient run-off and deposition from the atmosphere. The assessment considers both the trajectory of pollution levels and the distance from levels where they are considered not detrimental using standards applied in the UK.

The UK has made progress in reducing levels of air, water and marine pollution, these include long-term reductions in air pollutants that, in turn, have led to a decline in the area of sensitive habitats being harmed by acidification, and long-term reductions in hazardous materials in the marine environment, supported by recent initiatives to tackle plastic waste.

However, progress is assessed as insufficient because specific some sources of pollution remain above target levels. Approximately 78,000km² of UK terrestrial habitats is sensitive to acid deposition. About 73,000km² is sensitive to eutrophication; much of this is sensitive to both. The area of sensitive habitat exceeding critical loads for eutrophication (a level above which nutrient input from atmospheric deposition is considered to impact on ecosystem function and biodiversity) has shown little change since 2010, but the area affected by acid deposition has decreased from 47% to 42% between 2010 and 2015. Sixty five per cent of inland and coastal surface waters remain below target levels for ecological status under the Water Framework Directive. Although countries across the UK have recently introduced a range of measures to tackle marine litter, since 2010, levels of marine litter, especially marine plastics, has continued to rise, on beaches, in the water column, on the seafloor and in seabird stomachs.

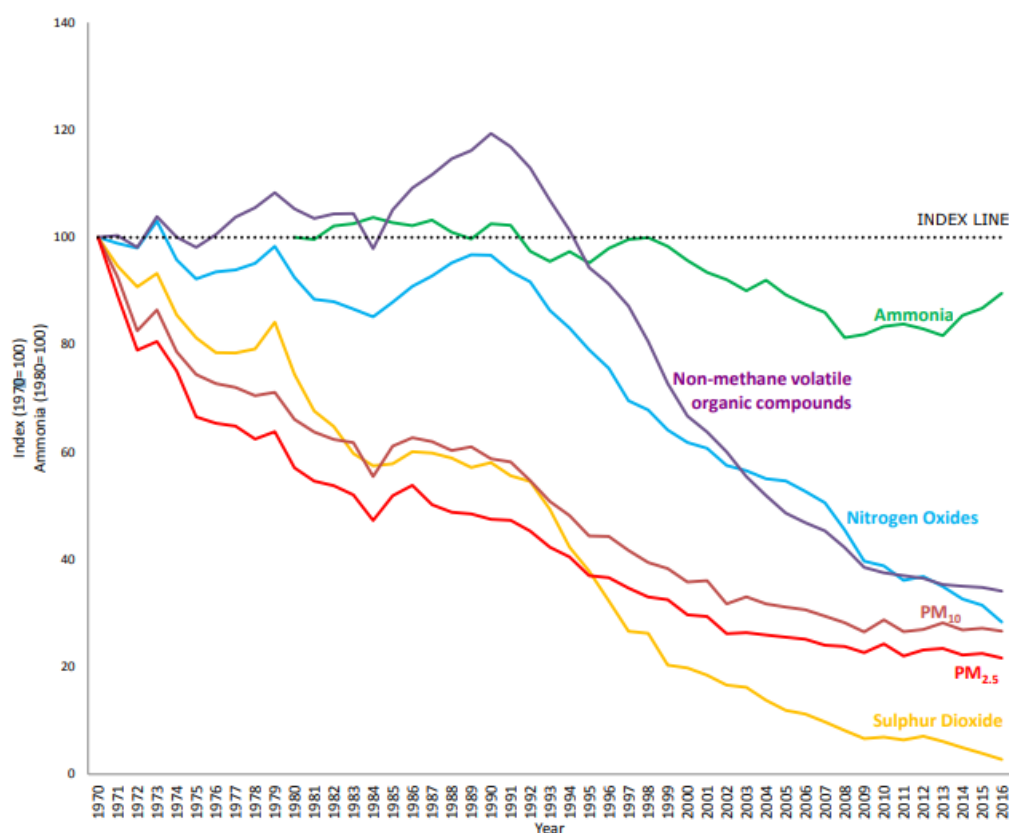
Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes current levels of air, water and marine pollution in the UK and examples of initiatives being implemented to help reduce pollution. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

Air pollution

There has been a long term decrease in the emissions of air pollutants in the UK between 1970 and 2016 (Figure 8.1) (Defra 2018). Of those pollutants which impact biodiversity through acidification and eutrophication, the UK continues to meet current international and EU ceilings for sulphur dioxide and ammonia, despite a recent increase in ammonia emissions.

The area of sensitive UK habitats that exceeds the critical load for acidification has continued to decline since 1996, but there has been less change in the area that exceeds the critical load for eutrophication (The UK Biodiversity Indicator B5a). Acid deposition exceeded critical load in 42% sensitive habitats in 2015, and nitrogen deposition exceeded critical load in 62% of sensitive habitats in 2015.



The index line is a comparator that shows the level of emissions if they had remained constant from the beginning of the time series.

Figure 8.1. Trends in UK sulphur dioxide, nitrogen oxides, non-methane volatile organic compounds, ammonia and particulate matter (PM₁₀, PM_{2.5}) emissions 1970 – 2016 (Defra 2018).

Water pollution

Substantial efforts to reduce point-source water pollution have been made and continue, however, diffuse source water pollution, particularly from agricultural activities, remains a problem (WRC 2015). The overall number of surface water bodies awarded high or good surface water status is assessed as declining in the short term and 65% remain in bad, poor or moderate ecological status, below Water Framework Directive target levels (UK Biodiversity Indicator B7).

Phosphorus is the top reason for English water bodies not achieving good ecological status. Phosphorus levels in rivers started to reduce in the mid-1990s and have been decreasing significantly since then (see Figure 8.2) (EA 2017). There have also been slight declines in nitrates in rivers since 2000 (Figure 8.3).

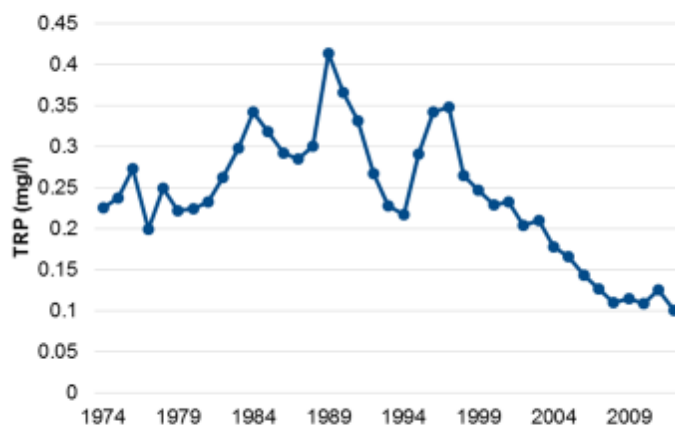


Figure 8.2. Annual average concentration of total reactive phosphorus in rivers, 1974 to 2012 (EA 2018).

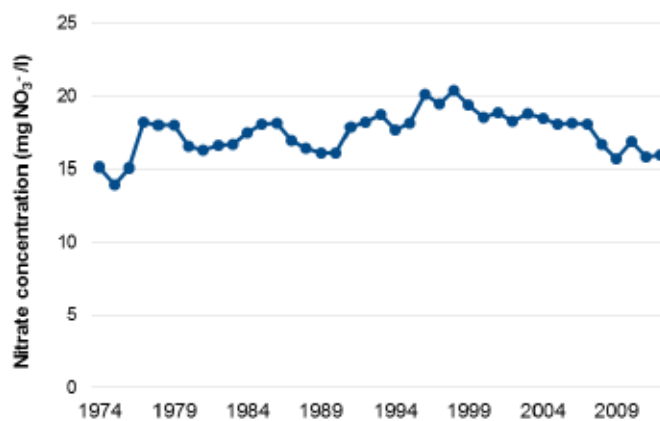


Figure 8.3. Annual average concentration of nitrate in rivers 1974 to 2012 (EA 2018).

Marine pollution

The OSPAR Intermediate Assessment (2017a) reported on the status of marine pollution in UK waters and wider North-East Atlantic.

Since 2010, contaminant concentrations have continued to decrease in the majority of areas assessed, especially for polychlorinated biphenyls (PCBs). Although

concentrations are generally below levels likely to harm marine species in the areas assessed, they mostly have not yet reduced to background levels (where these are specified). Concerns remain in some localised areas with respect to high levels of mercury, lead, and CB118 (one of the most toxic PCB congeners) and locally increasing concentrations of polycyclic aromatic hydrocarbons (PAHs) and cadmium in open waters. These results are supported by the UK Biodiversity Indicator B5b which shows that the combined inputs of six of the most hazardous materials in the UK marine environment have shown a long term decrease of 80% since 1990.

Hydrocarbons and ‘chemicals’ are routinely discharged to the marine environment during offshore oil and gas operations. Assessment of the data for the period 2009–2014 shows a decrease in the discharge of both hydrocarbons and the most hazardous offshore chemicals.

In 2015, reported impulsive sound sources were more prevalent in the northern and eastern North Sea, to the west of Scotland and in the Skagerrak, and were largely due to seismic survey activity. Sound sources categorised as Low or Very Low intensity were more common than higher intensity sources. This distribution is likely to vary year by year, depending upon the activities undertaken.

Marine litter, in particular plastic, is abundant on beaches, in the water column and on the seafloor. Marine litter also affects biota, as indicated by the levels of plastics in the stomachs of fulmars (*Fulmarus glacialis*) in the North Sea. The amount of plastics being ingested by this seabird species indicates that floating litter in the OSPAR Maritime Area is not decreasing. In addition, OSPAR’s first assessment of seabed litter has shown that litter is widespread on the seafloor across the area assessed, with plastic the predominant material encountered.

The results of the latest eutrophication assessment (for the period 2006–2014) indicate that eutrophication still occurs in the OSPAR Maritime Area, particularly in areas sensitive to nutrient inputs. While 100% of the UK’s marine waters have been identified as non-problem areas for eutrophication, there are 21 problem areas and 11 potential problem areas in its coastal and transitional waters within the Greater North Sea and Celtic Seas regions. The problem and potential problem areas are estuaries and harbours with restricted water circulation and represent a relatively small proportion of the total area of United Kingdom waters (0.03%) and of transitional and coastal waters (0.41%). Nitrogen and phosphorus inputs show decreasing trends in all regional sea areas.

UK initiatives

The UK is committed to emission reductions for five main air pollutants for the years 2020 and 2030 under the EU National Emissions Ceilings Directive (2016).

The UK Government has published a Clean Air Strategy in January 2019. It outlines the Government’s ambitions to reduce air pollution and protect health, nature and boost the economy. The strategy aims to establish a direction for future air quality policies and goals and sets out the actions Government will put in place to achieve its emissions reduction commitments, including a suite of measures to reduce ammonia emissions from agriculture.

The regulatory framework for freshwater includes the Water Resources Act 1991, the Water Act 2003, and the EC Water Framework Directive. The latter requires member states to restore or maintain freshwaters (as well as marine and estuarine waters) to

'good ecological status', and to ensure no deterioration of water bodies to poorer status categories.

Marine litter

The UK Government is committed to leading efforts to protect the marine environment and are taking a range of actions to tackle both land-based and sea-based sources of marine litter.

In April 2018 the UK and co-chair Vanuatu announced the Commonwealth Clean Oceans Alliance (CCOA), a ground-breaking initiative working with Commonwealth partners to reduce marine plastic pollution. The CCOA calls on other countries to pledge action on plastics, be this by a ban on microbeads, a commitment to cutting down on single use plastic bags, or other steps to eliminate avoidable plastic waste. To help deliver this, the UK committed an ambitious package of up to £66.4 million of UK aid to drive research and innovation and stop plastic from entering the oceans in the first place. As part of this funding package the UK contributes £25 million towards the Commonwealth Marine Plastics Research and Innovation Challenge Fund, which will support researchers to address marine plastics from a scientific, technical and social perspective. Canada and India have joined the UK and become founding members.

The Government, alongside Canada, launched the Global Plastics Action Partnership (GPAP) to help deliver the goals of the Alliance and further bring businesses, governments and organisations together to develop country action plans to address the plastic problem. Through which the UK have funded a £2.4million project to tackle global plastic pollution in rivers, deltas and oceans with three initial projects to be launched in Southeast Asia, West Africa and a Small Island Developing State. This has already received support and match funding from Coca Cola, Pepsico Foundation and Dow Chemicals.

The UK Government is also funding a project in the Overseas Territory of St Helena to help tackle marine plastic pollution. The project will aim to reduce the amount of plastic used by those living on the island and will establish a recycling programme for waste plastic. As part of this project, a marine debris monitoring programme will be established along St Helena's coastline to better understand this issue. Local school children and communities will be engaged in the project through an educational outreach programme.

In the Clean Growth Strategy <https://www.gov.uk/government/publications/clean-growth-strategy>, the UK set out a vision of zero avoidable waste by 2050, maximising the value extracted from resources, and minimising the negative environment and carbon impacts associated with their extraction, use and disposal. The strategy sets out ambitious policies towards this vision.

Country initiatives

Air quality is a devolved policy area in the UK and Scotland, Northern Ireland, and Wales lead on relevant policy within their own territories. Given the transboundary nature of air pollution, close partnership-working between the nations of the UK is essential. The UK government and the devolved administrations work together to manage transboundary air pollution across the UK, while also implementing their own country level initiatives.

Action Plan on Ammonia, Northern Ireland

Northern Ireland has largely seen reductions in emissions in recent years similar to those for the UK as a whole. Emissions of ammonia, however, have not declined overall. A Northern Ireland Expert Working Group on Sustainable Agricultural Land Management has examined the issue of ammonia in an annex to their original Strategy. In their report, *Making Ammonia Visible*², they make a number of key recommendations to government and farmers: a partnership approach to address ammonia; improved communication and education on ammonia; scientific research to address significant evidence gaps; adoption of guiding principles for planning applications; the implementation of ammonia mitigation measures on farms, including an end to the use of both splashplates for slurry-spreading and nonstabilised urea fertiliser; and the establishment of an Agri Emissions Partnership.

Northern Ireland's Department of Agriculture, Environment and Rural Affairs (DAERA) has established a Project Board on Ammonia to develop and implement a DAERA Action Plan on Ammonia. This action plan will set out an approach which aims to:

- achieve tangible and sustained reductions in ammonia emissions from Northern Ireland farms,
- reduce the impact of ammonia via nitrogen deposition on nature and habitats, and in particular, designated sites,
- respond to each of the recommendations of *Making Ammonia Visible*,
- encourage uptake of on-farm ammonia mitigation measures, and
- highlight the impact of ammonia on human health, while noting the relevant uncertainties.

Shared Nitrogen Action Plans, England

Natural England are piloting Shared Nitrogen Action Plans, a concept developed as part of the EU LIFE funded IPENS (Improvement Programme for England's Natura 2000 network sites) project. The plans bring together local authorities, NGOs and agricultural and energy sector representatives to encourage shared responsibility for managing nitrogen pollution and restoring habitats whilst maximising local economic benefits. For example, the Sherwood Forest Focus Area has many air pollution sensitive habitats and species across its 11 Sites of Special Scientific Interest (SSSI). Air pollution sources in the area range from large farms and biomass and waste gas plants to main road traffic.

Local land owners and industries are working to develop innovative solutions to reduce emissions. Opportunities to use Countryside Stewardship & Productivity schemes are available to support actions such as installation of slurry covers and shelter belts along roadsides and around farmyards, together with advice on the impacts of fertiliser use. This will aid the recovery of over 1,500 hectares of SSSI.

Local authorities, non-governmental organisations and Natural England have regular input on these plans to manage new emission sources to minimise the potential effects on protected habitats.

River Basin Management Plans, England

In 2016, updated River Basin Management Plans were published in England providing a framework for protecting and improving the water environment and focus on the improvements for the period 2016 to 2021. The Plans confirmed over £3 billion

² <https://www.daera-ni.gov.uk/sites/default/files/publications/daera/Ammonia%20Annex-%20Expert%20Working%20Group%20%28final%29.pdf>

investment by 2021 leading to improvements in at least 680 water bodies and 2,200km of waters, this is towards an overall target to enhance at least 8,000km of waters by 2021. This represents real progress on water quality and the work will continue in the next 3rd cycle of planning which is already underway. Water body status objectives will be reviewed and updated as part of the 3rd cycle river basin management plans due in 2021.

The UK Government published a Clean Air Strategy for England in January 2019. This includes further action to address air pollution impacts on the environment, including proposals for further regulatory measures to address agriculture as the main source of ammonia emissions and an extension of the Catchment Sensitive Farming advice programme to include advice to farmers on reducing emissions.

New farming rules for water came into force on the 2nd April 2018 in England (<https://www.gov.uk/guidance/rules-for-farmers-and-land-managers-to-prevent-water-pollution>). The rules have been introduced to protect water quality by standardising good farm practices. In essence, the rules require farmers to keep soil on the land, match nutrients to crop and soil needs, and keep livestock fertilisers and manures out of the water.

Waste and Plastics, England

The Resources and Waste Strategy, the Clean Growth Strategy and 25 Year Environment Plan include a set of ambitious policies towards a vision of zero avoidable waste by 2050; including sustainable production, tackling the scourge of waste plastic so that the UK can help can make the oceans cleaner and healthier. Better waste management on land will prevent waste reaching the sea and increasing recycling will return more plastic waste back into production processes, reducing waste and the need for virgin materials.

In England, the Government is currently consulting on a ban on the sale of supply of plastic straws, plastic drinks stirrers and plastic-stemmed cotton buds. The Government will also be consulting on the introduce a world-leading new tax on plastic packaging which does not contain enough recycled content, the development of producer responsibility schemes and introducing a deposit return scheme for beverage containers.

In England, the Government have committed in the 25 Year Environment Plan and the Resources and Waste Strategy to reforming our producer responsibility systems (including packaging waste regulations) to incentivise producers to take greater responsibility for the environmental impacts of their products. The Resources and Waste Strategy sets out how in England the 'polluter pays' principle will be invoked and producer responsibility for packaging will be extended, ensuring that producers pay the full costs for disposal of packaging they place on the market, and how to harness the potential for extended producer responsibility for other product types; this is among a number of policies to improve resource efficiency and minimise waste. Relevant proposals will be subject to consultation.

The UK have already introduced one of the world's toughest bans on the manufacture and sale of rinse-off personal care products containing microbeads. In addition, in England the plastic bag charge continues to reduce consumption - data shows that since the introduction of the charge, the seven key retailers had distributed around 15.6 billion fewer bags since the charge was introduced.

The UK Government launched a consultation in November 2018 on marine licensing including an aim to increase the likelihood of safe retrieval of 'ghost' fishing gear. This should give divers greater freedom to removal material which forms one of the highest harm forms of plastic pollution to marine life.

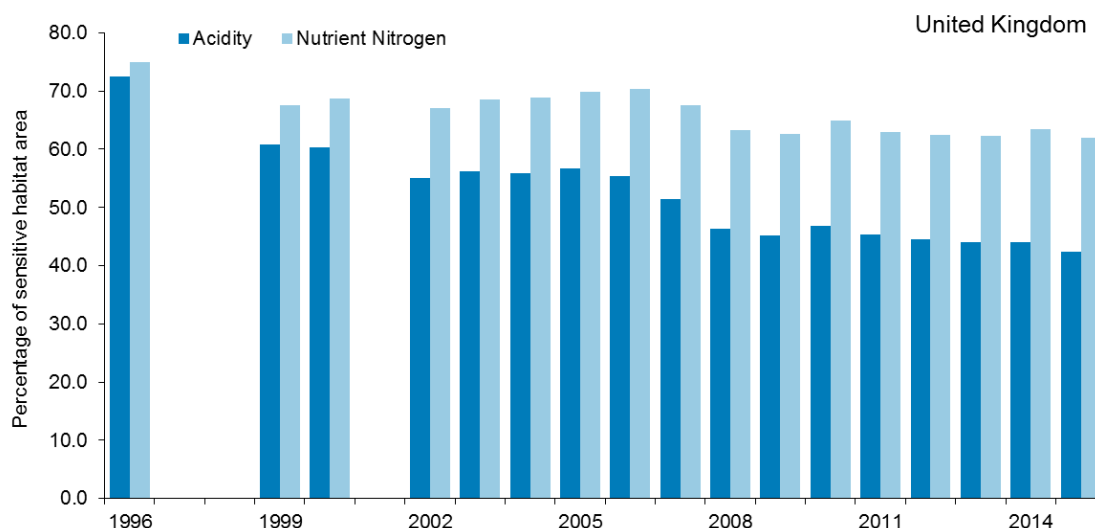
Indicators used in this assessment

UK Biodiversity Indicator **B5a: Air pollution** <http://jncc.defra.gov.uk/page-4245>.

- i. Area affected by acidity
- ii. Area affected by nitrogen

The area of sensitive UK habitats that exceeds the critical load for acidification has continued to decline since 1996, but there has been less change in the area that exceeds the critical load for eutrophication. Acid deposition exceeded critical load in 42% sensitive habitats in 2015, and nitrogen deposition exceeded critical load in 62% of sensitive habitats in 2015.

Figure B5ai. Area of sensitive UK habitats exceeding critical loads for acidification and eutrophication, 1996 to 2015.



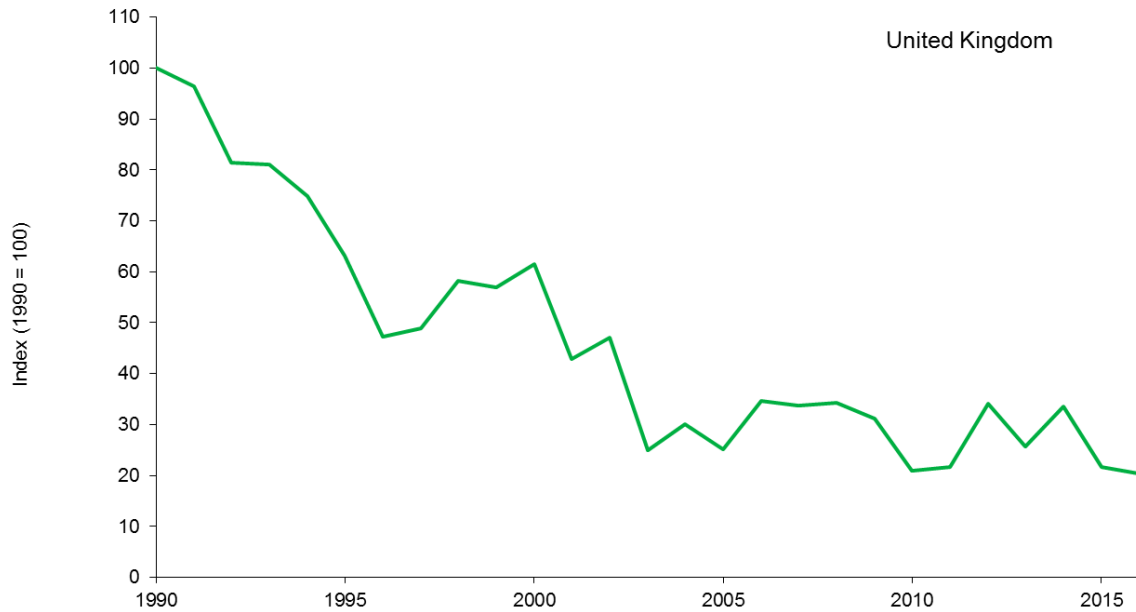
Notes:

1. Each column represents critical load exceedances based on a three-year average of deposition data to reduce year-to-year variability.
2. Since 2002, nitric acid has been included in the estimates of nitrogen deposition, and since 2003 aerosol deposition loads of sulphate, nitrate and ammonium have also been included. This additional deposition led to some increases in critical load exceedance compared with earlier periods.

UK Biodiversity Indicator **B5b: Marine pollution** <http://jncc.defra.gov.uk/page-6183>.

The combined inputs of all six hazardous materials into marine environments have shown a long term decrease of 80% since 1990. Inputs of five of these substances show decreases since 2011, however the input of copper has increased by 1% in the short term.

Figure B5bi. Combined input of hazardous substances to the UK marine environment, as an index of estimated weight of substances per year, 1990 to 2016.



Source: Defra Marine Strategy and Evidence Division, using data provided by: Environment Agency, Northern Ireland Environment Agency, Scottish Environmental Protection Agency.

Levels of all six substances declined over the period 1990 to 2016: mercury and lindane each by 90%; cadmium by 87%; lead by 66%; zinc by 63% and copper by 57%.

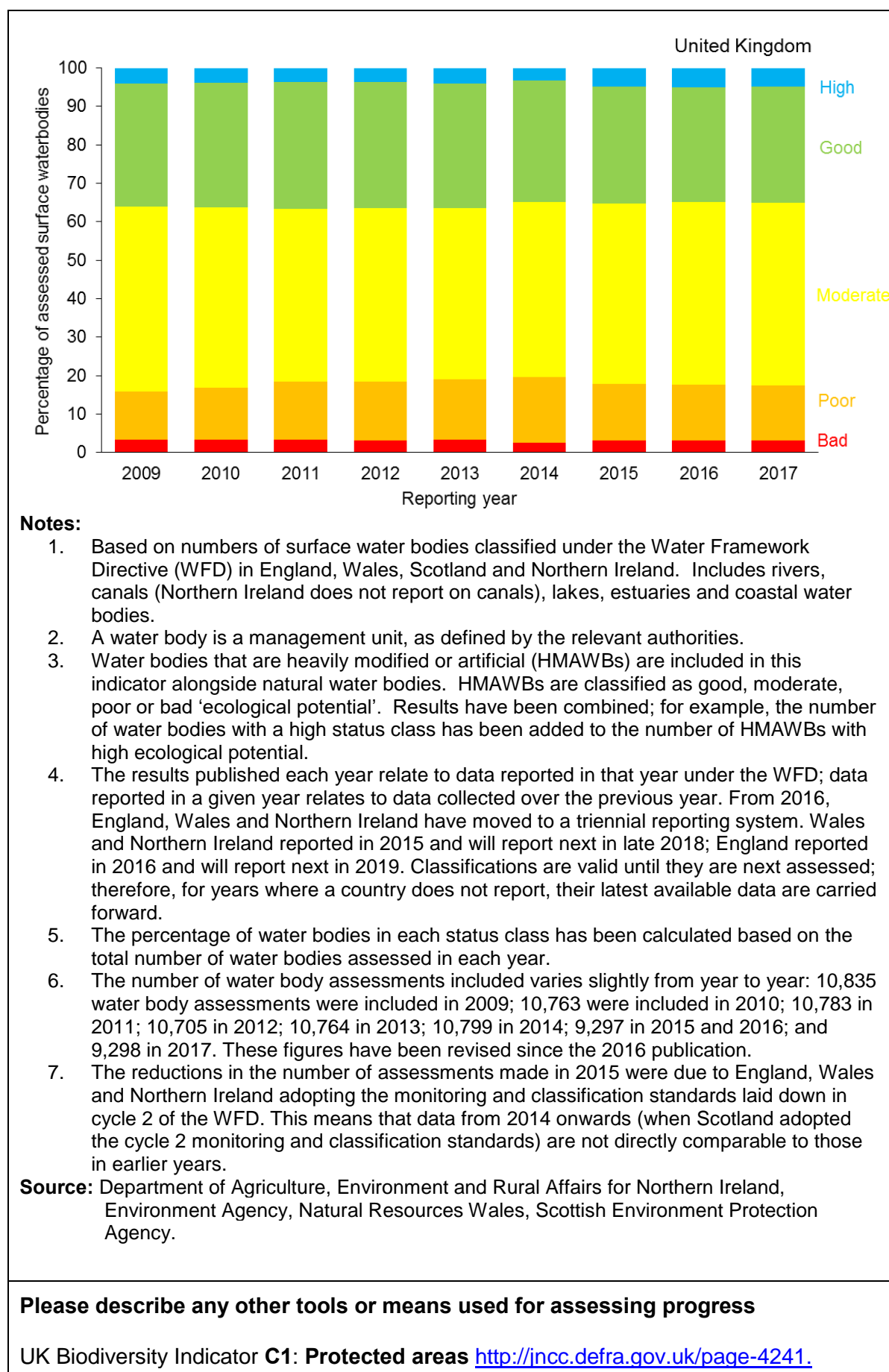
In the short term, inputs of hazardous substances decreased by 20% from 2011 to 2016 (using a 3 year average for 2011). Inputs of five of these hazardous substances declined in the short term: lindane had the highest percentage decrease (-56%), followed by lead which decreased by 40%, and then zinc (-7%), and both cadmium and mercury decreased by -1%. The input of copper has increased by 1% since 2011.

Inputs into the marine environment are estimated from concentrations and flow rates in rivers entering the sea and those from estuarine and coastal point sources. Riverine inputs reflect both point and diffuse sources upstream of the sampling point and tend to be strongly influenced by flow rates. Flow rates are heavily affected by rainfall patterns so year to year fluctuations in pollutant loads are likely.

UK Biodiversity Indicator **B7: Surface water status** <http://incc.defra.gov.uk/page-4250>.

There has been a small decrease in the overall number of surface water bodies in the UK awarded high or good status between 2012 and 2017. In 2017, 35% of surface water bodies were assessed under the Water Framework Directive (WFD) as being in high or good status compared with 36% in 2012; the indicator is assessed as declining in the short term.

Figure B7i. Status classification of UK surface water bodies under the Water Framework Directive, 2009 to 2017.



UK Biodiversity Indicator **C3a: Status of UK habitats of European importance**
<http://jncc.defra.gov.uk/page-4239>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Environment Agency (EA). 2018. The state of the environment: water quality. Accessed from:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/709493/State_of_the_environment_water_quality_report.pdf.

Department for Environment, Food and Rural Affairs (Defra) (2018) Defra National Statistics Release: Emissions of air pollutants in the UK, 1970 to 2016. Accessed from: <https://www.gov.uk/government/statistics/emissions-of-air-pollutants>.

Defra. 2019. Clean Air Strategy. <https://www.gov.uk/government/publications/clean-air-strategy-2019>.

OSPAR (2017a) OSPAR Intermediate Assessment 2017. Accessed from: <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/>.

OSPAR (2017b) Eutrophication Status of the OSPAR Maritime Area, Third Integrated Report on the Eutrophication Status of the OSPAR Maritime Area. Accessed from: <https://www.ospar.org/documents?v=37502>.

Water Research Assessment (WRC) (2015) Assessment of Member States' progress in the implementation of Programmes of Measures during the first planning cycle of the Water Framework Directive, Member State Report: United Kingdom (UK). Available from: http://ec.europa.eu/environment/water/water-framework/pdf/4th_report/country/UK.pdf.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi 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 of invasive alien species.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
- ☐ On track to achieve target
- ☒ Progress towards target but at an insufficient rate
- ☐ No significant change
- ☐ Moving away from target
- ☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target requires *action* to be in place to stop the establishment and spread of invasive non-native species. The assessment considers the actions in place to identify priority invasive non-native species (INNS); identify and control pathways of introduction and other measures to control or eradicate INNS. The assessment also considers the *outcomes* of these measures.

INNS are managed on a Great Britain and all-Ireland basis in the British Isles, with countries working closely together to co-ordinate their efforts. Priority species have been identified following extensive scientific review and expert input and a framework to prioritise their management have been developed. Comprehensive risk analysis

processes are in place (including horizon scanning, risk assessment and risk management), as are new information systems and contingency plans to support rapid response.

For established INNS, long term management is being undertaken to control some, but not all, of the most invasive INNS where feasible. In the recent past the GB has intercepted two species (Asian hornet and raccoon), and eradicated three species (African clawed toad, fathead minnow and black bullhead). Pathway management has focussed on a number of initial priority pathways and a comprehensive pathway prioritisation exercise in Britain is due to be completed by the end of 2018. The strategic approach adopted by UK countries has led to the successful interception and eradication of INNS with further eradications underway.

Despite strong action, the number of INNS established in Britain has remained constant, in terrestrial environments, and has increased in the freshwater and marine environment. The countries of the UK acknowledge that the impact and risk from INNS species in the UK remains significant and that there is a need to continue to develop plans to reduce the risk from all high priority pathways for invasive non-native species introduction and to raise awareness of the need for strong biosecurity. For this reason, progress is assessed as insufficient. INNS are known to be a pressure on many of the Overseas Territories; the logistics for eradication can be hugely challenging, but some successes have been recorded.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes the approach to INNS management taken in the UK and illustrative examples of INNS projects includes the condition and extent of natural habitats in the UK, and initiatives for their conservation. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

Country initiatives

The approach to INNS management to date in the UK has been to address invasive alien species on a biogeographical basis. A Great Britain (GB) programme of work has been developed which includes representation from England, Scotland and Wales. Northern Ireland work with the Republic of Ireland on a number of cross-border projects to manage INNS on the island of Ireland. Both biogeographical regions work closely together to ensure harmonisation of approach.

More widely, the UK championed the introduction of an EU Invasive Alien Species Regulation (which came into force on 1 January 2015) so that concerted action could be taken across Europe.

Great Britain Invasive Non-native Species Framework Strategy

The Great Britain (GB) Invasive Non-native Species Framework Strategy (2008, updated 2015) provides the framework within which actions of England, Scotland and Wales and their related bodies and key stakeholders can be better coordinated. Each

country works through a GB Programme Board developing both tools and measures while also pursuing individual priorities.

The Strategy embodies the three-pronged approach agreed under the Convention on Biological Diversity and sets out:

- a range of key actions to reduce the risk of introductions in future;
- measures to enable early detection of invasive non-native species and rapid action to control them before they become established; and
- measures to promote better value for money and effort spent tackling those that are already here and well established.

Under the Strategy a generic GB risk assessment mechanism has been developed (with assessments published on the GB Non-native Species Secretariat website at www.nonnativespecies.org) and the GB Non-native Species Information Portal (Roy *et al* 2014a, see <http://www.nonnativespecies.org/factsheet/>). The Non-native Species Information Portal provides access to distribution data for over 3,000 non-native species as well as additional information such as place or origin, date of introduction and methods of introduction. For 300 species, more detailed information is provided, including information on identification, impacts and control methods. Data on the recorded occurrence of species are available via the National Biodiversity Network (NBN) Atlas (<https://nbnatlas.org/>).

The GB INNS Framework Strategy provides a robust approach to prioritising INNS and their pathways. This includes the GB non-native species risk analysis mechanism, comprised of horizon scanning, risk assessment, risk management and risk communication, which provides evidence used to help prioritise the management of INNS. Aspects of the risk analysis mechanism are outlined in more detail below, as well as additional activities relating to pathways and contingency planning:

- *Horizon scanning*
In 2013, the Department for Environment, Food and Rural Affairs carried out a comprehensive horizon scanning exercise (using expert consensus methodology) to assess the likelihood of future arrival, establishment and impact of invasive alien species (IAS) (Roy *et al.*, 2014b). Based on the outputs of this (mainly a list of Top 30 species likely to invade and cause damage), GB develop pathway action plans (PAPs) or contingency plans for the highest risk species to prevent their establishment. This exercise will be repeated in 2018.
- *Risk assessment*
Since 2006, GB have used a comprehensive risk assessment process to assess the risk posed by established and new non-native species (Baker *et al.* 2008; Mumford *et al.* 2010). Close to 100 species have been risk assessed, with many more assessments in progress. A risk management scheme has also been developed to support the prioritisation of INNS for eradication (Booy *et al.* 2018). The scheme works in combination with GB's existing horizon scanning / risk assessment schemes to identify species for which eradication should be prioritised based on an assessment of the feasibility of delivering a response. This has been used to inform current priorities for eradication as well as the development of contingency plans for species likely to arrive in the near future.
- *Pathway Action Plans*
GB are in the process of carrying out a comprehensive prioritisation of introduction and spread pathways. To do this they are using CBD pathway categories (with

some refinements) and carrying out the analysis using data on the impact of species introduced to date as well as species identified as a future threat by horizon scanning.

In advance of the outcome of this prioritization process the countries have started developing action plans and produced our first pathway action plan (for zoos and aquaria) in 2016. The plan is designed to deliver a series of measures to raise awareness among key actors in this sector and strengthen existing mechanisms, such as ensuring that escapes are dealt with quickly.

The countries are currently developing two further pathway action plans – for (i) recreational boating; and (ii) angling and it is hoped to have these finalised in 2018. Both will be closely linked with the Check, Clean, Dry awareness raising campaign that launched in 2011 (based on the New Zealand campaign of the same name).

- **Contingency Planning**

In addition to PAPs GB have drafted contingency plans for five generic groups: terrestrial vertebrates, terrestrial plants, freshwater animals, freshwater plants and marine species. A terrestrial invertebrate plan is currently being developed. Specific annexes cover a total of 40 species that have been identified as posing a specific risk.

- **Risk Management**

GB have developed a risk management scheme to support the prioritisation of invasive alien species for eradication. The scheme works in combination with GB's existing horizon scanning/ risk assessment schemes to identify species for which eradication should be prioritised based on an assessment of the feasibility of delivering a response. This has been used to inform current priorities for eradication as well as the development of contingency plans for species likely to arrive in the near future.

In the recent past the GB has intercepted two species (Asian hornet *Vespa velutina* and raccoon *Procyon lotor*), eradicated three species (African clawed toad *Xenopus laevis*, fathead minnow *Pimephales promelas* and black bullhead *Ameiurus melas*) and eradication is underway for a further four (water primrose *Ludwigia grandiflora*, topmouth gudgeon *Pseudorasbora parva*, monk parakeet *Myiopsitta monachus*, American bullfrog *Lithobates catesbeianus*).

GB's first contingency plan for an INNS, the Asian hornet (*Vespa velutina*) has been adopted and measures implemented, leading to the destruction of two confirmed nests in England since 2016 so far preventing their spread into the UK (Defra 2017).

On a larger-scale, the GB Ruddy Duck Eradication Programme, which began in 2005, is almost complete. The population has been reduced from 4,400 to around 20-25 birds. Control is ongoing.

Northern Ireland INNS Programme

Northern Ireland and the Republic of Ireland work closely together on INNS issues which concern the whole of the island of Ireland. The Invasive Species Ireland website (<https://invasivespeciesireland.com/>) acts as a gateway to information relating to INNS on the island of Ireland, and includes information on a range of species, policy related

to individual species or groups of species, and action plans to deal with species that threaten the biodiversity and economies of Ireland and Northern Ireland.

The Northern Ireland Environment Agency works with Republic of Ireland colleagues on joint actions such as the All-Ireland Crayfish Group, 2016 Horizon Scanning workshop in Sligo, Marine Pathways Group and the development of an all-Ireland Contingency Plan for the Asian hornet (*Vespa velutina*). Northern Ireland shares risk assessments, species alerts and management plans with Republic of Ireland colleagues, having in many cases produced them jointly. Both Northern Ireland and Ireland have adopted and promoted the Check Clean Dry & Be Plant Wise campaigns, by sharing resources to create a consistent message. The *Spartina* Control Group (formed in 2010) has a cross border membership, sharing best practice information. Northern Ireland also share species record collection via the Invasive Species Ireland website from where records are disseminated to the Centre for Environmental Data Recording in Northern Ireland and the National Biodiversity Data Centre in Ireland.

Shiant Isles Recovery Project, Scotland

Shiant Isles Recovery Project is a four-year programme to help make the islands more secure for seabirds. The Shiant Isles are one of the most important breeding colonies for seabirds in Europe - around 10% of UK Atlantic puffins (*Fratercula arctica*) and 7% of UK razorbills (*Alca torda*) breed here every year. However, when the project began in 2014, as well as these amazing seabird populations, the islands were also home to invasive non-native black rats.

Black rats are thought to have arrived on the Shiant Isles from an 18th century shipwreck. They occupied the main islands in the archipelago. In April 2012 a survey estimated there were around 3,600 rats on the islands, and this number increased significantly in the summer months when more food was available.

The invasive non-native black rats were known to consume the seabirds' eggs and chicks on the islands. Their presence was considered to be affecting the productivity of ground nesting species and discouraging other species like Manx shearwaters and European storm petrels from breeding there.

In March 2018 the Shiant Isles were declared officially free of rats as a result of the project. Before this project began, similar eradication projects on other UK islands including Canna, Ramsey and Lundy had already been extremely successful. Manx shearwater (*Puffinus puffinus*) numbers on Lundy increased tenfold in the 10 years since eradication, and storm petrels were recorded there for the first time in 2014. More recently, seabirds are already recovering in St Agnes and Gugh in the Isles of Scilly, following the declaration of their rat-free status in 2016.

From spring 2016 Manx shearwaters and storm petrels were encouraged to nest on the Shiant Isles, and in the summer of 2017 calling storm petrels (*Hydrobates pelagicus*) were recorded on the islands for the first time. Breeding success of seabirds on the islands is being monitored to establish how they have benefited from the islands' restoration.

The following example from Wales illustrates the importance of maintaining vigilance to ensure the success of INNS eradication initiatives.

Rat eradication Ynys Seiriol / Puffin Island, Wales

In the late 1990s, the Countryside Council for Wales (CCW) and the Royal Society for the Protection of Birds (RSPB) undertook investigation into the decline of puffins on the uninhabited Ynys Seiriol / Puffin Island. The source was considered to be at ground level with brown rats predating Atlantic Puffin (*Fratercula arctica*) eggs. CCW and RSPB undertook an eradication programme to remove brown rats from Puffin Island which is both a Site of Special Scientific Interest and a Special Protection Area for birds. Following the implementation of an intensive eradication programme over a couple of years, the outcome was concluded as successful with the total eradication of the brown rats, however further monitoring continued. During a gull census in May 2017 which was jointly carried out by Natural Resources Wales (NRW) and Liverpool University a suspicious burrow was located close to the telegraph station, which looked like a potential rat burrow.

Potential rat faeces were collected and DNA tested, but results proved negative. In December 2017 NRW deployed 40 wax blocks in 8 bait stations and 32 plastic tubes over a 50m grid across the island. In January and February 2018, the wax blocks were checked and showed no evidence of chewing nor any further signs of rats on the island (droppings, burrows, bird carcasses with tooth marks). This in conjunction with previous work carried out by the North Wales Mammal group led to the conclusion the island remains rat free. Monitoring continues and plastic bait stations have been left on the island permanently which are checked when the island is visited. More information available at: <http://www.angleseynature.co.uk/puffinislandrateradication.html>.

Overseas Territories and Crown Dependencies initiatives

INNS are a huge threat to the 14 UK Overseas Territories and 3 Crown Dependencies and most of the OTs have limited capacity and need support to reduce the risk of future invasions and to manage existing ones. The UK Government has pledged £2.75 million over four years (2016-2020) for two projects.

The first project (£1 million) is helping the development of comprehensive biosecurity for the Overseas Territories by providing them with access to UK Government expertise. The work started with a gap analysis of capacity and practice which found that the main gaps were on horizon scanning, pathway analysis and pathway action planning. A programme of horizon scanning is ongoing and will be completed by April 2019. This will be followed by the development of pathway action plans with local stakeholders. In the meantime, model biosecurity legislation is being drafted for the territories.

The second project (£1.75 million) is a contribution to the RSPB-led eradication of mice from Gough Island in the South Atlantic. The mice kill approx. 800,000 seabird chicks per annum and are the main threat to the endangered Tristan albatross and Gough Island bunting. The aim is to carry out the eradication in 2020. This project will build on the experience of eradication of rodents on South Georgia – see the case study in Section II of this report for details.

The Royal Botanical Gardens Kew work with various partners to identify, monitor and address the threat of IASs in the UK overseas territories. They are part of numerous longstanding IASs projects including the production of field guides to help identify invasive species and instigate control measures e.g.: Upson, R., Myer, B., Floyd, K., Lee, J. & Clubbe, C. (2017). Field Guide to the Introduced Flora of South Georgia. Royal Botanic Gardens Kew, Richmond.

Some crown dependencies and overseas territories have their own IAS strategies and management plans in place, including:

- An 'Isle of Man Invasive Species Action Plan: Asian Hornet *Vespa velutina*', has been agreed, and is being revised in the light of the experience of adjacent jurisdictions. A draft marine biosecurity plan is under development. A terrestrial/freshwater plan is also planned (within the Biodiversity Strategy) but is currently at an early stage.
- Bermuda has a comprehensive biodiversity database, which records all known species on the island, including invasive. These data are held at the Bermuda Natural History Museum.
- Gibraltar also has a comprehensive INNS removal programme in place particularly focused on mammalian predators and plants (e.g. *Carpobrotus edulis*, *Chasmanthe floribunda*, etc.).
- The Falkland Islands have an Invasive Species and Biosecurity Strategy within their Biodiversity Framework that outlines actions to cope with specific threat species.

Indicators used in this assessment

UK Biodiversity Indicator **B6: Pressure from invasive species**

<http://jncc.defra.gov.uk/page-4246>.

- Freshwater invasive species
- Marine (coastal) invasive species
- Terrestrial invasive species

There are 3,163 non-native species in Great Britain, 1,980 of which are classified as established (reproducing in the wild).

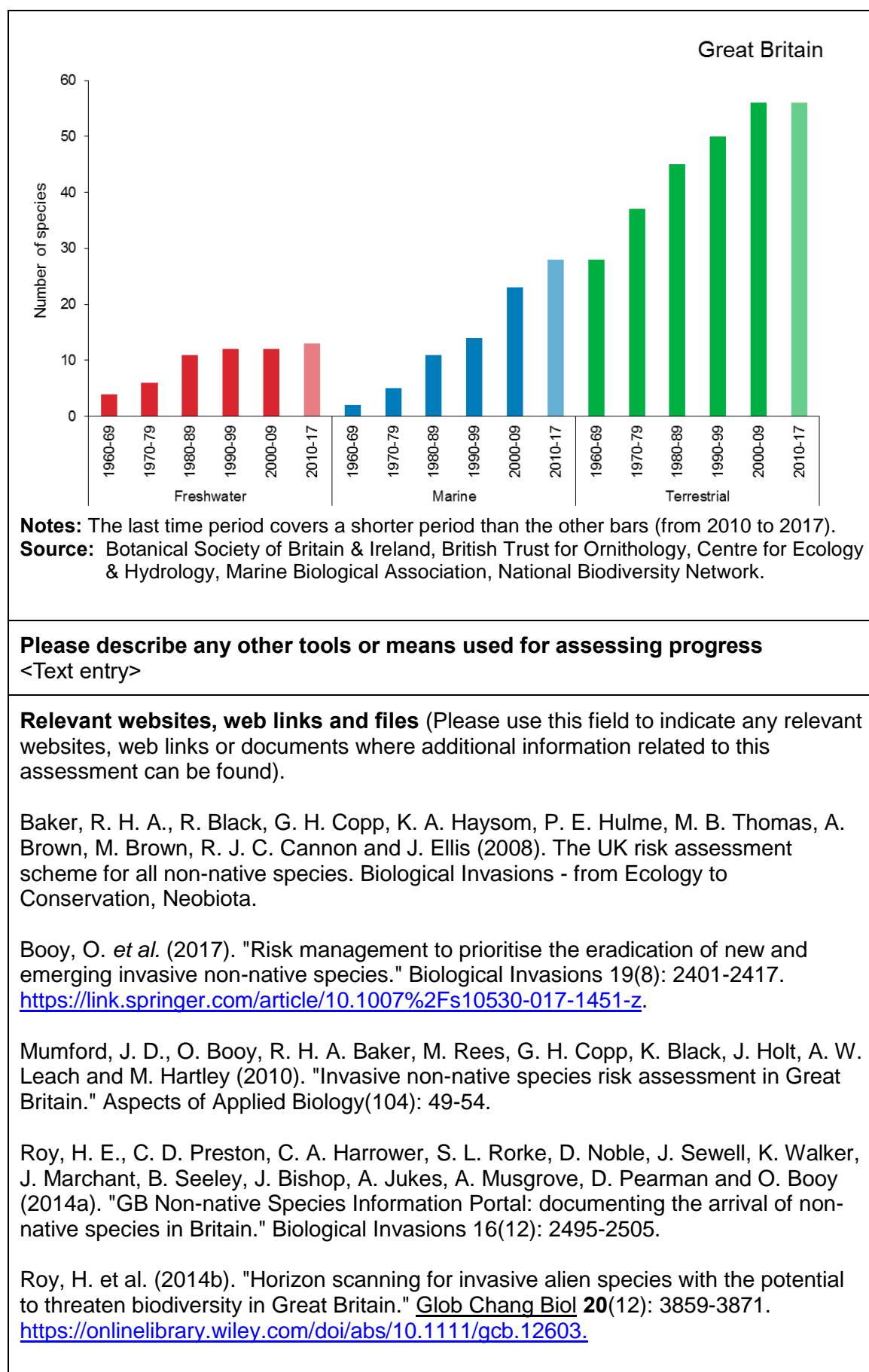
This indicator contains 190 non-native species that are considered to be exerting a negative impact on native biodiversity (46 freshwater species, 36 marine species and 108 terrestrial species). The majority (184) of these species are established; six³ are long-term resident but not known to breed in the wild.

Over the period 1960 to 2017, invasive non-native species have become more prevalent in the countryside. Since 1960, the number of these species established in or along 10% or more of Great Britain's land area or coastline has increased in the freshwater, terrestrial and marine (coastal) environments, thereby increasing the likely pressure on native biodiversity.

Comparing the latest period (2010 to 2017) with the previous one (2000 to 2009), the number of invasive non-native species established in or along 10% or more of Great Britain's land area or coastline has remained constant in terrestrial environments (at 56 species), and has increased in both freshwater (from 12 to 13 species) and marine environments (from 23 to 28 species).

Figure B6i. Number of invasive non-native species established in or along 10% or more of Great Britain's land area or coastline, 1960 to 2017.

³ The six long-term resident species included the indicator are two species of terrapin (*Emys orbicularis*, *Trachemys scripta*) and four freshwater fish (*Ameiurus melas*, *Leuciscus idus*, *Salvelinus fontinalis*, *Oncorhynchus gorbushas*).



Williams, F., Eschen, R., Harris, A., Djeddour, D., Pratt, C., Shaw, R.S., Varia, S., Lamontagne-Godwin, J., Thomas, S.E. and Murphy, S.T. (2010) The economic cost of invasive non-native species on Great Britain. CABI Proj No VM10066, pp.1-99.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity 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.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target

<input type="checkbox"/> On track to achieve target <input checked="" type="checkbox"/> Progress towards target but at an insufficient rate <input type="checkbox"/> No significant change <input type="checkbox"/> Moving away from target <input type="checkbox"/> Unknown
Date the assessment was done: 18 January 2019.
<p>Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).</p> <p>Assessment</p> <p>This target requires <i>action</i> to be in place to minimise impacts on vulnerable ecosystems. The assessment considers impacts from multiple sources, including climate change itself. It considers a range of vulnerable terrestrial, marine and coastal ecosystems in the UK and Overseas Territories.</p> <p>There is strong evidence that climate change is affecting UK ecosystems in a variety of complex and interacting ways, often with negative consequences, and that these impacts are likely to increase as the climate continues to warm. Terrestrial ecosystems such as uplands, woodlands, heathlands and wetlands are vulnerable to rising temperatures and changes in rainfall and seasonality. Coastal ecosystems such as saltmarsh, sand dunes and machair are vulnerable to sea-level rise and increased air and water temperature. Marine ecosystems, such as corals and other biogenic reefs, are also vulnerable to increased water temperature and ocean acidification. Information on other pressures faced by UK species and habitats are given in the assessments of progress for Targets 5 to 9. In response, the UK has made significant reductions in greenhouse gas emissions and has set ambitious targets for further reductions. Management has been introduced to minimise the impact of wider anthropogenic pressures and enhance the resilience of vulnerable ecosystems, including the designation of protected areas and habitat restoration initiatives. On both cold and warm water coral reefs action has been taken across the UK and Overseas Territories to safeguard these ecosystems, for instance through the designation of protected sites and restrictions on fishing practices.</p> <p>However, though there have been significant reductions in the UK's greenhouse gas emissions the Government recognises the need for further reductions to mitigate the impacts of climate change; ambitious future carbon budget targets have been set. Despite efforts to minimise the impact of anthropogenic pressures and enhance ecosystem resilience through the initiatives mentioned above, some vulnerable ecosystems remain in a degraded state in the UK and Overseas Territories. For these reasons, progress is assessed as insufficient.</p> <p>Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.</p> <p>Evidence used includes the impact of climate change on UK ecosystems and examples of initiatives in place to minimise anthropogenic pressures, including those from climate change, on vulnerable ecosystems. The examples provided here primarily focus on</p>

marine and coral ecosystems, however, additional information on the management of vulnerable peatland and woodland ecosystems in the UK is provided in Target 15's assessment in Section III of the report. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

Impacts of climate change on UK ecosystems

Many of the UK's ecosystems are vulnerable to a range of pressures associated with climate change. Terrestrial ecosystems such as uplands, woodlands, heathlands and wetlands are vulnerable to rising temperatures and changes in rainfall and seasonality. Coastal ecosystems such as saltmarsh, sand dunes and machair are vulnerable to sea-level rise and increased air and water temperature. Marine ecosystems, such as corals and other biogenic reefs, are also vulnerable to increased water temperature and ocean acidification.

A number of report cards have been produced that present evidence for the current and projected impacts of climate change ecosystems in the UK, including in the terrestrial (Morecroft & Speakman 2015) and marine (MCCIP 2017) environment. Seven additional report cards were published in October 2018 (see <http://www.mccip.org.uk/adaptation-action/climate-change-and-marine-conservation/>), each with a focus on a specific marine habitat or species, selected because they are known to be vulnerable to climate change impacts. These report cards present strong evidence that climate change is impacting UK ecosystems in a variety of complex and interacting ways, often with deleterious consequences, and that these impacts are likely to increase as the magnitude of climate change increases.

Rising temperatures have led to changes in the timing of key life-cycle events, such as leafing, flowering and egg laying, amongst most species assessed (Sparks & Crick 2015). Differential responses among species may cause problems for life cycles (e.g. pollinating insects emerging out of synchrony with flowers opening in spring), increasing vulnerability to extreme events such as late frosts, disruption of food webs, and changing the balance of competition between species.

Warming has also led to the range expansion of many species further north, and helped establish non-native species, including some which have colonised large parts of the UK from continental Europe (Pateman & Hodgson 2015). Concurrently, there is some evidence that northern and montane species are retreating at southern or low-altitude range margins. Some species groups are especially vulnerable, including seabirds for which poor breeding success, reduced survival and population declines has been linked to climate change and its effect on habitat and prey availability (Daunt *et al.* 2017).

The responses of different species to climate change has led to changes in the composition of some plant, microbial and animal communities and ultimately the ecosystems they comprise. Rising temperatures have contributed to changes in the composition of vegetation in the UK uplands, including a decrease in arctic-montane species (Carey 2015). In woodlands tree death and reduced growth amongst sensitive species has been recorded because of drought and dry summers (Carey 2015). Rising sea levels combined with the impacts of hard sea defences have been associated with the loss of coastal habitats, with intertidal habitats such as salt marsh experiencing the greatest losses (Mossman *et al.* 2017). There is also evidence that the overall effect of ocean acidification on marine ecosystems will be deleterious, including a risk of substantive reductions in shellfish growth (and harvest) within 50 years, although some

algae and seagrasses may benefit from increased availability of CO₂ (Williamson *et al.* 2017).

UK initiatives

UK carbon emissions targets and climate change adaptation

The best options for long term mitigation of pressures from climate change on vulnerable ecosystems still reside in cooperation with global targets to reduce carbon emissions, as mandated in the UK Climate Change Act 2008 and under commitments to the UN Framework Convention on Climate Change (UNFCCC). Further information on the UK's carbon emissions reduction progress is provided in Target 4's assessment in Section III of the report.

The Climate Change Act 2008 provides the framework both for mitigating climate change by reducing greenhouse gas (GHG) emissions and for adapting to climate change. For the latter, it includes a requirement to complete a Climate Change Risk Assessment (CCRA) every five years, followed by a National Adaptation Programme (NAP) setting out how the risks identified in the CCRA will be addressed. Additionally, the Act provides the Government with the power (known as the 'Adaptation Reporting Power') to require public bodies and infrastructure operators that provide key services, to report on what actions they are taking to address climate impacts.

The UK Government's second National Adaptation Programme (NAP) was published in July 2018. The NAP sets out the Government's response to the second Climate Change Risk Assessment (CCRA), showing the actions the Government (along with other sectors such as business, local government and infrastructure operators) is, and will be, taking to address the risks and opportunities posed by a changing climate. It forms part of the five-yearly cycle of requirements laid down in the Climate Change Act 2008 to drive a dynamic and adaptive approach to building our resilience to climate change.

In preparing the second CCRA and NAP report, government sought to follow the recommendations of the Adaptation Sub-Committee (ASC), the statutory advisers on climate adaptation, to set more focused priorities and specific and measurable objectives that clearly contribute to adaptation outcomes, and to lay out how these will be monitored and evaluated. Building ecological resilience to address risks to species and habitats (and the benefits they provide) is a key recommendation of the second CCRA and the corresponding NAP report includes specific objectives to build ecological resilience across broad environments on land and at sea.

Carbon capture by shelf seas

The NERC-Defra Shelf Sea Biogeochemistry Programme (SSB), 2013-2018 (see https://www.uk-ssb.org/shelf_seas_report.html) focused on scientific understanding of the shelf seas around Britain: the key processes that maintain their status, variability and response to impacts (climate and human); their potential to remove and store carbon ('blue carbon'); and the lessons for policy in monitoring, managing and valuing these precious habitats.

Key findings presented in the report include:

- The UK shelf seas take up large amounts of carbon dioxide, thereby slowing global warming; however, many knowledge gaps remain.
- Climate change is already affecting UK shelf seas and impacts will intensify.

- Many interacting factors control the amount and growth of the microscopic plants (phytoplankton) that underpin nearly all other life in the sea.
- Surprisingly, a summer-time lack of iron may be one of the constraints on phytoplankton growth; this has not been found before in shelf seas.
- The chemistry and biology of shelf seas is strongly affected by the highly variable conditions at the seafloor, affected by natural processes and human disturbance.
- Marine protected areas provide unique opportunities for separating climate-driven changes from direct human actions; for example, trawling.
- Most trawling impacts on seafloor life and processes seem to occur the first time an area is trawled; on that basis, it would seem better to have high fishing effort in some areas and none in others, rather than equally spreading the seafloor disturbance.
- Novel technologies are increasingly being used to find out how shelf seas work, providing many direct and indirect benefits to society.

Cold-water coral reefs (Lophelia pertusa)

Whilst cold-water coral reefs (*Lophelia pertusa*) are not susceptible to bleaching events, they are vulnerable to the effects of ocean acidification, and there is a growing body of evidence showing a possible weakening of the reefs may occur, leading to their ultimate collapse (Hennige *et al.* 2014, Büscher *et al.* 2017).

Protection is afforded to UK cold-water coral reefs under the European Commission (EC) Habitats Directive which is transposed into national law through the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017. These Regulations provide for the designation, protection and management of Special Areas of Conservation (SACs). The EC Habitats Directive commits Member States of the European Union to maintain and restore European protected habitats listed under Annex I of the Directive. Annex I Reefs designated in UK SACs include examples of cold-water coral reefs.

National legislation has also been adopted to protect cold-water coral reefs (*Lophelia pertusa*) under the Marine and Coastal Access Act 2009, the Marine (Scotland) Act 2010, and the Marine Act (Northern Ireland) 2013. Cold water coral reefs are a habitat feature protected within Marine Conservation Zones (in England) and Nature Conservation Marine Protected Areas (in Scotland).

The UK is also a Contracting Party to the Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention') which identifies *Lophelia pertusa* reefs as threatened and/or declining habitats in need of protection. As such the UK has designated examples of these habitats in MPAs, through the national legal framework outlined above. There are nine Marine Protected Areas that have been designated to conserve cold-water corals as a protected feature (see Table 10.1).

Table 10.1: Marine Protected Areas in the UK with cold water corals as a protected feature

Site name	Site status	Coral feature protected
Darwin Mounds	SAC	Reefs: Biogenic (<i>Lophelia</i>)
North West Rockall Bank	SAC	Reefs: Biogenic (<i>Lophelia</i>)
East Rockall Bank	SAC	Reefs: Biogenic (<i>Lophelia</i>)
Hatton Bank	cSAC	Reefs: Biogenic (<i>Lophelia</i>)
Anton Dohrn	SAC	Reefs: Biogenic (<i>Lophelia</i>)

East Mingulay	cSAC/SCI	Reefs: Biogenic (<i>Lophelia</i>)
The Canyons	MCZ	Cold-water coral reefs
Rosemary Bank Seamount	NCMPA	Seamount communities
Barra Fan Hebrides Terrace Seamount	NCMPA	Seamount communities

MPA management measures have been introduced to prevent damage being caused to cold-water coral reefs by anthropogenic activities, such as fishing. Currently fishing gear prohibitions have been introduced to Darwin Mounds MPA (Council Regulation (EC) No 602/2004) and North West Rockall Bank MPA (Regulation (EU) No. 227/2013). Joint Recommendations for fisheries management in other MPAs have been developed by Scottish Government and Defra in collaboration with JNCC, Marine Scotland and Cefas. Proposed measures include the restriction of certain fishing gears in all or part of the sites. These recommendations have undergone consultation but have not yet been implemented.

The UK is a Contracting Party to the North East Atlantic Fisheries Commission (NEAFC). NEAFC has established fisheries closures in parts of UK waters (such as Hatton Bank and Rockall Bank west of Scotland) which prohibit bottom trawling and fishing with static gear, thereby also protecting the cold-water coral reefs found in these areas. An EU-wide Deep-Sea Fisheries Regulation came into force in 2017 which prohibits trawling in waters greater than 800m. This will protect deeper areas of cold-water corals in the UK.

Country initiatives

*Horse mussel (*Modiolus modiolus*) beds, Wales*

Horse mussel (*Modiolus modiolus*) bed habitats are at risk from both ocean acidification and rising seawater temperatures. In Wales the latter is of particular concern as horse mussel beds in Welsh waters are at the southerly end of the UK distribution. Within Welsh waters two relatively extensive horse mussel beds have been protected from fishing by towed gears (Closed Area Sea Fisheries Order 2012 No 2571). One of these horse mussel beds is also offered further protection by being part of the Annex I Reef feature of a Special Area of Conservation (Pen Llŷn a'r Sarnau / Llyn Peninsula and the Sarnau SAC).

National Coastal Change Assessment, Scotland

Scotland's Coastal Change Assessment aims to create a shared evidence base to support more sustainable coastal and terrestrial planning decisions in the light of a changing climate and protect vulnerable coastal ecosystems.

The Climate Change (Scotland) Act 2009 requires the development of an Adaptation Programme to take forward the risks identified within the UK's Climate Change Risk Assessment (UK-CCRA). The UK-CCRA anticipates increases in sea level, coastal erosion and coastal flooding to increasingly affect Scotland's soft coastlines and the assets found on these coasts. Shoreline Management Plans have been produced for only short sections of the Scottish coast which limits the information available to coastal managers. Consequently, a National Coastal Change Assessment (NCCA) has been commissioned by the Scottish Government and is supported by a number of agencies.

Research undertaken:

- The NCCA used 2,300 maps and data to analyse all 21,000 km of the Scottish shoreline to a level of detail never achieved before. It mapped the position and type of the soft coastline in 1890, 1970 and today, assessing the likelihood of its present and future erosion.
- Areas of erosion were projected to 2050, to provide indicative figures of the natural and built assets at increased risk if past changes and rates continue.
- The NCCA took no account of future management (improving resilience) or accelerating erosion due to climate change (increasing risk). Managing these assumptions, NCCA mapped the proximity of assets along the whole coastline to understand coastal erosion resilience and exposure to hazard.
- Several web-maps allow public access to the underlying data and evidence base (dynamiccoast.com).
- NCCA source data are available to public sector organisations to support delivery of statutory duties, particularly flood risk management and climate change adaptation planning. It allows a step-change to occur in public sector adaptation planning.

Overseas Territories and Crown Dependencies initiatives

Warm-water coral reefs

Warm-water coral reefs are sensitive to increased seawater temperature and ocean acidification as a result of climate change (Spalding & Brown 2015). Warm-water coral reefs are found in a number of the UK Overseas Territories, including Anguilla, Bermuda, British Indian Ocean Territory (BIOT), the British Virgin Islands (BVI), Cayman Islands, Montserrat, Pitcairn Islands and the Turks and Caicos Islands (TCI). To help protect UKOTs vulnerable marine ecosystems, including warm-water coral reefs, Marine Protected Areas have so far been established in all but Montserrat.

A number of projects have been undertaken that aim to improve scientific understating and protection of the UKOT's warm-water coral reefs. For example, the UK Government's Darwin Initiative recently funded a Bangor University led research project to help strengthen the world's largest Marine Protected Area in the British Indian Ocean Territory (BIOT), and improve protection of its internationally important coral reefs.

In addition, The Blue Belt Programme supports the delivery of the UK Government's commitment to enhance marine protection of over four million square kilometres of marine environment across UKOTs. Further information on the progress of The Blue Belt Programme to date is provided in the case study *Delivering an ecologically-coherent and well-managed network of Marine Protected Areas to safeguard marine biodiversity in UK seas* in Section II of the report.

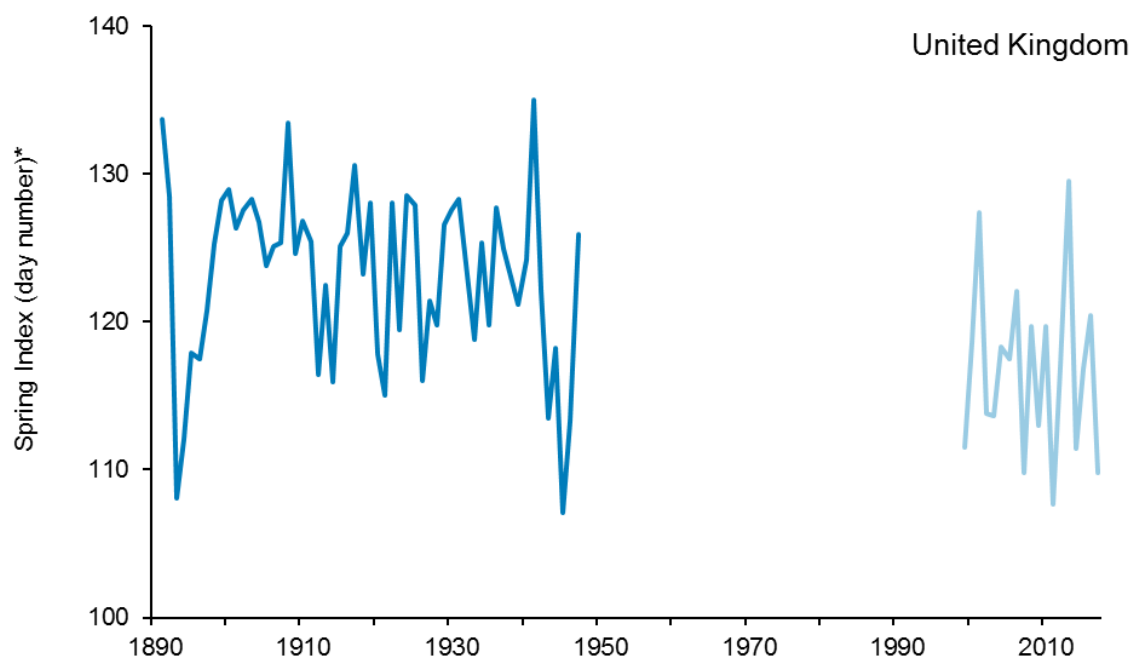
Indicators used in this assessment

UK Biodiversity Indicator **B4: Pressure from climate change - Spring Index**
<http://jncc.defra.gov.uk/page-4247>.

Since 1999, the annual mean observation dates have been around 6 days in advance of the average dates in the first part of the 20th century.

The Index shows a strong relationship with mean temperature in March and April, and it advances more rapidly when the mean temperature equals or exceeds 7 degrees Celsius.

Figure B4i. Index of the timing of biological spring events (number of days after 31 December) in the UK, 1891 to 1947, and 1999 to 2017.



Notes: * Number of days after 31 December (e.g. day 121 = 1 May).

Source: 1891 to 1947 – Royal Meteorological Society; 1999 to 2017 – UK Phenology Network.

OSPAR Intermediate Assessment 2017

In the marine environment, the OSPAR Hazardous Substances Committee, which has responsibility for OA monitoring in the North East Atlantic, is developing an OA indicator for the OSPAR Quality Status Report 2023. This will build on the OA work conducted for the OSPAR Intermediate Assessment 2017, use data and information on marine pH concentrations that is available from Contracting Parties, and use data, information and assessments that have already been carried out.

Please describe any other tools or means used for assessing progress

UK Biodiversity Indicator **B5a: Air pollution** <http://jncc.defra.gov.uk/page-4245>.

UK Biodiversity Indicator **B5b: Marine pollution** <http://jncc.defra.gov.uk/page-6183>.

UK Biodiversity Indicator **B7: Surface water status** <http://jncc.defra.gov.uk/page-4250>.

UK Biodiversity Indicator **C2: Habitat connectivity** <http://jncc.defra.gov.uk/page-6891>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Büscher, J.V. et al. 2017. Interactive Effects of Ocean Acidification and Warming on Growth, Fitness and Survival of the Cold-Water Coral *Lophelia pertusa* under Different Food Availabilities. *Frontiers in Marine Science*, 4, doi: 10.3389/fmars.2017.00101.

Carey, P. D. (2012). Terrestrial Biodiversity climate change report card technical paper 5: Impacts of Climate Change on Terrestrial Habitats and Vegetation. Available from: <https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity-source05/>.

Daunt, F., Mitchell, I., & Frederiksen, M. (2017) Seabirds. Marine Climate Change Impacts Partnership: Science Review 2017. Available from: http://www.mccip.org.uk/media/1764/2017arc_sciencereview_004_seb.pdf.

Hennige, S.J. et al. 2014. Short-term metabolic and growth responses of the cold-water coral *Lophelia pertusa* to ocean acidification. *Deep Sea Research Part II: Topical Studies in Oceanography*, 99, 27-35.

Kröger S, Parker R, Cripps G & Williamson P (Eds.) 2018. *Shelf Seas: The Engine of Productivity, Policy Report on NERC-Defra Shelf Sea Biogeochemistry programme*. Cefas, Lowestoft. https://www.uk-ssb.org/shelf_seas_report.html.

MCCIP (2017). Marine Climate Change Impacts: 10 years' experience of science to policy reporting. (Eds. Frost M, Baxter J, Buckley P, Dye S and Stoker B) Summary Report, MCCIP, Lowestoft, 12pp. doi:10.14465/2017.arc10.000-arc. Accessed from: <http://www.mccip.org.uk/media/1770/mccip-report-card-2017-final-artwork-spreads.pdf>. Report cards on saltmarsh, maerl beds, coral gardens, sandeels, seagrass, horse mussel beds, and saline lagoons: <http://www.mccip.org.uk/adaptation-action/climate-change-and-marine-conservation/>.

Morecroft, M.D. & Speakman, L. (2015) Biodiversity Climate Change Impacts Summary Report. Living With Environmental Change. ISBN 978-0-9928679-6-6 copyright © Living With Environmental Change. Accessed from: <https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity/>.

Mossman, H. L., Grant, A., Lawrence, P. J., & Davy, A. J. (2015). Biodiversity climate change impacts report card technical paper: 10. Implications of climate change for coastal and inter-tidal habitats in the UK. Available from: <https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity-source10/>.

OSPAR (2017) OSPAR Intermediate Assessment 2017. Accessed from: <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/>.

Pateman, R., & Hodgson, J. (2015) Biodiversity Climate change impacts report card technical paper 6: The effects of climate change on the distribution of species in the UK. Available from: <https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity-source06/>.

Spalding, M. D., & Brown, B. E. (2015). Warm-water coral reefs and climate change. *Science*, 350(6262), 769-771.

Spark, T., & Crick, H. (2015) Biodiversity Climate Change impacts report card technical paper 12: The impact of climate change on biological phenology in the UK. Available from: <https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity-source12/>.

Williamson, P., Turley, C., & Ostle, C. (2017) Ocean acidification. Marine Climate Change Impacts Partnership: Science Review 2017. Available from:
http://www.mccip.org.uk/media/1760/2017arc_sciencereview_001_oac.pdf.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity Target 11

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 landscape and seascape.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target sets a quantitative *outcome* (extent of protected areas – covering all protected area types identified by the IUCN, including National Parks and Areas of Outstanding Natural Beauty). The assessment also considers whether the more qualitative parts have also been addressed (representative and well-connected systems, effectively and equitably managed).

The UK has made significant progress in ensuring its species and habitats of national and international importance are safeguarded in a network of marine and terrestrial protected areas. The UK's protected area network currently (as of March 2018) covers 28% of the UK's land area and 24% of its sea area, and further designation work is expected to ensure key species are adequately protected. The UK's protected area network has been designated following principles to help identify they are ecologically representative and well-connected. Civil society are involved in the protected area designation and management process through appropriate consultation processes or as stakeholders in management groups. Over 60% of sites within the UK protected area network are compliant with global management effectiveness criteria, as supported by positive trends seen in the condition of the UK protected areas. Nevertheless, the UK recognises that continued management is necessary to ensure the full recovery of protected habitats and species in the UK. In particular, work to fully implement marine protected area management measures and monitor their effectiveness is ongoing.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes the extent of UK protected areas and their contribution to qualitative aspects of the target. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK protected area network

Designation and management of protected areas are key mechanisms for taking action to reverse the loss of biodiversity and are a key component of the UK country biodiversity strategies. Protected areas cover many of the most valuable sites for biodiversity in the UK with associated legal mechanisms for safeguarding habitats and species with different levels of national and international importance. In addition, wider landscape designations have a number of purposes, including conservation and public enjoyment.

Within the UK sites that are nationally important for plants, animals or geological or physiographical features are protected by law as Sites of Special Scientific Interest (SSSIs) – or in Northern Ireland as Areas of Special Scientific Interest (ASSIs). In the marine environment a number of regional marine protected area (MPA) are designated, including Marine Conservation Zones in England, Wales and Northern Ireland and Nature Conservation MPAs (NCMPAs) in Scotland.

The UK also contributes to international networks of protected sites created under the Ramsar, World Heritage and OSPAR Conventions. Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), provide protection to habitats and species of European importance.

Wider landscape designations in the UK include Areas of Outstanding Natural Beauty (England, Wales and Northern Ireland), National Scenic Areas (Scotland), and National Parks (England, Scotland and Wales). These are categorised under the IUCN Protected Areas framework as category V or VI protected areas. They are included in the statistics calculated as the planning processes that operate in these areas have biodiversity conservation as a material concern in determining whether development should be supported or not. Work is underway to improve understanding of current and potential future biodiversity delivery through these wider designations in the UK, including the Glover Review in England (<https://www.gov.uk/government/news/national-parks-review-launched>).

The total extent of land and sea protected in the UK through national and international protected areas, and through wider landscape designations, has increased by 12.6 million hectares, from 15.4 million hectares in December 2013 to 28.0 million hectares at the end of March 2018. As a result the UK protects 28% of its land area, and 24% of its marine area, through national and international protected areas, and wider landscape designations (UK Biodiversity Indicator C1 and the UK MPA stocktake). This increase is almost entirely down to the designation of inshore and offshore MPAs under European Directives, and national designation programmes. The extent of protected areas on land has increased by 12,900 hectares since 2013. For information about the UK's MPAs, please refer to Section II of the report and the case study on 'Developing an ecologically-coherent and well-managed network of Marine Protected Areas (MPAs) to safeguard marine biodiversity in UK seas'. This includes information on the UK's Blue Belt Programme to designate MPAs in Overseas Territories' waters.

Protected area designation is continuing to take place in the UK, notably to ensure marine birds are adequately protected by the UK's MPA network. This has resulted in the recent designation of new marine SPAs with more expected shortly.

Significant progress has been made with the designation and management of protected areas in the UK's Overseas Territories (OTs) and Crown Dependencies (CDs) (see Barnsley *et al.* 2016), including, amongst others:

- **The Cayman Islands**
The expansion of current protected areas to cover 40-50% of Cayman's marine habitats has been put forward by the Department of Environment to the National Conservation Council and a public consultation has been conducted. In the terrestrial environment, protected areas such as the Colliers Reserve have been established for prime habitat for the blue iguana (*Cyclura lewisi*), which, assisted by the significant efforts of dedicated local conservationists, has now seen its IUCN Red List conservation status improve from Critically Endangered to Endangered.
- **Anguilla**
Sombrero Island (94 acres) has been designated as Anguilla's first Ramsar Convention Wetland of International Importance. It is a remote, flat-topped rocky outcrop 65 kilometres northwest of Anguilla. The cliffs and rocky areas are home to a large seabird colony including internationally important numbers of masked booby (*Sula dactylatra*), brown booby (*Sula leucogaster*), bridled tern (*Sterna anaethetus*) and brown noddy (*Anous stolidus*), as well as the endemic ground lizard (*Ameiva corvine*). The surrounding reefs are important for corals, sea-grass beds and foraging hawksbill turtles (*Eretmochelys imbricate*).

Effectively managed

In England, Scotland and Northern Ireland the percentage of features, or area, of A/SSSIs in favourable or unfavourable-recovering condition increased from 67% in 2005, to 86% in 2013, and remained stable at 85% in 2018. The proportion of features or area of land in unfavourable-recovering condition has increased from 14% in 2005 to 35% in 2018 (UK Biodiversity Indicator C1c). These changes reflect improved management of sites, but may also be affected by a greater number of sites/features having been assessed over time.

The proportion of European sites in favourable or unfavourable-recovering condition increased from 58% in 2005 to 74% in 2018 for SACs, and from 73% in 2005 to 83% in 2018 for SPAs. The proportion in recovering condition has increased from 17% in 2005 to 32% in 2018 for SACs, and from 9% to 28% for SPAs. This change reflects improved management of sites, but is also affected by a greater number of sites/features having been assessed over time. Significant effort has been put into targeted conservation effort, including agreement of the management required with land-owners/occupiers.

The IUCN National Committee UK, on behalf of the Department for Environment, Food and Rural Affairs, carried out an initial assessment of this on the UK's protected areas against IUCN's World Commission on Protected Areas (WCPA) Framework for Assessing Management of Protected Areas. The WCPA Framework identifies six key elements of protected area management, which together provide the basis of a PAME assessment, enabling an assessment of the way protected areas are established and managed, i.e. the management cycle.

This initial assessment, completed in January 2018, identified the following UK sites as falling within systems that effectively assess management effectiveness: OSPAR MPAs (via the OSPAR MPA management effectiveness assessment), natural World Heritage Sites (via World Heritage Periodic Reporting and IUCN's World Heritage Outlook 2014

and 2017) and all UK designations covered by Common Standards Monitoring (SSSIs/ASSIs, SACs and SPAs (Natura 2000 sites), and Ramsar). The assessment methodology adopted a simple traffic light system of compliance. Although these systems were deemed to be compliant there are still some gaps. There are over 8,000 UK protected areas within these PAME-compliant systems, which is more than 60% of UK protected areas by number. The proportion of the UK network by area in the terrestrial and marine environment is still to be calculated. Other designations were assessed as not having PAME-compliant methodologies as yet. The PAME information on these sites was submitted to UNEP-WCMC for inclusion within the GD-PAME and for use in CBD protected area outputs.

The UK has made substantial progress in the development of its MPA network. Work is ongoing to implement the management measures considered necessary to achieve the objectives of the UK MPA network and its constituent components, and to put in place monitoring programmes to detect the effectiveness of these measures over time. Further information is provided in the *Delivering an ecologically-coherent and well-managed network of Marine Protected Areas (MPAs) to safeguard marine biodiversity in UK seas* case study in Section II of the report.

Equitably managed

Civil society are involved in the protected area designation and management decision making process in the UK. In particular, the designation process for identifying and selecting national MPAs has allowed for increased stakeholder input. The identification of Marine Conservation Zones in England and Nature Conservation Marine Protected Areas in Scotland allowed for early involvement of stakeholders and considered socio-economic factors during site identification. Public participation and consultation is also central to the development of protected area management plans and management measures, which may take account of socioeconomic and cultural factors. For example, stakeholders are involved in decision making at 141 UK Ramsar sites (see section 16.3 of Ramsar COP13 UK National Report (2018)).

The UK also has a large and active non-governmental organisation community, which are engaged in wide range of national biodiversity conservation issues and have a constructive relationship with the UK government in helping achieve environmental objectives.

Ecologically representative and well-connected

To provide a good representation of the range and diversity of “best example” sites across Great Britain, A/SSSI selection is carried out on a basis which subdivides Britain into a number of geographical units, or “Areas of Search (AoS)”. These AoS are based upon either administrative or biogeographical boundaries and provide a practical geographical framework for selection across the national range of variation in both habitats and species assemblages resulting from differences in environmental factors, such as climate, topography, geology, soils and land-use history.

A number of ecological principles and considerations may influence the size, number and spacing of sites within any area which are outlined in guidance for specific habitats and species. Although this guidance seeks consistency in standards of SSSI selection, it is not possible to specify the uniform application of criteria to any species or habitat across Britain. The network must allow for and reflect geographical variation in habitats, plant and animal communities, species morphology and genetic variability. It must also reflect the

extent, distribution and abundance of features. For further information on A/SSSI selection criteria see <http://jncc.defra.gov.uk/page-2303>.

The protected areas network has been designated with an aim to be ecological representative and well-connected. Some of the terrestrial national sites which underpin international designations are small, so while they have been chosen to be good examples for the species and habitats they protect, and thus can be viewed as representative, they may not be as well connected as the larger sites.

The development of the UK MPA network is based on principles derived from OSPAR guidance on developing an ecologically coherent network of MPAs (OSPAR 2006). MPAs in UK mainland waters represent all biogeographic regions of the UK in >10% coverage. All 23 broad-scale habitat types occurring in English waters are protected within MPAs more than once across all regions in which the feature occurs (Carr *et al.*, 2016a). In Scotland, the MPA network affords protection to all known sub-types of habitats and species across their geographic range (Cunningham *et al.*, 2015). In Wales, there are a small number of shortfalls in the protection of habitats and species of conservation interest that will be addressed through Welsh Government's work to complete its contribution to the wider UK MPA network where MPAs are considered an appropriate conservation mechanism (Carr *et al.*, 2016b).

Understanding of connectivity in the marine environment is limited. However, the OSPAR guidance (OSPAR 2006) provides guidance on appropriate distance between MPAs: nearshore MPAs should be <250 km apart and offshore areas <500 km apart. According to these guidelines, the UK network can be considered well-connected.

Indicators used in this assessment

UK Biodiversity Indicator **C1: Protected areas** <http://jncc.defra.gov.uk/page-4241>.

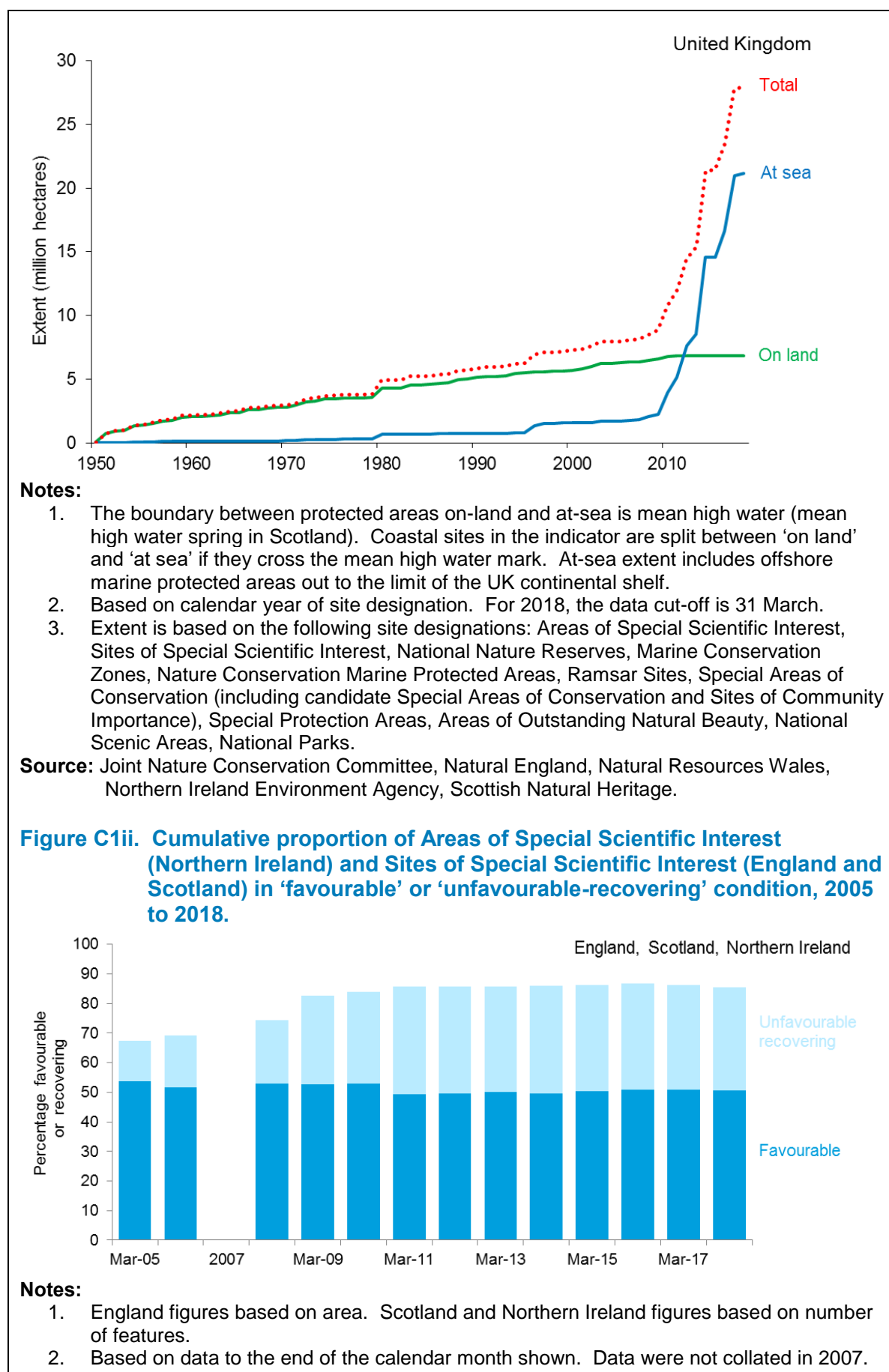
- a. Total extent of protected areas: on-land
- b. Total extent of protected areas: at-sea
- c. Condition of Areas / Sites of Special Scientific Interest

The total extent of land and sea protected in the UK through national and international protected areas, and through wider landscape designations, has increased by 12.6 million hectares, from 15.4 million hectares in December 2013 to 28.0 million hectares at the end of March 2018.

This 12.6 million hectare increase is almost entirely down to the designation of inshore and offshore marine sites under the European Union (EU) Habitats Directive, the designation of Marine Conservation Zones in English, Welsh, and Northern Irish waters, and designation of Nature Conservation Marine Protected Areas in Scottish waters. The extent of protected areas on land has increased by 12,900 hectares since 2013.

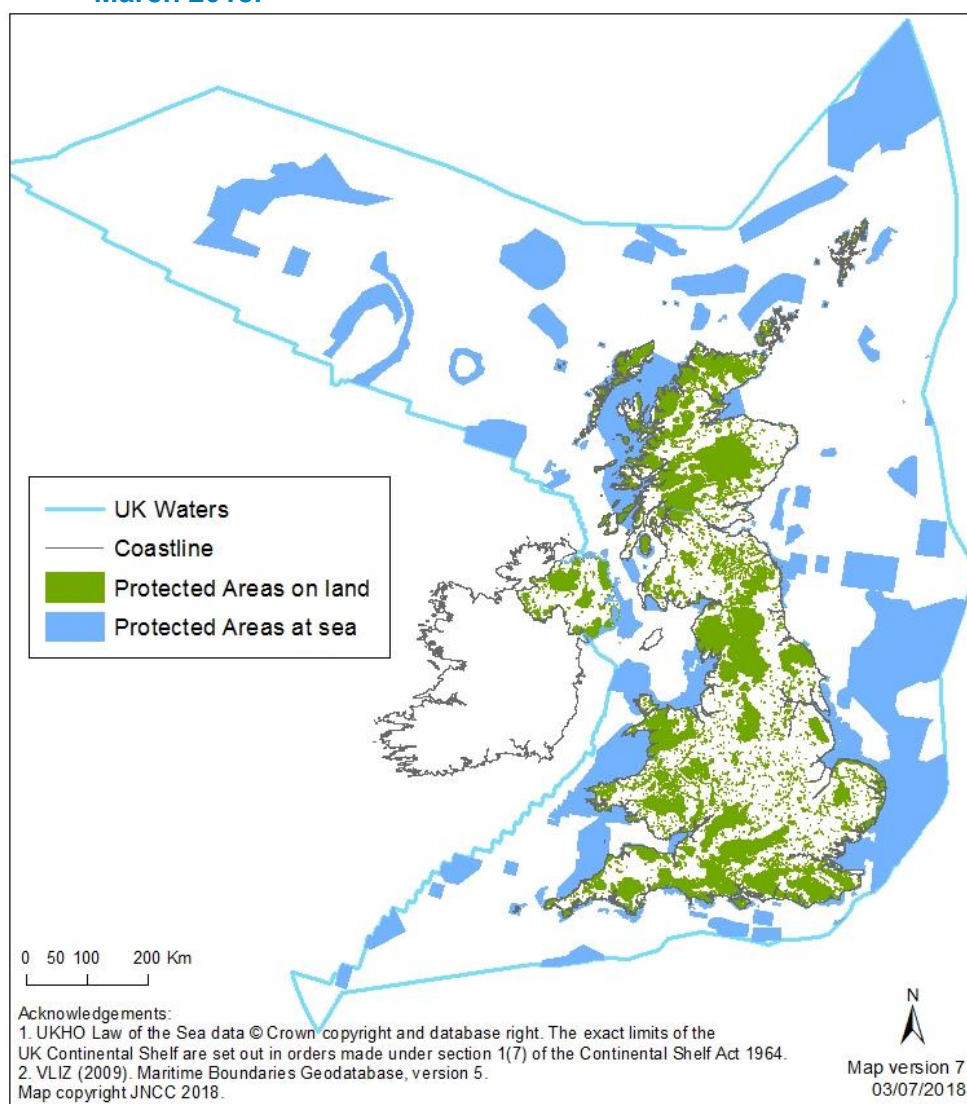
The percentage of features, or area, of A/SSSIs in favourable or unfavourable-recovering condition increased from 67% in 2005, to 86% in 2013, and remained stable at 85% in 2018. The proportion of features or area of land in unfavourable-recovering condition (the light blue part of Figure C1ii) has increased from 14% in 2005 to 35% in 2018. These changes reflect improved management of sites, but may also be affected by a greater number of sites/features having been assessed over time.

Figure C1i. Extent of UK nationally and internationally important protected areas: (a) on land and (b) at sea, 1950 to 2018.



3. Imputation has been used to calculate the breakdown between favourable and unfavourable-recovering for Northern Ireland for the years 2009 to 2011.
 4. Figures exclude condition of A/SSSIs notified for geological features only.
- Source:** Natural England, Northern Ireland Environment Agency, Scottish Natural Heritage.

Figure C1iii. Map of UK terrestrial and marine protected areas, as at 31 March 2018.



Note: Includes the following site designations: Areas of Special Scientific Interest, Sites of Special Scientific Interest, National Nature Reserves, Marine Conservation Zones, Nature Conservation Marine Protected Areas, Ramsar Sites, Special Areas of Conservation (including candidate Special Areas of Conservation and Sites of Community Importance), Special Protection Areas, Areas of Outstanding Natural Beauty, National Scenic Areas and National Parks.

Source: Joint Nature Conservation Committee, based on its own data and data from Natural England, Natural Resources Wales, Northern Ireland Environment Agency and Scottish Natural Heritage.

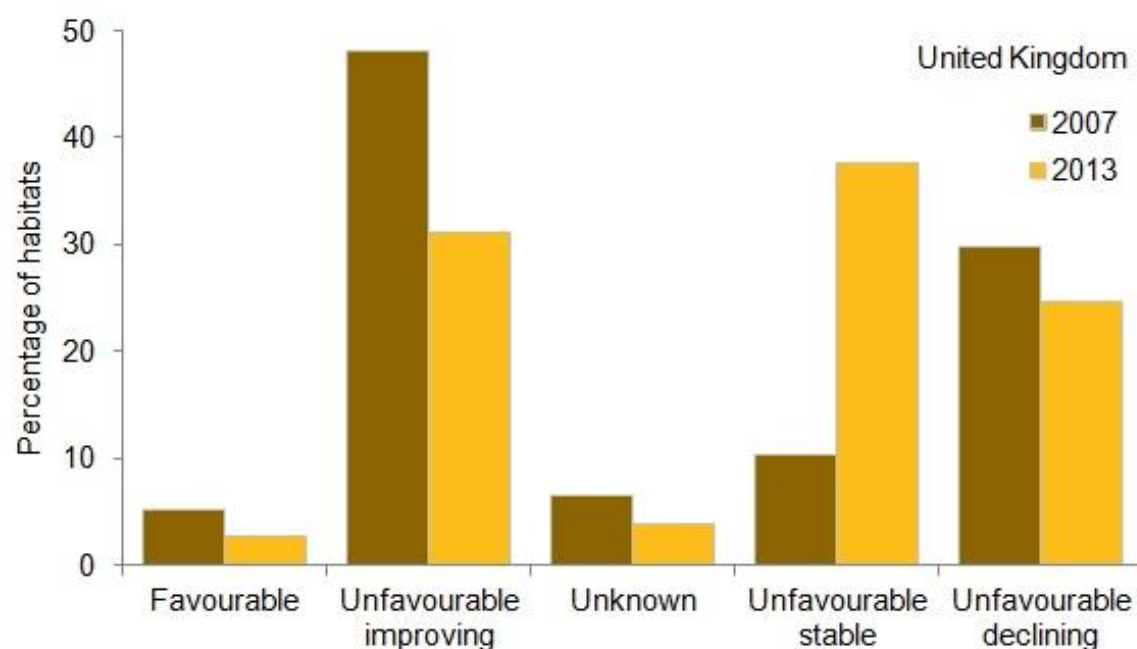
UK Biodiversity Indicator **C3a: Status of UK habitats of European importance**
<http://jncc.defra.gov.uk/page-4239>.

In 2007, 5% of UK habitats listed on Annex I of the Habitats Directive were in favourable conservation status, decreasing to 3% in 2013.

The conservation status of 48% of habitats was unfavourable-improving in 2007, decreasing to 31% in 2013.

The conservation status of 30% of the habitats was unfavourable-declining in 2007, decreasing to 25% in 2013.

Figure C3ai. Percentage of UK habitats of European importance in improving or declining conservation status in 2007 and 2013.



Notes:

1. The chart is based on 77 habitats listed on Annex I of the Habitats Directive.
2. The aim of the Habitats Directive is to achieve favourable conservation status for the species and habitats listed in its Annexes. An assessment of status and trends for each species and habitat is undertaken every 6 years. Trends in unfavourable conservation status allow identification of whether progress is being made, as it will take many years for some habitats and species to reach favourable conservation status.

Source: UK Habitats Directive (Article 17) reports 2007 and 2013.

UK Biodiversity Indicator C3b: Status of UK species of European importance

<http://jncc.defra.gov.uk/page-6566>.

In 2007, 26% of UK species listed on Annexes II, IV or V of the Habitats Directive were in favourable conservation status, increasing to 39% in 2013.

The conservation status of 18% of species was improving in 2007, decreasing to 10% in 2013.

The conservation status of 13% of the species was declining in 2007, increasing to 15% in 2013.

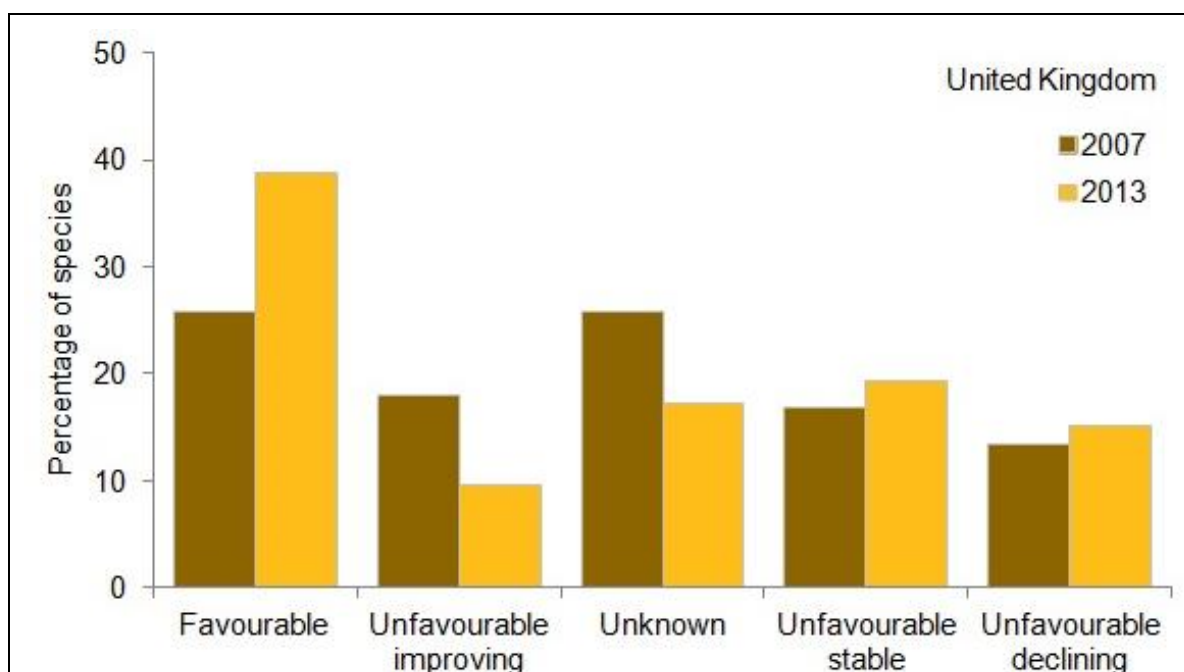


Figure C3bi. Percentage of UK species of European importance in improving or declining conservation status in 2007 and 2013.

Notes:

1. The number of species assessed was 89 in 2007, and 93 in 2013.
2. The chart is based on species listed on Annexes II, IV and V of the Habitats Directive, but excluding vagrants.
3. The aim of the Habitats Directive is to achieve favourable conservation status for the species and habitats listed in its Annexes. An assessment of status and trends for each species and habitat is undertaken every 6 years. Trends in unfavourable conservation status allow identification of whether progress is being made, as it will take many years for some habitats and species to reach favourable conservation status.

Source: UK Habitats Directive (Article 17) reports 2007 and 2013.

Please describe any other tools or means used for assessing progress

UK Biodiversity Indicator **C2: Habitat connectivity** <http://jncc.defra.gov.uk/page-6891>.

UK Biodiversity Indicator **C4a: Status of UK priority species - Relative abundance** <http://jncc.defra.gov.uk/page-4238>.

UK Biodiversity Indicator **C4b: Status of UK priority species – Distribution** <http://jncc.defra.gov.uk/page-6850>.

UK Biodiversity Indicator **C5: Birds of the wider countryside and at sea** <http://jncc.defra.gov.uk/page-4235>.

UK Biodiversity Indicator **C6: Insects of the wider countryside (butterflies)** <http://jncc.defra.gov.uk/page-4236>.

UK Biodiversity Indicator **C7: Plants of the wider countryside** <http://jncc.defra.gov.uk/page-6886>.

UK Biodiversity Indicator **C8: Mammals of the wider countryside (bats)**
<http://jncc.defra.gov.uk/page-4271>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Barnsley, S., E. Cray, M. Pienkowski, C. Wensink (2016) Measures of performance by 2016 of UK Overseas Territories and Crown Dependencies in implementing the 2001 Environment Charters or their equivalents and moving towards the Aichi Targets and Sustainable Development Targets. UK Overseas Territories Conservation Forum, ISBN 978-1-911097-03-7.

Carr *et al.* (2016a) Assessing progress towards an ecologically coherent MPA network in Secretary of State Waters in 2016: Results. Joint Nature Conservation Committee. Available at:
http://jncc.defra.gov.uk/pdf/JNCC_NetworkProgressInSoSWaters2016_Results_Final.pdf

Carr *et al.* (2016b) Assessing the contribution of Welsh MPAs towards an ecologically coherent MPA network in 2016. Joint Nature Conservation Committee. Available at:
http://jncc.defra.gov.uk/pdf/JNCC_NetworkProgressWelshWaters_Final.pdf.

Cunningham *et al.* (2015) Scottish Marine Protected Area advice. Scottish Natural Heritage. <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/national-designations/marine-protected-areas/scottish-marine-protected>.

Fletcher, S., *et al.* 2012. Description of the ecosystem services provided by broad-scale habitats and features of conservation importance that are likely to be protected by Marine Protected Areas in the Marine Conservation Zone Project area. Natural England Commissioned Reports, Number 088.

OSPAR (2006) Guidance on developing an ecologically coherent network of OSPAR Marine Protected Areas (Reference number 2006-3). OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic.

Ramsar 13th Meeting of the Conference of the Contracting Parties UK National Report (2018). Available from:
https://www.ramsar.org/sites/default/files/documents/library/cop13nr_united_kingdom_e.pdf.

Saura, S. & J. Torné (2009) Conefor Sensinode 2.2: a software package for quantifying the importance of habitat patches for landscape connectivity. Environmental Modelling & Software 24: 135-139.

UK MPA Stocktake <http://jncc.defra.gov.uk/page-7438> and contributing to a Marine Protected Area network <http://jncc.defra.gov.uk/page-4549>.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity 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.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target relates to known threatened species and has two components: prevention of extinction and improvement in conservation status.

CBD guidance recommends that assessment of status is based on IUCN red list categories, or assessments of change in the distribution or abundance of species. There is limited information change information on for IUCN status categories in the UK. The UK, has therefore used data on relative abundance and distribution of selected species. This has the advantage that data from a greater number of species can be considered in the assessment. However, these data are complex, with data showing different patterns for different groups of species and requires a qualitative assessment, rather than a simple comparison of status in 2011 vs status in 2018.

The evidence of ongoing decline in conservation status is clear, and the UK has made its assessment against this background of historical, long-term, widespread decline. Good progress has been made in some limited areas, but it is acknowledged that overall conservation status of threatened species is still declining.

There has been progress in improving the status (abundance and/or distribution) of some nationally and internationally threatened species, largely through targeted interventions, often involving partnerships of Government, conservation non-governmental organisation, academics and the landowning community. Examples include successful re-introductions of the white-tailed eagle, short haired bumble bee, beaver in Scotland, and chequered skipper in England as well as recovery programmes for red kite and natterjack toad. Knowledge gaps remain in the number and trends of threatened species in the UK, but progress has been made in assessing the threat of extinction to UK species, and with monitoring indicator species to help inform a broad assessment of the status of UK species and prioritise management. Overall 14% of UK species have had their conservation status assessed; 21% of these are threatened but none have gone extinct since 2010, although not all of the UK flora and fauna has been assessed.

Progress is assessed as insufficient because evidence suggests that there have been widespread and significant ongoing declines across many species (for example for priority species as a group and for groups such as farmland birds, specialist butterflies and other pollinating insects). Whilst declines have not been on the scale seen in the last Century, progress has not been sufficient to secure an overall improvement in their status.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes the conservation status of UK species, indicator species trends and examples of species conservation initiatives. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

Conservation status of UK species

The UK Species Inventory, managed by the Natural History Museum, currently (as of November 2018) contains 59,210 species of animals, plants and fungi that are known to occur in the UK (including native, naturalised and non-native species). This number is increases further (estimated up to 80,000) when including single-celled organisms and accounting for known deficiencies in insects and invertebrates and gaps in taxonomic groups which remain poorly studied.

There are 8,584 species which have been either assessed at the national or global scale based on IUCN Red List criteria (JNCC 2018a). While progress has been made, many UK species have not been assessed against IUCN Red List criteria. For example, no fish, marine mammals, amphibians or reptiles have had their national conservation status assessed. Any consideration of trends both within and between taxa should be understood within this context.

The majority of these species have been assessed under the ‘Species Status Assessment Project’ led by the UK’s Statutory Nature Conservation Bodies (Natural England, Natural Resources Wales, Scottish Natural Heritage, Joint Nature Conservation Committee), working with individual species monitoring groups, taxon specialists and NGOs.

The national conservation status can only be considered for native, naturalised species and sub-species. Species which are non-native, exotic, introduced or vagrant are not evaluated and therefore not included in this summary. With the exception of vascular plants, the majority of species assessed in each taxonomic group have only had one conservation status assessment, and some of these were assessed against historic guidelines rather than the latest IUCN (2001) Red List Categories and Criteria. The majority of species assessed to date therefore require further periodic re-assessment to be able to evaluate trends in their statuses, and to ensure they are assessed against the latest criteria. The most recent assessment for each species, regardless of its age, is presented below to provide an indication of the number of threatened and extinct species in the UK.

The date a species is assessed as Extinct (date of assessment) is different from the actual date of extinction (the year last seen in the wild) and a species can only be declared Extinct after 10 years of searching and recorded absence. Therefore, none of species currently assessed as Extinct have been declared extinct in the last decade.

Nationally threatened species

8,041 species have been assessed against IUCN Red List criteria at a national scale for Great Britain and have assigned the following categories: 1,569 are threatened (Critically Endangered (Possibly Extinct), Critically Endangered, Endangered and Vulnerable), 673 are Near Threatened, 4,941 are Least Concern and 651 are Data Deficient and therefore the threat of extinction for these species remains unknown. The taxa with the highest proportion of species assessed nationally above Least Concern include birds (49%) and terrestrial mammals (55%). Insects, and in particular beetles and moths, have experienced the highest proportion of national extinctions in GB across taxa, with 5% of insect species assessed being classified as extinct.

207 species have been assessed as nationally extinct in Great Britain in recent history, however no species are known to have gone nationally extinct since 2010.

Table 12.1. Total number of known species aggregated into broad taxon groups which have been assessed Nationally against IUCN Red List criteria showing total numbers assigned as threatened (CR(PE), CR, EN, VU), Near Threatened, Least Concern and Extinct in Great Britain. The total number assessed includes species assessed as Data Deficient.

Broad Taxon Group	Number of known UK Species	Number assessed	Number threatened	Number NT	Number LC	Number Extinct in GB
Insects	22,059	2,798	746	261	1,339	138
Fungi + lichen	18,599	2,088	203	233	1,363	29
Invertebrates	9,322	237	24	14	182	1
Vascular plants	4,566	1,891	349	94	1,378	27
Non-vascular plants	1,622	16	11	3	0	2
Arachnids	1,661	638	102	29	491	3
Fish	662	0				
Birds	590	326	123	34	162	7
Terrestrial mammals	60	47	11	5	26	
Marine mammals	39	0				
Amphibians	15	0				
Reptiles	15	0				
TOTAL	59,210	8,041	1,569	673	4,941	207

Globally threatened species

There are 348 species known to be endemic to Great Britain. These endemic species have a global IUCN Red List status applied as they do not occur outside Great Britain (Table 12.2). There are likely to be more endemic species in the UK and further research is in progress to identify them.

Table 12.2. Total number of known endemic species aggregated into broad taxon groups which have been assessed Globally against IUCN Red List criteria showing total numbers assigned as threatened (CR(PE), CR, EN, VU), Near Threatened, Least Concern and Extinct. The total number assessed includes species assessed as Data Deficient.

Broad Taxon Group	Number assessed	Number Threatened	Number Near Threatened	Number Least Concern	Number Extinct Globally
Fish	1	1	0	0	0
Insects	2	1	1	0	0
Vascular plants	343	155	11	149	6
Invertebrate	1	1	0	0	0
Arachnids	1	1	0	0	0
Total endemics	348	159	12	149	6

The total number of known threatened species in Great Britain, including endemics and those assessed at the national scale, is 1,728; approximately 21% of species assessed.

Where certain taxonomic groups such as marine mammals, reptiles, fish and amphibians are yet to be assessed nationally, their global status as published on the IUCN Red List (2018) has been considered instead (Table 12.3). A significant proportion of the UK's fish (27%), reptiles (46%) and marine mammals (19%) that have been assessed globally are categorised as threatened. However, not all species are assessed, and many assessments are historical and based on historic IUCN criteria (before 2001). These global assessments have not been included in the overall number of known threatened species in Great Britain.

Table 12.3. Total number of known species aggregated into broad taxon groups which have been assessed Globally (and with no equivalent national assessment) against IUCN Red List criteria

showing total numbers assigned as threatened (CR(PE), CR, EN, VU), Near Threatened, Least Concern and Extinct. The total number assessed includes species assessed as Data Deficient.

Broad Taxon Group	Number assessed	Number Threatened	Number Near Threatened	Number Least Concern	Number Extinct Globally
Fish	152	42	16	76	1
Marine mammals	26	5	0	12	0
Amphibians	8	0	0	8	0
Reptiles	13	6	1	5	0
Total	199	53	17	101	1

Eight UK species have been assessed as globally extinct in recent history, including six endemic flowering plant species, great auk (*Pinguinus impennis*) and houting (*Coregonus oxyrinchus*). However, no species are known have gone globally extinct in the UK since 2010.

The UK's overseas territories are home to globally significant species populations. To date, of the c.28,000 native species recorded on the OTs, 1,937 (~7%) species have assessed globally against IUCN Red List criteria, and 303 are globally threatened (Churchyard *et al.* 2014). In part as a result of the island geography of the OTs, many of their species are endemic and so are found nowhere else in the world. In addition, and as an indication of the threat to island biodiversity, there are 39 recorded extinctions in the UK Overseas Territories (JNCC 2018b). The latest extinction in the Overseas Territories, the St Helena olive *Nesiota elliptica*, occurred in 2003 when the last tree in cultivation died (the last wild individual died in 1994). It is likely that these figures are under-estimates; new studies invariably report the occurrence of additional species or populations, especially amongst the less well-known taxa, such as invertebrates.

Indicator species trends

Recent trends across the UK Biodiversity Indicators for species have been mixed; while positive trends towards recovery are evident amongst some indicator species (UK Biodiversity Indicator C8 & C3b), this is set against wider indicator species trends that show continued declines in abundance and/or populations that remain significantly below baselines for many terrestrial and marine birds, butterflies and UK priority species (UK biodiversity Indicators C5, C6 & C4a, OSPAR 2017). Wider evidence from 4,000 freshwater and terrestrial species in the UK suggests there has been 56% decline in abundance or occupancy since 1970 (Hayhow *et al.* 2016).

Bat populations in the UK have increased by 31% between 1999 and 2017, the increase being significant in four out of the eight bat indicator species (UK Biodiversity Indicator C8). These bat population trends should be understood within the context of significant bat population declines that are likely to have occurred throughout Western Europe during the 20th century.

Between 2007 and 2013 there has been an increase in the proportion of UK species of European importance in favourable conservation status from 26% to 39% (UK Biodiversity Indicator C3b). This, however, has been accompanied by an increase in the proportion UK species of European importance with a declining conservation status from 13% to 15%.

There have been long-term declines in the abundance of most groups of indicator birds, including breeding farmland, woodland, water, wetland, and seabirds (UK Biodiversity Indicators C5). There has, however, been a long-term increase in the abundance of

wintering waterbirds in the UK and the abundance of woodland and wetland birds has stabilised in the short-term.

Populations of butterfly habitat specialists and species of the wider countryside have stabilised in the short-term but remain significantly lower than when records began in 1976 (UK Biodiversity Indicators C6).

While the distribution of 2,890 UK priority species has remained stable, with an even balance of species increasing and decreasing in their distribution (UK Biodiversity Indicator C4a), the abundance of UK priority species has declined significantly to 32% of its value in 1970 (UK Biodiversity Indicator C4b). Of the four broad taxonomic groups included on the priority species list (mammals, birds, moths and butterflies), the decline in priority species abundance is largely driven by moths.

The State of Nature report (Hayhow et al. 2016), published by a consortium of UK conservation and research organisations, found that 56% of almost 4,000 terrestrial and freshwater species assessed in the UK have declined in abundance or occupancy since 1970. Average species abundance or occupancy has fallen by 16% since 1970. Of the three taxonomic groups assessed - vertebrates, invertebrates and plants – a higher proportion of invertebrates are declining than other taxonomic groups, with 59% having declined since 1970.

Since the mid-2000s, the breeding abundance of more than a quarter of the marine bird species assessed in the OSPAR Maritime Area have been below the 1992 baseline, indicating that the populations are not healthy (OSPAR 2017). A similar pattern was found in the non-breeding abundance of species that visit the Arctic Waters and Celtic Seas during migration and / or during winter. In contrast, non-breeding populations in the Greater North Sea are doing much better, and with 75% or more of species meeting assessment values in every year since 1993 are considered healthy.

UK initiatives

OSPAR Threatened and/or Declining Species & Habitats

The UK is a Contracting Party to the OSPAR Convention which is the legislative instrument used for regulating international cooperation on environmental protection in the North East Atlantic.

In order to protect biodiversity, OSPAR has defined a list of 'threatened and/or declining species and habitats' that are in need of protection, including 42 species and 16 habitats (<https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats>). This list is based upon nominations of species and habitats that were considered priorities for protection by Contracting Parties and observers to the Commission. For each of the habitats and species on the list, OSPAR has developed background documents and recommendations on furthering their protection and conservation in the relevant regions of the OSPAR Maritime Area.

The UK has made considerable progress in implementing these recommendations at the national level and is working closely with other OSPAR Contracting Parties to implement those that require collective action. Progress made by the UK in implementing these recommendations was reported to the OSPAR Commission in 2013 and 2016, and is due again in 2019 (and six-yearly thereafter). Measures adopted to date include the designation of marine protected areas, measures to avoid or reduce disturbance, injuring and/or killing, and the establishment of monitoring programmes.

Millennium Seed Bank

Royal Botanic Gardens Kew's Millennium Seed Bank UK Programme comprises a suite of projects to secure ex-situ collections of the UK Flora and to make these available for use in recovery and restoration programmes. As of March 2018, the Millennium Seed Bank held 7,435 seed collections from the UK, comprising 2,077 native and archeophyte taxa. This represents 75% of the UK's total native and archeophyte flora and 78% of threatened taxa. These collections are made available for use in science and conservation, including for use in species recovery projects. Between 2012 and 2017 small samples were made available via the MSB seed list from 154 collections for environmental purposes including regeneration, reintroduction and habitat restoration projects. Furthermore, during 2011-2018 Kew has worked with 31 partners to provide plant material and technical expertise to 57 projects for species recovery and habitat restoration.

Country initiatives

A range of species reintroduction and reinforcement programmes have been undertaken across the UK and its Overseas Territories and Crown Dependencies:

- Reintroduction programmes designed to reintroduce species previously extinct in the UK: white-tailed sea eagle (*Haliaeetus albicilla*) in Scotland; Eurasian beaver (*Castor fiber*) in Scotland and England (trial release only); short-haired bumblebee (*Bombus subterraneus*) in England; large blue butterfly (*Maculinea arion*) in England.
- Reinforcement programmes designed to restore population numbers in existing territories: golden eagle (*Aquila chrysaetos*) in Scotland; common crane (*Grus grus*) in England; pine marten (*Martes martes*) and red squirrels (*Sciurus vulgaris*) in Wales; lady's slipper orchid (*Cypripedium calceolus*) in England; Lesser Kestrel (*Falco naumanni*) and Barbary Partridge (*Alectoris barbara*) in Gibraltar; seagrass (*Cymodocea nodosa* and *Zostera marina*) in Gibraltar; European oyster (*Ostrea edulis*) in Gibraltar.
- Reintroduction programmes in suitable sites to promote range expansion of priority species: red kite (*Milvus milvus*) in England, Scotland and Northern Ireland; sand lizard (*Lacerta agilis*) in England and Wales; natterjack toad (*Bufo calamita*) in England and Wales; dormice (*Muscardinus avellanarius*) in England; juniper (*Juniperus communis*) on the Isle of Man.

There is increasing evidence for the positive impact of agri-environment schemes (AES) in helping support farmers manage their land sustainably and promote species conservation (GWCT 2018). With AES funding UK farmers have been able to introduce a range conservation measures which have led to increase in numbers or breeding success of endangered bird species, such as skylark (*Alauda arvensis*), linnet (*Linaria cannabina*), corn bunting (*Emberiza calandra*) and lapwing (*Vanellus vanellus*).

A common factor in the success of these species conservation initiatives has been partnership working between government, non-governmental organisations, local communities and land owners.

Species conservation programmes, England

In 2017/18 Natural England and Defra invested £780,000 in the Species Recovery Programme in England, which then received over £1.5 million further investment from project partners. The programme exists to promote targeted recovery action – including

land management, habitat restoration and reintroductions, surveys, and research. The Back from the Brink programme is a £7.7 million partnership, led by Natural England, with a range of NGOs and delivery partners, working to prevent the extinction of threatened species in England. The programme is targeting 112 species, taking direct action to conserve them. Public engagement is central to this programme, training 14,450 people in the skills needed to act for threatened species and inspiring volunteers to devote time towards species conservation.

As part of commitments in the 25 Year Environment Plan, the UK Government will provide opportunities for the reintroduction of formerly native species to England where there are clear environmental and socio-economic benefits.

The UK Government has licenced the release of beavers as part of a 5-year trial reintroduction on the River Otter in Devon, led by the Devon Wildlife Trust, which will conclude in 2020. It is estimated that there are currently eight pairs of animals within this trial. This trial will be used to inform decision making and strategy regarding the permanent reintroduction of the species into the wild. The Government welcomes applications for trial releases of beavers and will continue to assess proposals on a case by case basis, in line with published guidance.

Development of a national framework for the IUCN global translocation and reintroduction guidelines, Scotland

A new Scottish Code and Best Practice Guidelines for Conservation Translocations was produced in 2014, led by RBGE and SNH, on behalf of the 27 organisations of the National Species Reintroduction Forum (www.snh.gov.uk/translocation-code). This involved input from the land-use, conservation and science sectors. The Code and Guidelines have been produced to guide conservation translocations in Scotland and to minimise conflicts. For 'low risk' translocations, they serve as a checklist of issues to consider, and provide a mechanism for translocations to proceed in a careful and thorough fashion, aiming to maximise the chances of success, without the need for excessive bureaucracy and paperwork. Where translocation has legal constraints, or the potential for negative impacts on people, biodiversity or the wider environment, the code and guidelines outline the process for planning, consultation, and evaluation of benefits and risks to inform the decision of whether (and how) to proceed.

Overseas Territories and Crown Dependencies initiatives

Conservation action leads to increased Cahow population, Bermuda

The Bermuda petrel, or cahow, (*Pterodroma cahow*) is endemic to Bermuda and was thought to have been extinct for three centuries. In 1951, a small colony was discovered on some small offshore islets. Due to the conservation efforts of the Bermuda Government, and supported by non-governmental organisations, the population has increased from the historic low of 18 pairs to around 117 pairs in the 2016-2017 breeding season, with 61 chicks successfully fledged in spring 2017. A key element of the conservation work has been the translocation of birds from low lying nesting islands to establish a new nesting colony on the larger and more elevated Nonsuch Island, where there is an ongoing rodenticide programme which aims to keep the nesting islands rat-free. Additional habitat enhancement has been carried out, including measures to stop nest-site competition with the white-tailed tropicbird (*Phaethon lepturus catsbyii*) by fitting baffles with specially sized holes at nest entrances, which exclude tropicbirds but allow entry by the petrels.

The Cahow Recovery Programme continues; latest updates can be found in annual reports online at <http://environment.bm/cahow-recovery-programme>.

Lesser Antillean iguana reintroduction, Prickly Pear, Anguilla

In Anguilla, local volunteers, led by the Anguilla National Trust and with the support of international partners, have had success restoring the native wildlife on the islands of Prickly Pear East and West. Internationally recognised as both a Key Biodiversity Area and an Important Bird Area, the Prickly Pear cays have come under significant recent pressure from the invasive brown rat (*Rattus norvegicus*). However, the islands have now been declared rat free following a rat eradication programme that started in 2015 and used plastic bottles donated by the local community for bait traps. This in turn has allowed for the re-introduction of the native Lesser Antillean iguana (*Iguana delicatissima*) to Prickly Pear East, protecting them from threats on the mainland that include competition with the invasive green iguana (*Iguana iguana*), loss of habitat from the clearing of land, and hunting by humans, cats, and dogs. The re-introduction serves as a successful model for future conservation work in the Lesser Antilles region and worldwide.

Indicators used in this assessment

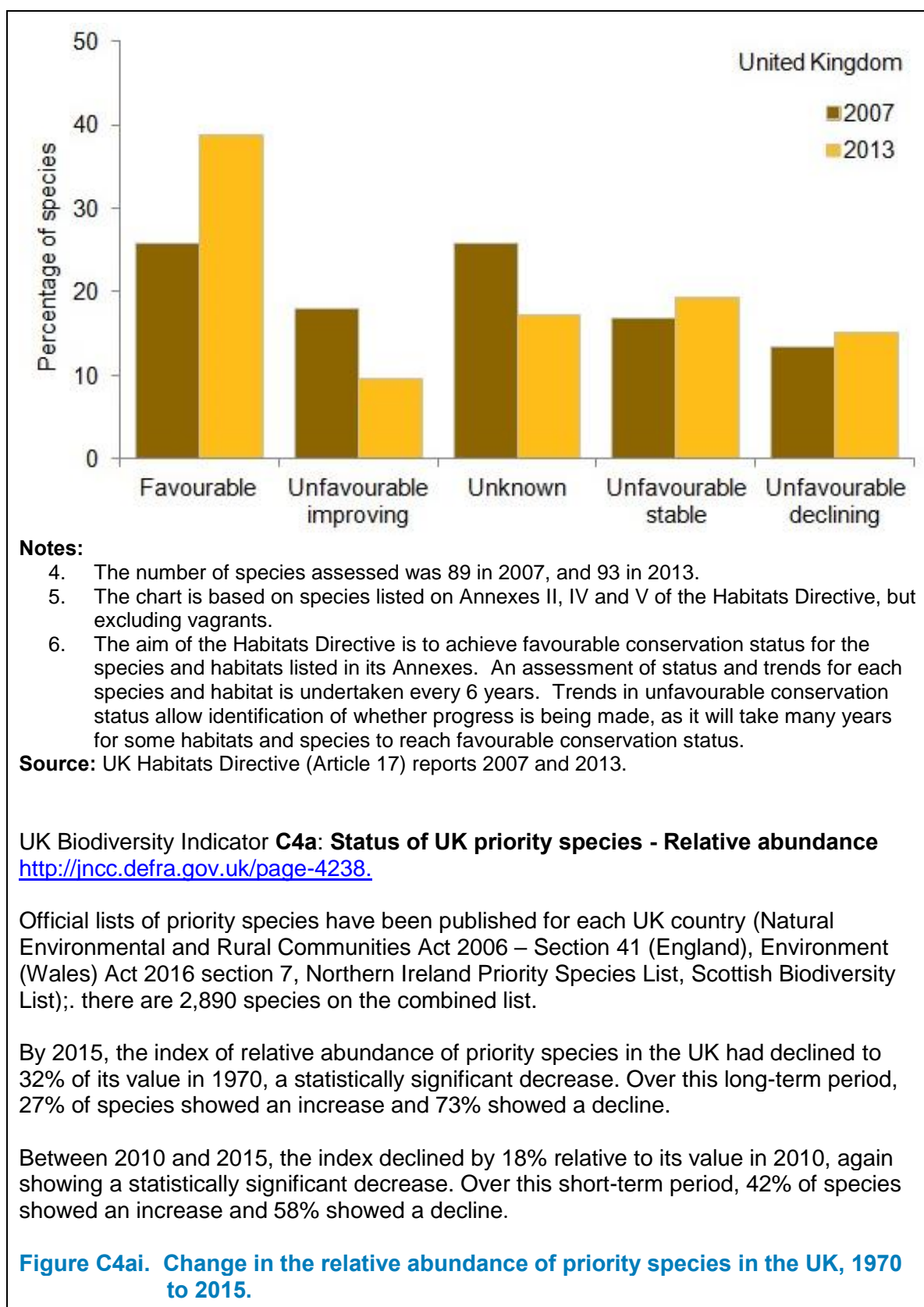
UK Biodiversity Indicator **C3b: Status of UK species of European importance**
<http://jncc.defra.gov.uk/page-6566>.

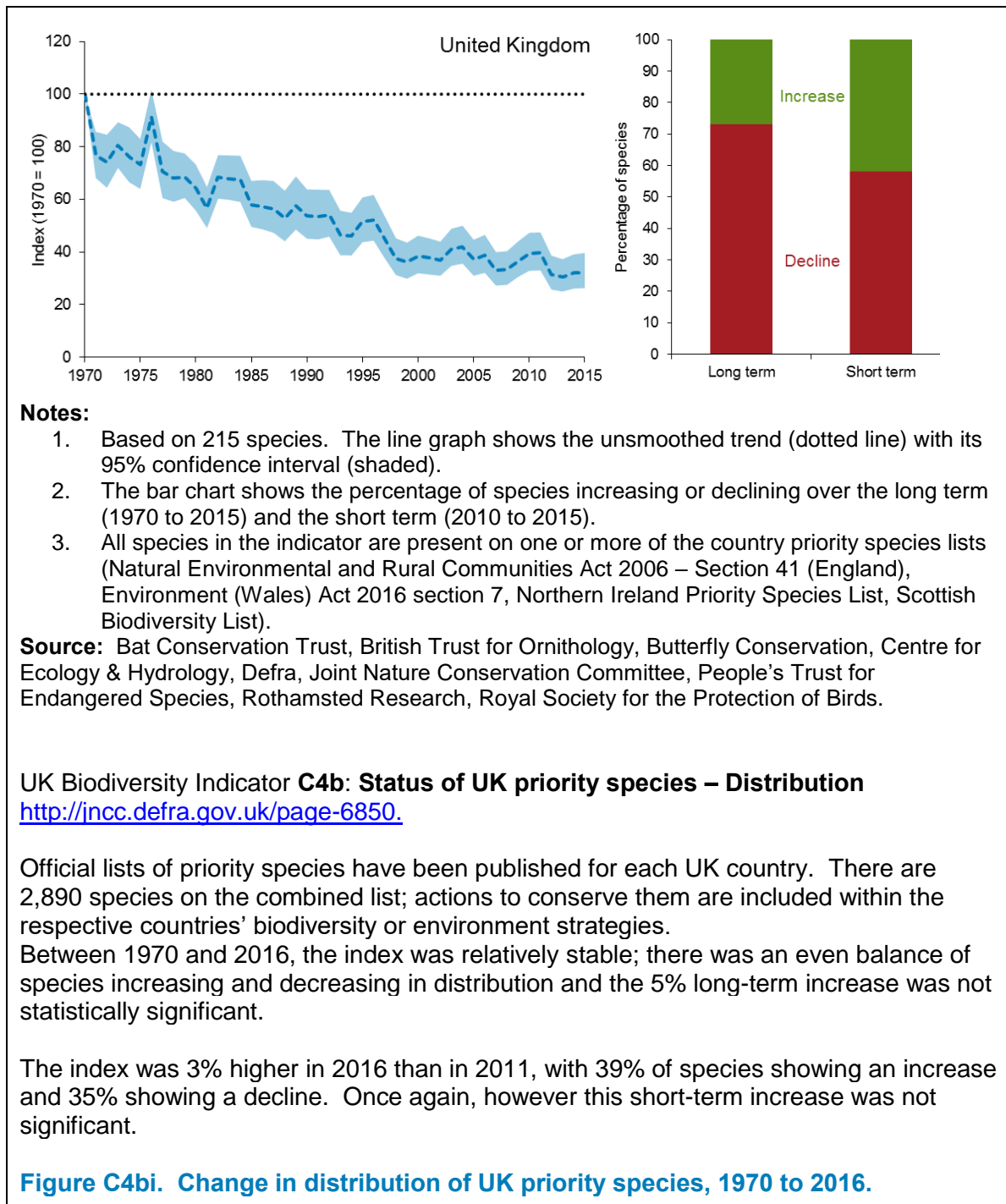
In 2007, 26% of UK species listed on Annexes II, IV or V of the Habitats Directive were in favourable conservation status, increasing to 39% in 2013.

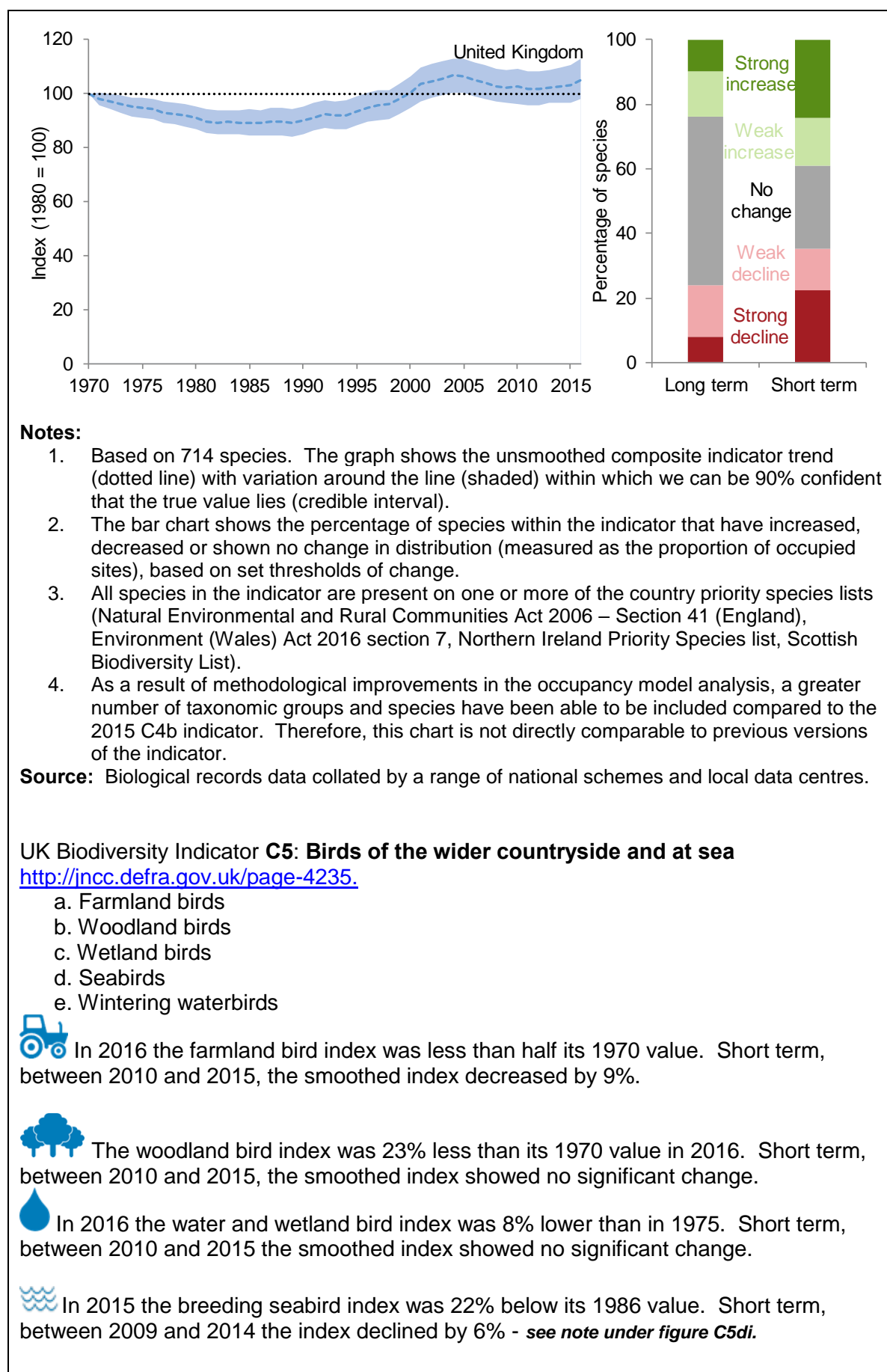
The conservation status of 18% of species was improving in 2007, decreasing to 10% in 2013.

The conservation status of 13% of the species was declining in 2007, increasing to 15% in 2013.

Figure C3bi. Percentage of UK species of European importance in improving or declining conservation status in 2007 and 2013.



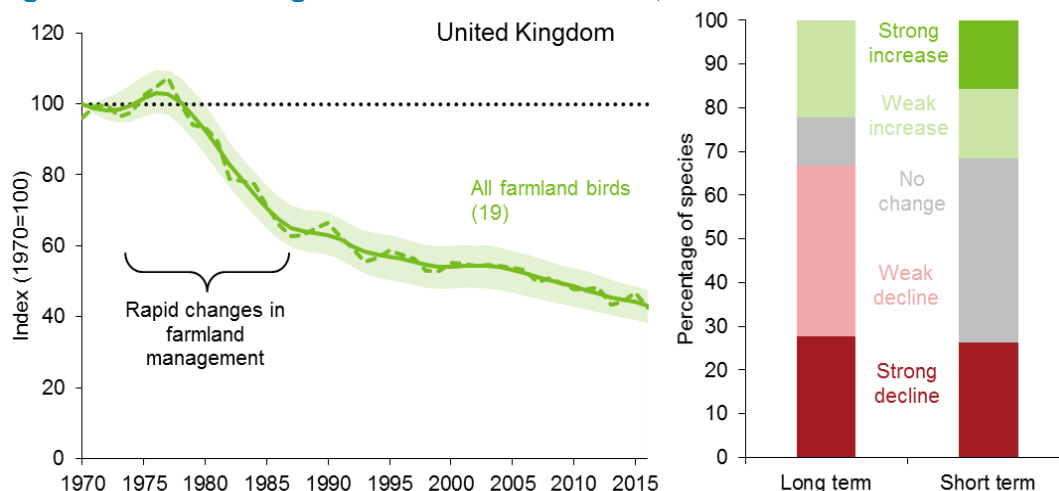






In 2015/16, the wintering waterbirds index was 87% higher than in 1975/76. Short term, between 2009/10 and 2014/15, the smoothed index fell by 8%.

Figure C5ai. Breeding farmland birds in the UK, 1970 to 2016.

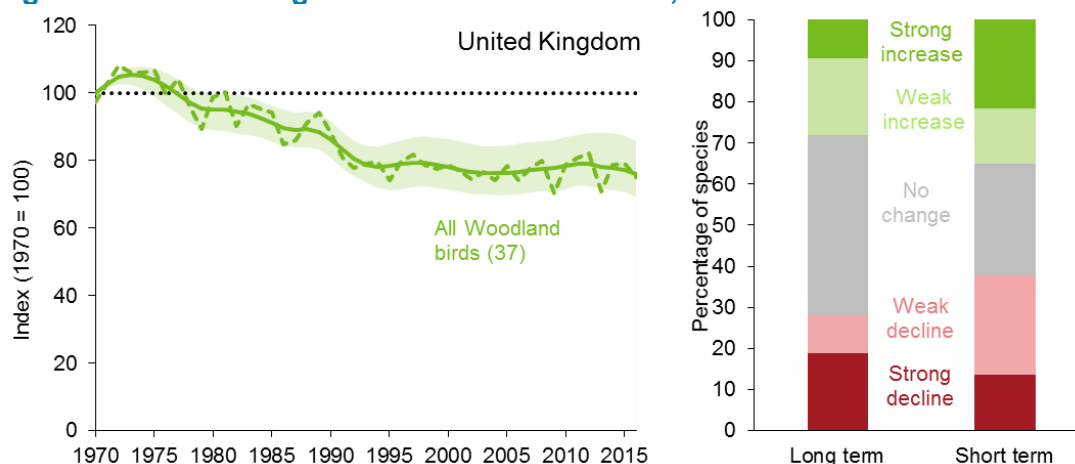


Notes:

4. The figure in brackets shows the number of species.
5. The line graph shows the unsmoothed trend (dashed line) and smoothed trend (solid line) with its 95% confidence intervals.
6. The bar chart shows the percentage of species within the indicator that have increased, decreased, or shown no change, based on set thresholds of annual change.

Source: British Trust for Ornithology, Defra, Joint Nature Conservation Committee, Royal Society for the Protection of Birds.

Figure C5bi. Breeding woodland birds in the UK, 1970 to 2016.

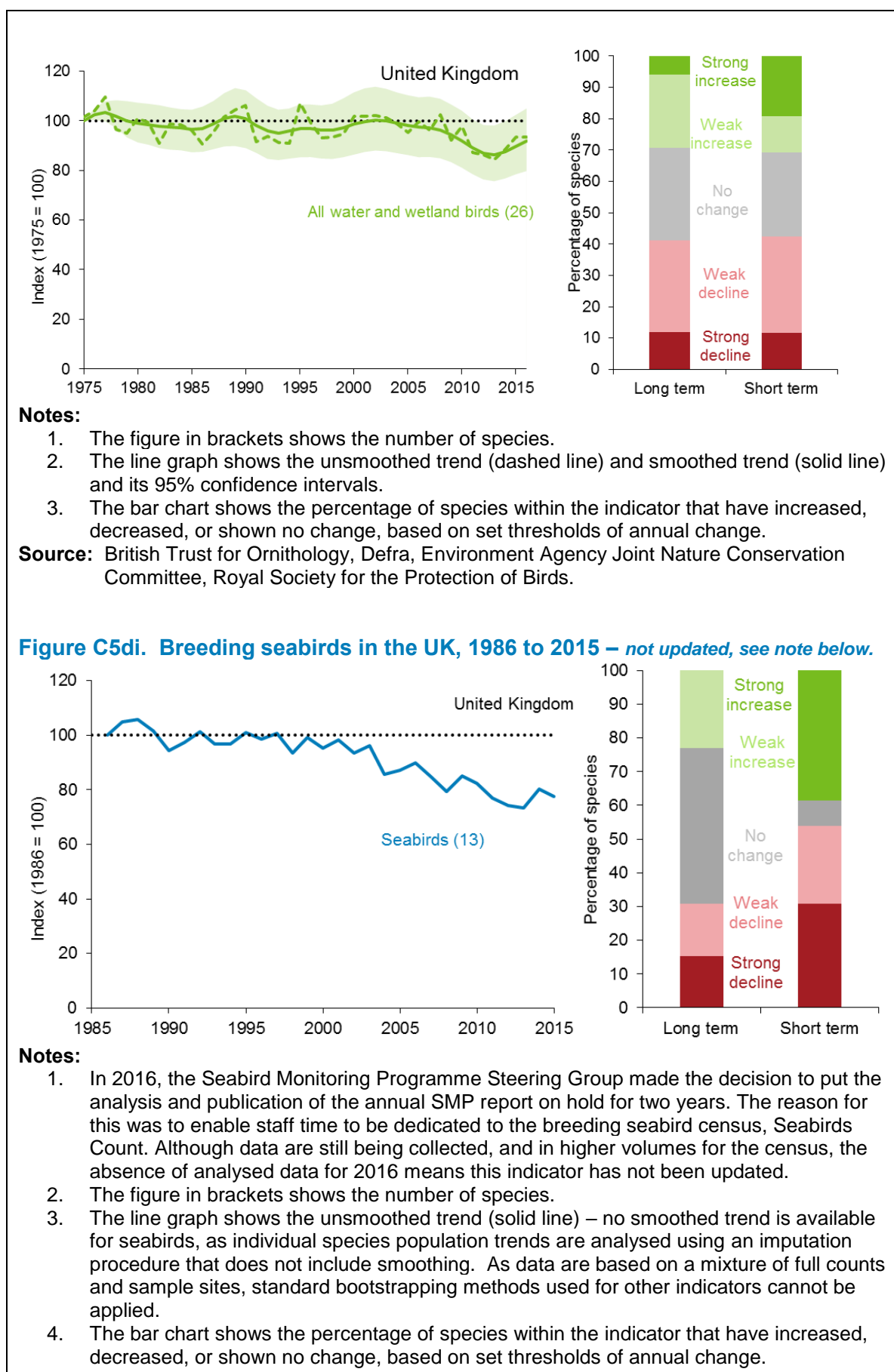


Notes:

4. The figure in brackets shows the number of species.
5. The line graph shows the unsmoothed trend (dashed line) and smoothed trend (solid line) with its 95% confidence intervals.
6. The bar chart shows the percentage of species within the indicator that have increased, decreased, or shown no change, based on set thresholds of annual change.

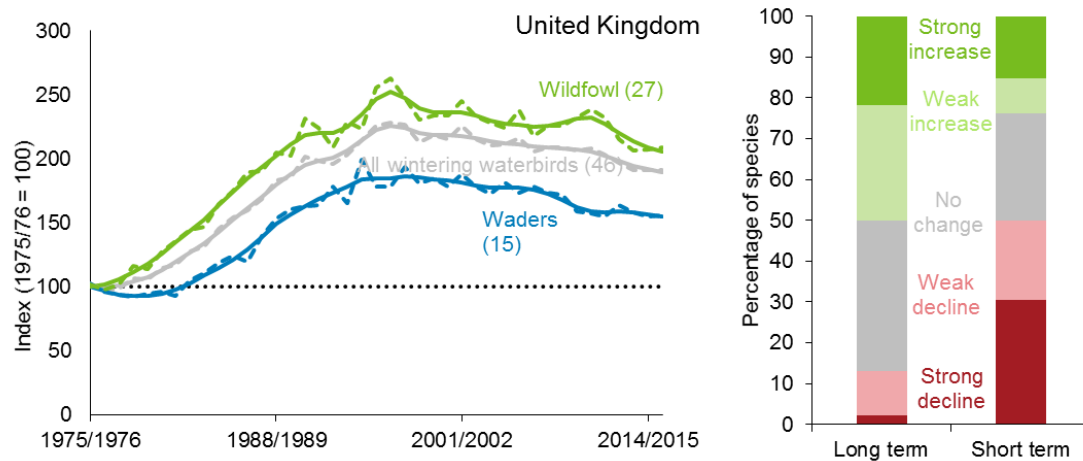
Source: British Trust for Ornithology, Defra, Joint Nature Conservation Committee, Royal Society for the Protection of Birds.

Figure C5ci. Breeding water and wetland birds in the UK, 1975 to 2016.



Source: British Trust for Ornithology, Defra, Royal Society for the Protection of Birds, Seabird Monitoring Programme (co-ordinated by Joint Nature Conservation Committee).

Figure C5ei. Wintering waterbirds in the UK, 1975/76 to 2015/16.



Notes:

1. The figure in brackets shows the number of species.
2. Based on financial years.
3. The line graph shows the unsmoothed trend (dashed line) and smoothed trend (solid line).
4. Data from surveys of wintering waterbirds are based on full counts on wetland and coastal sites of markedly varying size. This means that standard indicator bootstrapping methods cannot be applied.
5. The bar chart shows the percentage of species within the indicator that have increased, decreased, or shown no change, based on set thresholds of annual change.

Source: British Trust for Ornithology, Defra, Joint Nature Conservation Committee, Royal Society for the Protection of Birds, Wildfowl and Wetlands Trust.

UK Biodiversity Indicator C6: Insects of the wider countryside (butterflies)

<http://jncc.defra.gov.uk/page-4236>

- a. Semi-natural habitat specialists
- b. Species of the wider countryside



Since 1976, the habitat specialists butterflies index has fallen by 77%. Over the same period, the index for species of the wider countryside has fallen by 46%.

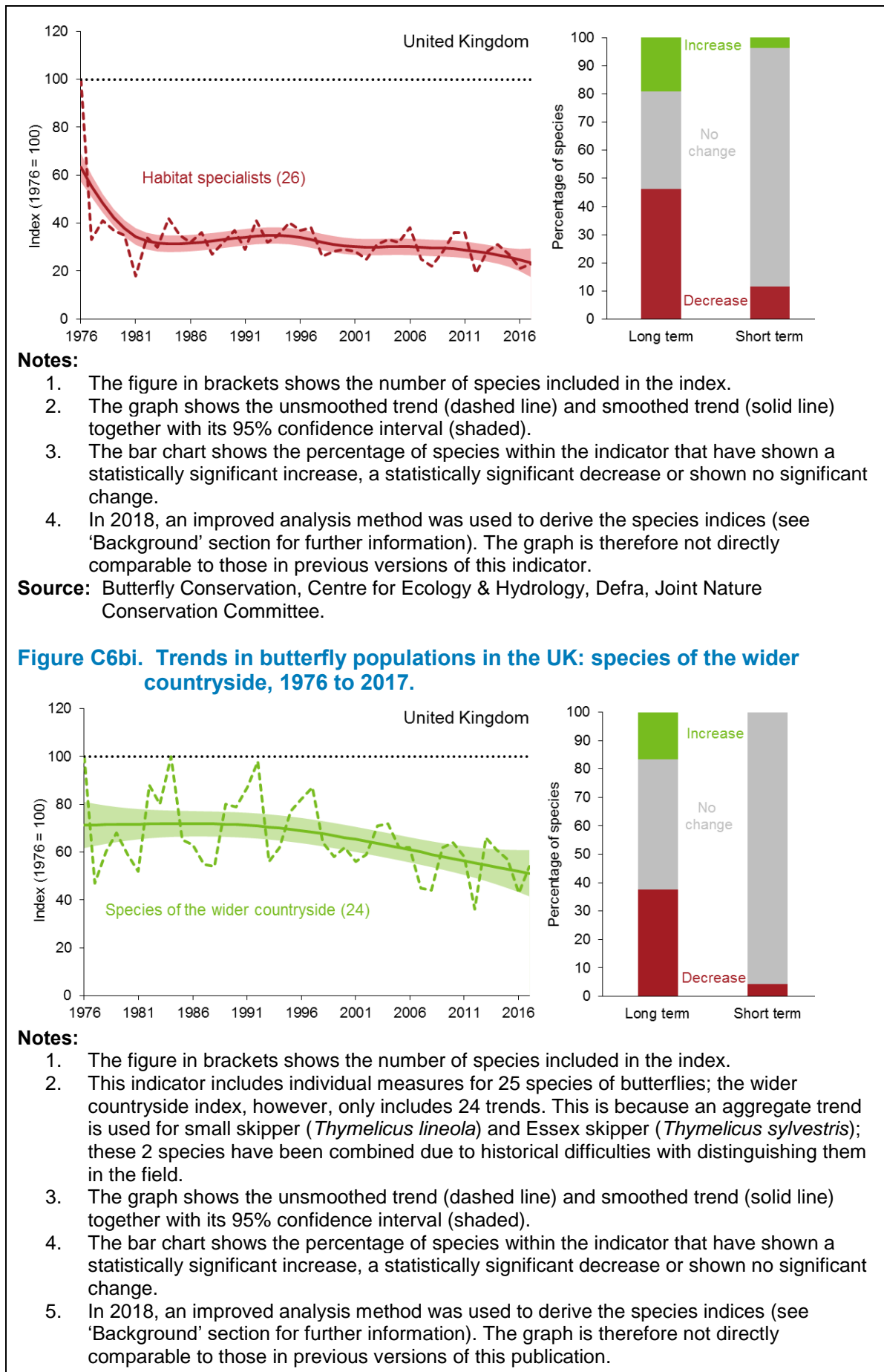


Large fluctuations in numbers between years are typical features of butterfly populations, principally in response to weather conditions. 2017 was a relatively bad year for butterflies; it was likely due to periods of unfavourable weather during the spring and summer months and preceding winter.



The statistical assessment of change is made on an analysis of the underlying smoothed trends. Since 1976, populations of habitat specialists and species of the wider countryside have declined significantly but both trends show no significant change since 2012.

Figure C6ai. Trends in butterfly populations in the UK: habitat specialists, 1976 to 2017.



Source: British Trust for Ornithology, Butterfly Conservation, Centre for Ecology & Hydrology, Defra, Joint Nature Conservation Committee.

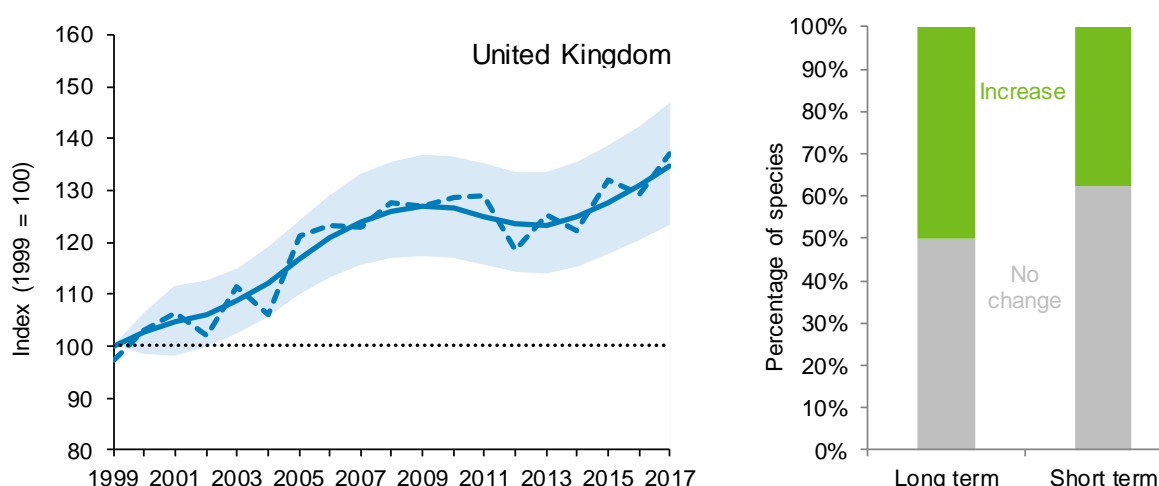
UK Biodiversity Indicator **C8: Mammals of the wider countryside (bats)**

<http://jncc.defra.gov.uk/page-4271>.

Between 1999, when trends from standardised large-scale monitoring became available through the National Bat Monitoring Programme (NBMP), and 2016, bat populations have increased by 31%. An assessment of the underlying smoothed trend shows this is a statistically significant increase.

In the short term, between 2011 and 2016, an assessment of the underlying smoothed trend shows that bat populations have shown a 4.7% increase in population size which is statistically significant.

Figure C8i. Trends in bat populations, 1999 to 2017.



Notes:

1. The headline measure is a composite index of eight bat species: brown long-eared bat, common pipistrelle, Daubenton's bat, lesser horseshoe bat, Natterer's bat, noctule, serotine and soprano pipistrelle.
2. The model used to analyse some individual species trends has changed since the previous publication, and these results are therefore not directly comparable (see Background section for more details).
3. The line graph shows the unsmoothed trend (dashed line) and smoothed trend (solid line) with its 95% confidence interval (shaded).
4. The bar chart shows the percentage of species which, over the time periods of the long-term and short-term assessments, have shown a statistically significant increase or decline, or no significant change.

Source: Bat Conservation Trust.

Please describe any other tools or means used for assessing progress

UK Biodiversity Indicator **C1: Protected areas** <http://jncc.defra.gov.uk/page-4241>.

UK Biodiversity Indicator **C2: Habitat connectivity** <http://jncc.defra.gov.uk/page-6891>.

UK Biodiversity Indicator **C3a: Status of UK habitats of European importance**
<http://jncc.defra.gov.uk/page-4239>.

UK Biodiversity Indicator **C9a: Animal genetic resources – effective population size of Native Breeds at Risk** <http://jncc.defra.gov.uk/page-4240>.

UK Biodiversity Indicator **C9b: Plant genetic resources – Enrichment Index** <http://jncc.defra.gov.uk/page-6573>.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Alliance for Zero Extinction (AZE). 2018. 2018 Global AZE map [viewed on 18/07/2018]. Accessed from: <http://zeroextinction.org/site-identification/2018-global-aze-map/>.

Churchyard, T., Eaton, M., Hall, J., Millett, J., Farr, A., Cuthbert, R. and Stringer, C. (2014). The UK's wildlife overseas: a stocktake of nature in our Overseas Territories. RSPB, Sandy, UK. Accessed from: http://ww2.rspb.org.uk/Images/ukots-stocktake_tcm9-369597.pdf.

Hayhow DB, Burns F, Eaton MA, Al Fulaij N, August TA, Babey L, Bacon L, Bingham C, Boswell J, Boughey KL, Brereton T, Brookman E, Brooks DR, Bullock DJ, Burke O, Collis M, Corbet L, Cornish N, De Massimi S, Densham J, Dunn E, Elliott S, Gent T, Godber J, Hamilton S, Havery S, Hawkins S, Henney J, Holmes K, Hutchinson N, Isaac NJB, Johns D, Macadam CR, Mathews F, Nicolet P, Noble DG, Outhwaite CL, Powney GD, Richardson P, Roy DB, Sims D, Smart S, Stevenson K, Stroud RA, Walker KJ, Webb JR, Webb TJ, Wynde R and Gregory RD (2016) State of Nature 2016. The State of Nature partnership. Accessed from: <https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/state-of-nature/state-of-nature-uk-report-2016.pdf>.

Game & Wildlife Conservation Trust (GWCT) (2018) Working Conservationists: The land managers saving British wildlife. Accessed from: <https://www.gwctshop.org.uk/2269---working-conservationists-519-p.asp>.

International Union for Conservation of Nature (IUCN) (2001) IUCN Red List Categories and Criteria: Version 3.1. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.

Joint Nature Conservation Committee (JNCC) (2018a) Conservation Designations Spreadsheet. Accessed from: <http://jncc.defra.gov.uk/page-3408..>

Joint Nature Conservation Committee (JNCC) (2018b) The importance of the Territories for biodiversity and geodiversity. <http://jncc.defra.gov.uk/page-4513> (accessed 01/11/2018)

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity Target 13



By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and 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.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

The target requires *action* to be in place to conserve genetic diversity in farmed or cultivated species and their relatives. The UK assessment also considers the *outcomes* of those actions, including the status of native breeds of farm animals and the genetic diversity within *ex-situ* collections in gene banks.

The UK is a World leader in ex-situ seed conservation. The Millennium Seed Bank at the Royal Botanic Gardens in Kew contains 75% of the UK's total native and archeophyte plant species. The total number of accessions into UK seed banks has continued to rise since 1960 and there has been a 15% increase between 2013 and 2018 in the Enrichment index – a measure of plant genetic diversity in UK gene banks. Wider measures to conserve biodiversity also safeguard genetic resources in-situ. A significant proportion of UK crop wild relatives (CWR) are conserved within the protected site network, and in some areas of the UK, for example on the Lizard Peninsula in England, site management has started to explicitly consider the ecological requirements of CWR. CWR are commonly associated with linear habitat features (e.g. hedgerows) thus it is anticipated agri-environment measures to conserve these habitats in the UK, will benefit CWR conservation.

The UK has also made progress with the conservation of genetic diversity of native breeds of livestock. No native breeds of UK livestock at risk have been lost in the last two decades, despite recent declines in the effective population size of some native horse and pig breeds. Significant progress has been made on the ex-situ conservation of genetic resources. The UK have a number of established genebanks for the preservation of genetic resources of plant species and animals, for example the UK National Livestock Gene Bank and the Millennium Seed Bank. The UK government also consults regularly with its expert committee on farm animal genetic resources.

Strategic approaches to strengthen the conservation of genetic diversity are in place. For example, in England the national biodiversity strategy sets out plans for genetic conservation, including support for ex-situ collections and the integration of rare and native breeds in agri-environment management. In addition, the UK has contingency plans in place to provide protection to at risk breeds in the event of exotic disease outbreak, within the constraints of controlling the disease.

Despite significant progress implementing strategies for the conservation of genetic resources, particularly for ex-situ seed conservation, progress is assessed as insufficient in recognition of published declines in the effective population size of some native animal breeds. Furthermore, the UK Government is exploring options for in-situ management of crop wild relatives.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes examples of initiatives to conserve the genetic diversity of famed animals and of cultivated plants in the UK, and additional work to develop a strategic

approach to Target 13 being undertaken in Scotland. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK initiatives

Farm Animal Genetic Resources Committee

The Farm Animal Genetic Resources Committee (FAnGR) provides advice to the UK and the devolved administrations in Scotland, Wales and Northern Ireland on all issues relating to farm animal genetic resources particularly its conservation and sustainable use. The priorities of FAnGR is as follows:

- Continue to monitor populations of our livestock breeds regularly, with data now being collected annually from almost all our breeds at risk, (with the assistance of the Rare Breeds Survival Trust and industry bodies). These data are published in an annual inventory on the Gov.UK website.
- Use of monitoring data to keep list of breeds considered to be at risk under annual review, with those breeds at risk potentially eligible for protection in an outbreak of an exotic disease (within the constraints of controlling the disease).
- Ensure work complements that of industry and other bodies, in particular the Rare Breeds Survival Trust which works to conserve and protect the UK's rare native breeds of farm animals from extinction.

Animal gene banks

In the UK there are a number of ex-situ gene banks with the purpose of conserving the genetic material of UK native farm livestock breeds and globally endangered animals. For instance, the Rare Breed Survival Trust manage the UK National Livestock Gene Bank (<https://www.rbst.org.uk/gene-bank>). The Frozen Ark (<https://www.frozenark.org/>) is run in partnership between the University of Nottingham, the Natural History Museum and the Zoological Society of London.

Plant gene banks

The UK Government has continued to fund a number of plant gene banks which conserve and provide access to a variety of plant genetic material. The Government aims to further increase the accessibility to and utilisation of these gene banks in the future, as well as making use of new genomic technologies. Supporting gene banks helps ensure the UK meets its international agreements to protect important crops and safeguard global food security.

There currently exist a number of different plant gene banks in the UK, funded by the Department for Environment, Food & Rural Affairs:

- The National Fruit Collection (<http://www.nationalfruitcollection.org.uk/>) at Brogdale in Kent is curated and maintained by the University of Reading. It is one of the largest fruit collections in the world with over 3,500 varieties of named apple, pear, plum, cherry, bush fruit, vine and cob nut cultivars. Unlike other gene banks where plant genetic material is stored as seeds, the National Fruit Collection is a live collection of plants open to the public as a visitor attraction.
- The UK Vegetable Gene Bank (<https://warwick.ac.uk/fac/sci/lifesci/wcc/gru/genebank/>) is held at the University of Warwick. It manages a collection of around 14,000 samples of vegetable crops, stored as frozen seeds. The gene bank supplies materials to plant

breeders, researchers and growers, as well as Genetic Improvement Networks (supported by Defra) which facilitate the transfer of genetic variations from collections of plant genetic resources into new varieties.

- The pea collection at the John Innes Centre (<https://www.jic.ac.uk/GERMPLASM/JI%20Pisum%20Collection.htm>) comprises over 3,500 accessions of wild and semi-cultivated material.

Millennium Seed Bank UK Programme

Royal Botanic Gardens Kew's Millennium Seed Bank UK Programme (<http://www.kew.org/science-conservation/collections/millennium-seed-bank>) holds (as of March 2018) 7,435 wild-origin and regenerated (cultivated) collections from the UK, comprising 2,077 native and archeophyte taxa. This represents 75% of the UK's total native and archeophyte flora and includes crop wild relatives and other socio-economically valuable species.

National Tree Seed Project

In 2013 Kew launched the UK National Tree Seed Project which is making multi-provenance collections in order to conserve the genetic diversity of UK forest genetic resources. During its first 5 years the project focused on 60 native tree species, conserving 10 million seeds from 7,623 trees. A study of the project collections of Ash (*Fraxinus excelsior*) suggests that over 90% of the UK genetic diversity of this species has been conserved by the project. Further to this project RBG Kew and others are developing a Strategy for UK Forest Genetic Resources, which seeks to both better understand genetic diversity in UK trees and to minimise genetic erosion and safeguard genetic diversity through both in situ and ex situ conservation, and sustainable use.

Plant Heritage National Plant Collections

Plant Heritage's National Plant Collections contain, among other internationally significant socio-economically and culturally valuable resource, 2,395 taxa in seven genera across 14 locations (Plant Heritage, 2018). In the past year these incremented by 512 taxa at three locations newly registered within the scheme (Plant Heritage, 2018).

Unpublished data (2011-2018) held within Plant Heritage's Threatened Plants Project (Seymour, 2012) and publicly available data (e.g. <http://epic.kew.org>, <http://rbg-web2.rbge.org.uk/multisite/multisite3.php>, <https://herbaria.plants.ox.ac.uk/bol/obga>, https://plantrecords.yorkshirearboretum.org/plantrec_public.php) additionally shows that 9,000 taxa in 54 genera are held across 185 other locations throughout the UK, including significant holdings by the National Trust and National Trust for Scotland, the Royal Horticultural Society, national, university and other botanic gardens and arboreta, the Sir Harold Hillier Gardens and the Eden Project.

Crop Wild Relatives

As with wider biodiversity policy, conservation of genetic diversity is a devolved matter in the UK. Biodiversity 2020 sets out the UK Government's approach to conservation of genetic diversity, including crop wild relatives in England. This includes establishing a coherent and resilient ecological network for habitats and species, including crop wild relatives. The strategy also sets out proposals for raising awareness of the importance of genetic diversity of farmed, cultivated and crop wild relatives; encouraging protection through our incentive programmes and securing genetic resources in ex-situ collections.

The protected sites series is the core component in any resilient ecological network, and independent reviews have confirmed that they hold a significant proportion of our plant genetic resource ([Hopkins and Maxted, 2011](#)). A 2015 study identified 15 “hotspots” that would conserve 148 CWR species identified as priority in England; from which 77% are well represented in protected sites with the remaining 23% being poorly represented in protected areas in England ([Fielder et al, 2015](#)). Natural England have started to integrate conservation of genetic diversity, including crop wild relatives, into protected areas. The Lizard National Nature Reserve in Cornwall is one site of particular importance due to the concentrations of crop wild relatives ([Maxted et al, 2007](#)). Natural England in partnership the University of Birmingham are working on measures to integrate the management of crop wild relatives into the park. Going forward it is likely that these measures will also be introduced to other National Nature Reserves that have been identified within the 15 CWR “hotspots”. Natural England’s strategy to guide their landscape and biodiversity designation work, both for the conservation and enhancement of these assets of natural and cultural heritage value as well as the services they provide including the genetic resources in particular crop wild relatives. 6 CWR species in England are recognised as threatened and listed as protected species under the NERC Act. A 2015 study found that crop wild relatives are commonly associated with linear features (roadsides, hedgerows, field margins and field boundaries) ([Jarvis et al, 2015](#)) thus it is anticipated agri-environment measures that conserve these habitats will indirectly benefit crop wild relatives.

Though steps have been made through wider habitat and species measures that are most likely to support the conservation of crop wild relatives and specific measures have been taken regarding their in-situ management it is recognised that there is more work to be done, for instance integration of their conservation into wider land management practices.

Country initiatives

Conserving Genetic Diversity of wild taxa, including those of socio-economic and cultural value in Scotland.

Recent work in Scotland has started to address the implementation of Aichi Target T13 for wild species in two ways. First, a method to evaluate population genetic diversity across a wide range of wild taxa, including those of socio-economic and cultural value, has been developed in Scotland, for worldwide application. Progress to date has involved:

- Developing criteria for taxon and establishing an initial set of priority species,
- Developing a framework using various information sources to undertake genetic risk assessments (encompassing both direct measures of genetic diversity and inferences from demographic/environmental data)
- Defining the primary generic genetic risks to in situ populations (lack of regeneration/turnover restricting evolutionary adaptation, loss of genetic diversity due to population size reductions or fragmentation, ‘genetic pollution’ due to elevated inter or intra-specific hybridisation), and
- Developing a framework for assessing the degree to which ex situ conservation collections are representative of the genetic diversity of the focal taxa (e.g. spatial and/or environmental coverage of extant range).

The project team recognised the challenges of selecting a representative group of species and so a set of categories has been identified to reflecting the reasons why a species might be considered socio-economically or culturally important:

- Species prioritised for conservation value
- Species identified as being culturally important
- Species providing important ecosystem services
- Game species (wild species of direct commercial value through hunting)
- Species collected for food or medicine (forage species)

Twenty-five species are in the process of being assessed.

A second longer-term approach would be to use genomic data that allows direct measurement and trend monitoring of comparable genetic diversity measures.

Indicators used in this assessment

UK Biodiversity Indicator **C9a: Animal genetic resources – effective population size of Native Breeds at Risk** <http://jncc.defra.gov.uk/page-4240>.

- Goat breeds
- Pig breeds
- Horse breeds
- Sheep breeds
- Cattle breeds

The average effective population size of the native breeds at risk included in this indicator:



Pigs increased from 176 in 2000 to 192 in 2012, but decreased to 156 in 2017;



Horses decreased from 178 in 2000 to 130 in 2012 and to 127 in 2017;



Sheep increased from 246 in 2000 to 378 in 2012 and to 411 in 2017;



Cattle increased from 89 in 2000 to 206 in 2012 and to 251 in 2017;

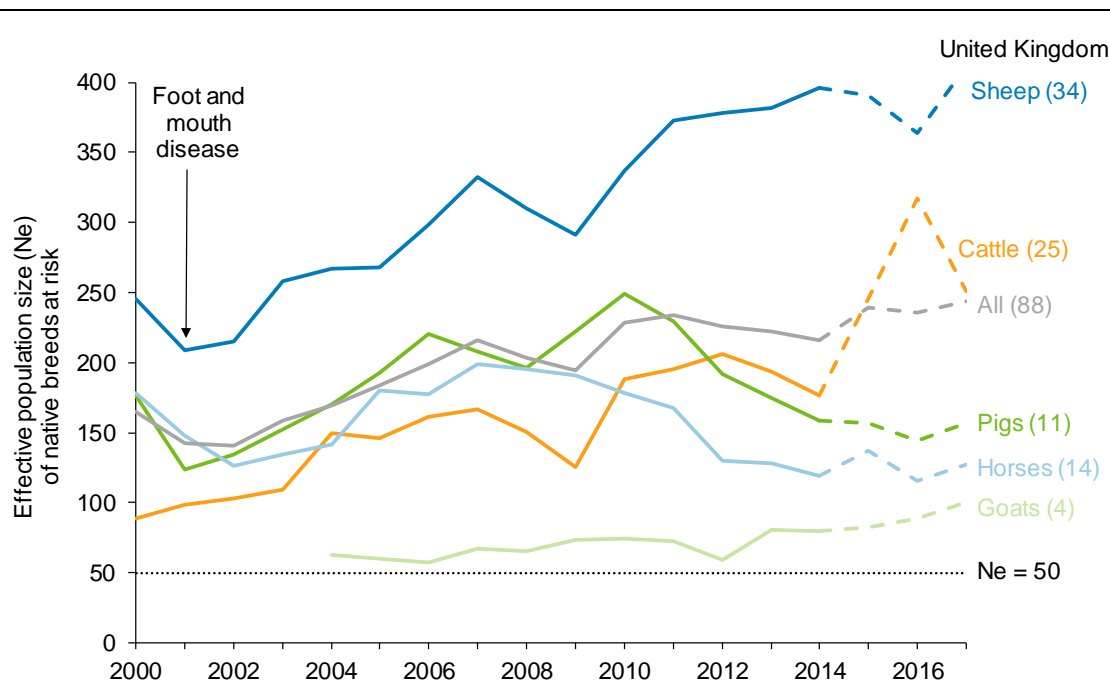


Goats the dataset starts in 2004 when it was 62, decreasing to 59 in 2012 and increasing to 101 in 2017; prior to 2004, effective population size could only be calculated for one breed.

The *average* effective population sizes calculated between 2000 and 2017 for the native breeds at risk of goats, pigs, horses, sheep and cattle were each above 50, the figure set by the United Nations Food and Agriculture Organisation as a threshold for concern. However, in 2017, of the Native Breeds at Risk, one breed of goat (Toggenburg), three breeds of horse (Cleveland Bay Horse, Eriskay Pony, and Suffolk Punch), and three breeds of cattle (Dairy Shorthorn (original population), Northern Dairy Shorthorn, and Vaynol), had a N_e less than 50. No breeds of sheep or pig had effective population sizes below the threshold in 2017.

There has been no reported UK extinction of any breeds of goats, pigs, horses, sheep or cattle since 1973.

Figure C9ai. Average effective population size (N_e) of Native Breeds at Risk, 2000 to 2017.

**Notes:**

1. The number of breeds included in the indicator varies year by year as a result of data availability for both sires and dams (data for both are needed to calculate effective population size). The maximum number of breeds included in each measure is shown in brackets after the species name in the legend. The 2017 values are based on four goat breeds, 11 pig breeds, 13 horse breeds, 31 sheep breeds, and 20 cattle breeds. Further details of how many breeds are included in each year can be found in the technical background document and the datasheet.
2. Data for 2015, 2016 and 2017 are provisional, hence the last part of the lines are shown as 'dashed'. It is expected that the provisional data can be confirmed later in 2019 (see the online technical document for details).
3. Based on data in the UK Farm Animal Genetic Resources Breed Inventory published on 3 May 2018.
4. Historic data for some breeds of sheep and cattle are now available in the inventory published in 2017 and again in 2018, affecting the series for these species. There have been some minor revisions to previously published data, some going back to 2000. As a result, this indicator is not directly comparable with the previous publication. The Breed Inventory Results published on 3 May 2018 can be accessed through the following link:
<https://www.gov.uk/government/statistics/uk-farm-animal-genetic-resources-fanqr-breed-inventory-results>.
5. The dotted black line shows effective population size (N_e) equal to 50; the level set by the United Nations Food and Agriculture Organisation as a threshold for concern. The pale grey line is an average of all 88 Native Breeds at Risk for which N_e could be calculated; this is included to provide context, but is not assessed.

Source: British Pig Association, Defra, Grassroots Systems Ltd., Rare Breeds Survival Trust, and participating breed societies.

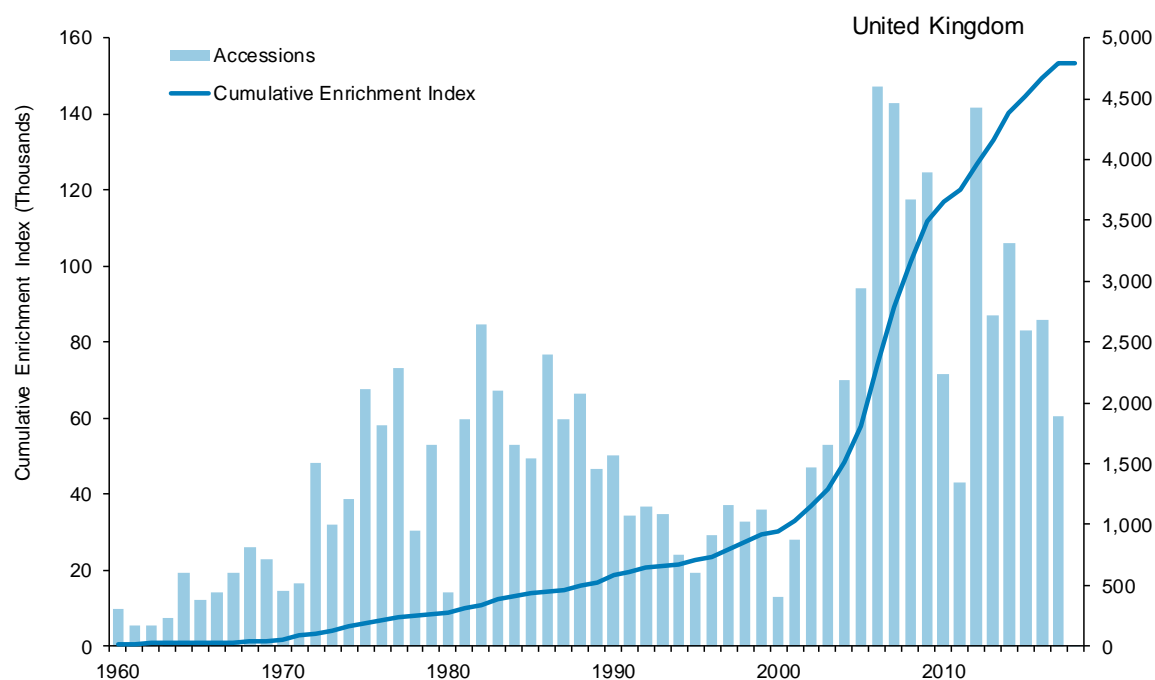
UK Biodiversity Indicator **C9b: Plant genetic resources – Enrichment Index**

<http://jncc.defra.gov.uk/page-6573>.

There is considerable annual variability in the number of new accessions into UK germplasm collections. The total number of accessions has risen since 1960, totalling 93,786 accessions by June 2018.

There was a 15% increase in the Enrichment Index between 2013 and 2018. A rapid rise in the Enrichment Index since 2000 can be attributed to a concerted collection effort by the Millennium Seed Bank.

Figure C9bi. Cumulative Enrichment Index of plant genetic resource collections held in the UK and annual number of accessions, 1960 to 2018.



Notes:

1. Data was obtained from EURISCO, which collates information across Europe from national germplasm collections, including the UK National Inventory of Plant Genetic Resources. The UK National Inventory includes food crop genetic resources such as crops, forages, wild and weedy species (including crop wild relatives), medicinal and ornamental plants, but does not include forest genetic resources.
2. The UK 2018 update of EURISCO includes information which had previously not been submitted as a result of improvements within the holding institutes to catalogue their holdings. The indicator is therefore not directly comparable with the versions previously published.

Source: EURISCO Catalogue <http://eurisco.ipk-gatersleben.de/apex/f?p=103:1>; date of data download 7 June 2018; based on UK contributions from: Genetic Resources Unit, Aberystwyth; Heritage Seed Library, Garden Organic; Commonwealth Potato Collection, The James Hutton Institute; Germplasm Resources Unit, John Innes Centre; Nottingham Arabidopsis Stock Centre; Millennium Seed Bank Partnership; Science and Advice for Scottish Agriculture, Scottish Government; Warwick Crop Centre, Genetic Resources Unit.

Please describe any other tools or means used for assessing progress

<Text entry>

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Plant Heritage. 2018. *The National Plant Collections 2018 Directory*. Plant Heritage, March 2018, 162 pp.

Seymour, K. 2012. Conserving cultivars. *The Plantsman* n.s. p.154-159.

Hopkins J. & Maxted N. 2011. Crop Wild Relatives: Plant conservation for food security. Natural England Research Reports 037. Natural England. Sheffield. ISSN 1754-1956. http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwjGw6Sc_4jfAhWiPOwKHdUCDrEQFjAAegQICBAC&url=http%3A%2F%2Fpublications.naturalengland.org.uk%2Ffile%2F64058&usq=AOvVaw2-EAYq_-kTO0RZpDFcqQZP_

Fielder H, Brotherton P, Hosking J, Hopkins JJ, Ford-Lloyd B, Maxted N (2015) Enhancing the Conservation of Crop Wild Relatives in England. PLoS ONE 10(6): e0130804. doi:10.1371/journal.pone.0130804.

Jarvis, Susan; Fielder, Hannah; Hopkins, John; Maxted, Nigel; Smart, Simon. 2015. Distribution of crop wild relatives of conservation priority in the UK landscape. Biological Conservation (2015), 191. 444-451. <https://doi.org/10.1016/j.biocon.2015.07.039>.

Nigel Maxted, Maria Scholten, Rosalind Codd, Brian Ford-Lloyd (2007) Creation and use of a national inventory of crop wild relatives. Biological Conservation. Volume 140, Issues 1–2, 142-159. <https://doi.org/10.1016/j.biocon.2007.08.006>.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity 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.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
- ☐ On track to achieve target
- ☒ Progress towards target but at an insufficient rate
- ☐ No significant change
- ☐ Moving away from target
- ☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target requires that the provision of essential ecosystems services, such as climate mitigation, flood protection, pollination and wildlife conservation should be maintained. The assessment considers whether the status of key services has been assessed, and the status of supporting habitats and species.

Significant progress has been made assessing the value and condition of ecosystem services in the UK, including the development of natural capital accounting systems. A variety of initiatives have been implemented to safeguard ecosystems in the UK, including the designation of protected areas to safeguard ecosystems at large and policy to protect specific services, such as national pollinator strategies. Positive trends have been recorded in the provision of climate regulation services by terrestrial ecosystems, such as woodlands, and trends in some key services have stabilised or are recovering

following historic decline, for example the indicator on the proportion of large fish in the North Sea. Through the Darwin Initiative, the UK is also funding biodiversity conservation projects that support developing countries and which also reduce poverty and gender inequality. The Darwin Initiative uses criteria and guidance to ensure all projects take account of the needs of local communities, the welfare and wellbeing of local people, and gender equality. This integration is tested through monitoring and evaluation of projects.

Progress is assessed as insufficient, as the condition of UK ecosystems providing key services is mixed, and some remain in a degraded state in the UK as indicated by the significant proportion of inland and coastal waters that remain below high or good levels for ecological status and recognition that further work is required to restore habitats such as peatlands so they provide a service as a carbon sink and manage the release of floodwater from uplands.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes current trends in ecosystem services and the condition of supporting habitats and species in the UK, as well as examples of initiatives being implemented to assess the value and condition of ecosystems services and ensure their protection in the UK and in developing countries. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK ecosystem service trends

The UK has a diverse range of ecosystems that provide important supporting, regulating, provisioning and cultural services essential to human well-being.

The UK's terrestrial ecosystems are making an increasingly positive contribution to climate regulation and have become a growing net sink of greenhouse gases since 1990, as reported in the Land Use, Land Use Change and Forestry (LULUCF) sector of the UK Greenhouse Gas (GHG) Emissions Inventory (BEIS 2018). UK forests in particular continue to play an important role in climate regulation through their sequestration of greenhouse gases (UK Biodiversity Indicator D1b). Further information on the contribution of UK ecosystems to climate regulation can be found in the assessment of Target 15 in Section III of the report.

There has been an overall decrease in the distribution of pollinators in the UK from 1980 onwards, and therefore a decline their capacity to provide valuable ecosystem services, including pollination (UK Biodiversity Indicator D1c). In 2016 there had been a 22% decline in the distribution of pollinators compared to 1980. Nevertheless, in the short-term, between 2011 and 2016, the trend has stabilised.

UK fish stocks are showing signs of recovery from previously overexploited levels, helping improve their sustainability as food source while also enhancing the resilience of the ecosystems they are part of. The proportion of stocks fished at or below the level capable of producing Maximum Sustainable Yield (MSY) and the proportion of stocks with biomass above the level capable of producing MSY have increased significantly since 1990 both to around 50% (UK Biodiversity Indicator B1). In 2016, large fish in the

North Sea survey made up 16% of the weight of the fish community (UK Biodiversity Indicator D1a). This is close to the value of 20% recorded in 1983 and a noticeable increase from a low of 4% in 2001.

A significant proportion of UK inland and coastal waters and the diverse ecosystem services they provide are in a degraded state. The overall number of inland and coastal surface water bodies awarded high or good surface water status is assessed as declining in the short term and 65% remain in bad, poor or moderate ecological status, below Water Framework Directive target levels (UK Biodiversity Indicator B7).

UK ecosystem condition

The sustainable provision of ecosystem services is dependent upon the condition of associated ecosystems, including their habitats, species and ecological processes.

Between 2007 and 2013 (the latest published assessment) 45% of UK habitats of European importance had improved or remained favourable, but 51% had declined or remained in unfavourable conservation status (UK Biodiversity Indicator C3a).

Recent trends across the UK Biodiversity Indicators for species have been mixed; while positive trends towards recovery are evident amongst some bat species and UK species of European importance (UK Biodiversity Indicator C3b & C8), this is set against wider indicator species trends that show continued declines in abundance and/or populations that remain significantly below baselines, including many bird, butterflies and UK priority species (UK Biodiversity Indicators C4, C5 & C6).

The percentage of habitats and species protected by Areas/Sites of Special Scientific Interest in favourable or unfavourable-recovering condition increased from 67% in 2005, to 86% in 2013, and remained stable at 85% in 2018 (UK Biodiversity Indicator C1c). The proportion of European sites in favourable or unfavourable-recovering condition increased from 58% in 2005 to 74% in 2018 for Special Areas of Conservation, and from 73% in 2005 to 83% in 2018 for Special Protection Areas.

UK initiatives

UK National Ecosystem Assessment

The UK National Ecosystem Assessment (UK NEA 2011) was the first analysis of the UK's natural environment in terms of the benefits provided to society and continuing economic prosperity. Part of the Living With Environmental Change (LWEC) initiative, the UK NEA commenced in mid-2009 and reported in June 2011. It was an inclusive process involving many government, academic, NGO and private sector institutions. The UK NEA delivered a wealth of information on the state, value (economic and social) and possible future of terrestrial, freshwater and marine ecosystems across the UK, but also identified key knowledge gaps.

The UK Government is committed to adding to this knowledge base and therefore supported a two-year long follow-on phase of the UK NEA starting in 2012. The follow-on phase further developed and promoted the arguments that the UK NEA put forward and made them applicable to decision and policy making at a range of spatial scales across the UK to a wide range of stakeholders. The findings from the follow-on phase are published in UK NEA (2014).

UK natural capital account reporting

As a result of the UK Government's Natural Environment White Paper in 2011, the Office of National Statistics (ONS) and Department for Environment, Food & Rural Affairs (Defra) jointly committed to work to incorporate natural capital into the UK Environmental Accounts by 2020.

The work to date falls into three categories:

- 1) *UK aggregate accounts* (<https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/uknaturalcapital/ecosystemserviceaccounts1997to2015>) which provide an annual update on a wide range of environmental services that make human life possible.
- 2) *Broad habitat accounts* which detail the extent and condition of eight broad categories of land cover present in the UK, together with estimates of the volume and value of the ecosystem services they provide. So far, experimental accounts have been published for urban, freshwater, farmland and woodland ecosystems (<https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/methodologies/naturalcapital>) and work is progressing on accounts for the remaining four broad habitats.
- 3) *Cross-cutting accounts* for important natural assets such as land (<http://webarchive.nationalarchives.gov.uk/20160105173306/http://www.ons.gov.uk/ons/rel/environmental/uk-natural-capital/land-cover-in-the-uk/art-uk-natural-capital-land-cover-in-the-uk.html#tab-abstract>) and carbon (<https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/uknaturalcapital/experimentalcarbonstockaccountspreliminaryestimates>).

Taken together these work streams will allow the UK to understand the value of its natural capital and how this is changing across time. The UK is on track to develop a full set of *Broad habitat accounts* by the end of 2020, although more developmental work is envisaged beyond that.

UK National Pollinator Strategies and Pollinator Monitoring Scheme

Protecting pollinators and the valuable ecosystem services they provide is a priority for each of the countries of the UK. Each country has developed its own pollinator strategy:

- England – The National Pollinator Strategy.
- Scotland – Pollinator Strategy for Scotland.
- Wales – The Action Plan for Pollinators in Wales.
- Northern Ireland – All Ireland Pollinator Plan.

The strategies aim broadly to improve pollinator habitat and population health, and to raise society's awareness of the importance of pollinators. All four pollinator strategies have a strong emphasis on gathering and using scientific evidence to inform management decisions. The four countries are now working together to develop a UK Pollinator Monitoring Scheme that will:

- Develop and test a sustainable monitoring framework that can be implemented by professionals and volunteers (2014-16),
- Implement new monitoring scheme(s),
- Improve data standards,
- Expand pool of taxonomic expertise,
- Improve understanding of the motivations of volunteer recorders, and
- Support long-term storage and new technology.

Darwin Initiative

The Darwin Initiative is a competitive grant scheme focused on preserving and increasing biodiversity - animal and plant species and their habitats - in developing countries. Projects funded under the Darwin Initiative must support sustainable development in developing countries for the reduction of poverty. Applications for funding must define the project's contribution to economic development and welfare, whether this is direct or indirect. All applicants must also consider whether and how their project will contribute to reducing inequality between persons of different gender. Applicants are encouraged to design interventions that proactively contribute to increased equality, and to provide indicators disaggregated by gender where possible. Successful projects must refer to the actions undertaken for equality when reporting.

Further information on the Darwin Initiative and the UK's wider funding of international biodiversity is provided in Target 20's assessment in Section III of the report.

Country initiatives

Woodland and Peatland

Woodland and peatland ecosystems are significant carbon stores. Peatlands are the UK's largest terrestrial carbon store, though drained peatlands release carbon and add greenhouse gases to the atmosphere. Since 1990 UK forests have cumulatively removed the equivalent of nearly 600 Mt of CO₂ from the atmosphere. Though carbon sequestration is key service provided by these ecosystems it is well known they provide wider economic and social benefits. Peat bogs and fens provide flood management and improve water quality. Woodland and peatlands are known to provide positive health and well-being benefits, mostly through recreation and exercise.

In recognition of environmental, social and economic benefits these ecosystems provide, across the UK a range of initiatives have been established to restore peatland and woodland ecosystems. See Section II for case study on "Peatland restoration in the UK" and Section III targets 5 and 15 contain more information on initiatives in place to support these ecosystems. Furthermore, the UK's Clean Growth Strategy recognised the need to enhance the benefits and value of our natural resources, including on contribution of woodland and peatland to carbon sequestration.

Green Infrastructure

Green infrastructure can provide wildlife-rich habitats in urban areas as well as these ecosystems provide broader social and economic benefits, for instance reducing summer temperatures and improve air quality. Access to green and blue urban spaces can lead to improves in both physical and mental health. Greening cities further offers the opportunity to promote local social interaction, bringing individuals together with nature, and helps in developing strong community networks through shared participation.

Action is being taken to recognise the services green infrastructure provides across the UK. In England, the Government have committed to planting one million trees in towns and cities by 2022; this is supported by £10 million of funding announced in October 2018. The National Planning Policy Framework also reinforces the importance of green infrastructure. In 2019, working across Government Departments a national framework of standards to set out what good green infrastructure entails will be developed for use by Local Authorities and developers. In Scotland, £37.4 million will be invested in blue and green infrastructure to deliver a step change in environment quality, woodland cover and recreational opportunities. The Welsh Government launched in 2018 the Enabling

Natural Resources and Well-being in Wales grant Scheme, designed predominately to support projects that make improvements in residential areas.

Valuing and governing forest ecosystem services in England

Led by the Forestry Commission in England, the aim of this Programme is to value forest ecosystem services and inform governance and delivery. The specific objectives of the programme are to:

- develop and apply methods and tools for valuing the range of forest ecosystem services and benefits, and integrating different values,
- understand and advise on the development of mechanisms (including governance arrangements) to deliver forest ecosystem services, and
- analyse changes in values for forest ecosystem services under a range of scenarios to inform management and woodland creation.

The outputs of the programme can be found here:

<https://www.forestry.gov.uk/forestry/bee-h-abt-klb>.

Nature Improvement Areas, England

Twelve Nature Improvement Areas (NIA) were established in April 2012 to create joined up and resilient ecological networks at a landscape scale and contributed to England's strategy for wildlife and ecosystem services – Biodiversity 2020. The NIAs were designed to enable partnerships (including local authorities, local communities, land managers, the private sector and conservation organisations) to develop and implement a shared vision for their natural environment and to demonstrate how a 'step change' in nature conservation might be delivered at a landscape scale, enhancing ecosystem services including social and economic objectives.

In their three years the NIAs developed partnerships, established shared visions and objectives for the natural environment in their areas, and implemented ambitious work programmes. They delivered a range of benefits, including: real change in the quality and quantity of priority habitats; enhanced ecosystem services; joint working with a wide range of partners and the involvement of many people as volunteers or visitors, leading to benefits for local people and communities.

Lessons from NIAs have been used to inform the UK Government's 25 Year Environment Plan and their ambitions to enhance landscape-scale restoration of ecosystems by establishing a Nature Recovery Network.

A full evaluation of NIAs project is available at:

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18555&FromSearch=Y&Publisher=1&SearchText=WC1061&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>.

Natural Capital Asset Index, Scotland

Scotland's Natural Capital Asset Index made it the first country in the world to publish a detailed attempt to measure annual changes in its natural capital, based on an evaluation of ecosystem service potential. Further information can be found in the Target 2 assessment of Section III of this report.

Making space for water: a nature based approach to flood defence, Wales

In Swansea Vale, a major commercial and retail park together with industrial estates and a caravan site at risk from flood events on the River Tawe, were protected by flood defences dating back to the 1970s. To address the risk of overtopping during extreme flood events, the embankments were reconstructed, including by setting them back over part of the site. As a result of this setback scheme, a six-hectare area of former industrial brownfield land that used to lie behind the flood defences now acts as an area of new flood plain, becoming inundated during periods of high river flow. A significant volume of floodwater now 'has somewhere to go', relieving pressure on the defences protecting the other parts of the site and reducing the risk of the new flood banks being overtopped during extreme events. The area is now developing into wetland habitat and is providing green space and a recreational asset accessible to the general public.

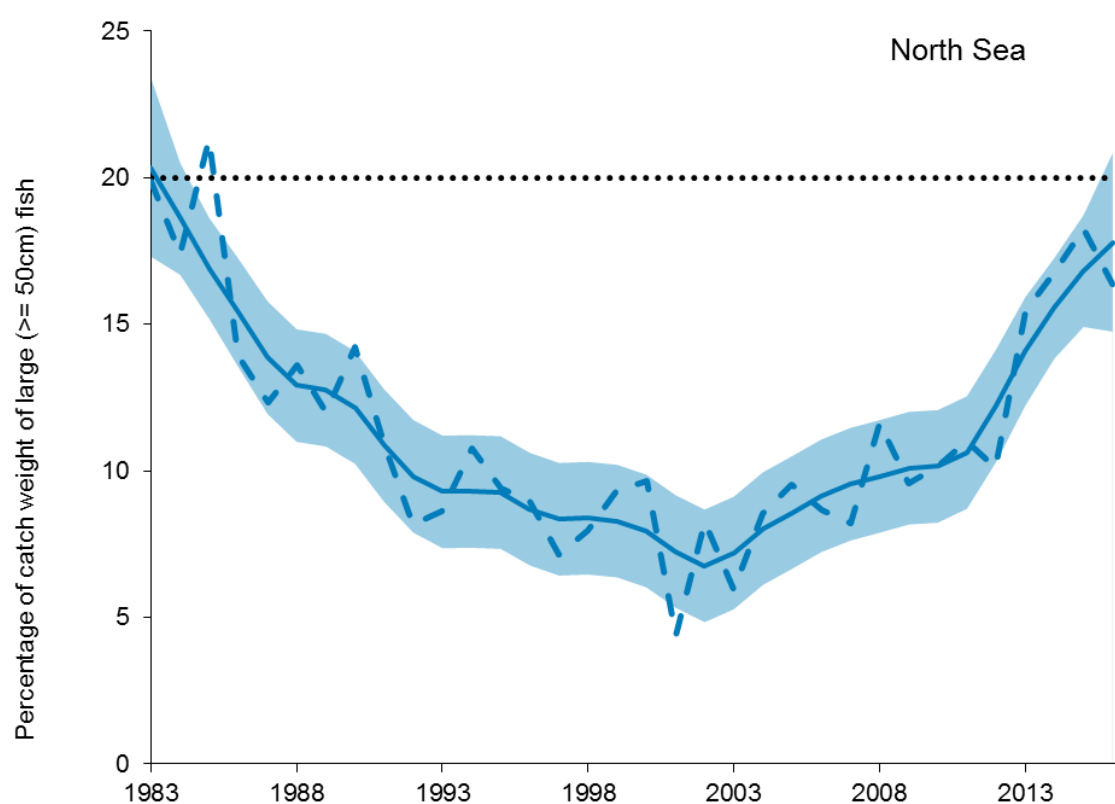
Indicators used in this assessment

UK Biodiversity Indicator D1a: Fish size classes in the North Sea

<http://jncc.defra.gov.uk/page-4248>.

In 2016, large fish in the North Sea survey made up 16% of the weight of the fish community. This is close to the value of 20% recorded in 1983 and a noticeable increase from a low of 4% in 2001. While there was a clear decline in the indicator from 1983 to 2001, there has been rapid recovery since and this pace of recovery accelerated after 2010.

Figure D1ai. Proportion of large fish (equal to or larger than 50cm), by weight, in the North Sea, 1983 to 2016.



Notes: The line graph shows the unsmoothed trend (dashed line) and a LOESS smoothed trend (solid line) with the shaded area showing the 95 per cent confidence intervals around the smoothed trend. The horizontal dashed line shows the assessment threshold.

Source: Centre for Environment, Fisheries and Aquaculture Science; Marine Scotland.

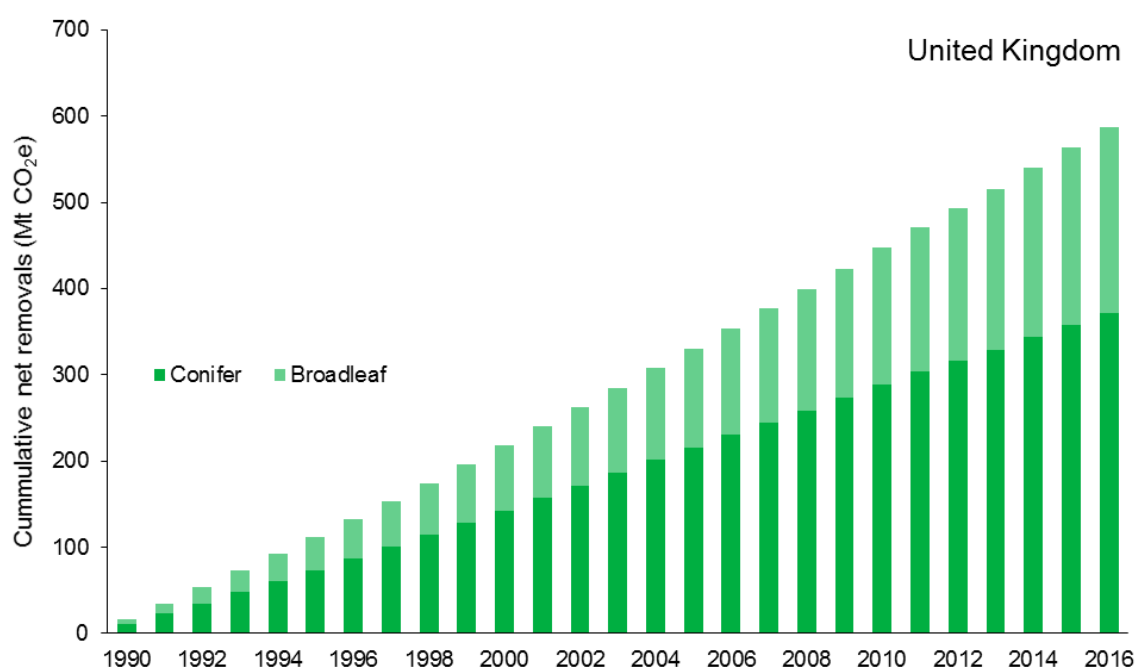
Since the previous publication of this indicator additional data have been provided for the North Sea and metrics for other regional seas have been restated. The size structure has also been changed from 40cm to 50cm. This indicator is therefore not directly comparable with previous publications.

UK Biodiversity Indicator **D1b: Removal of greenhouse gases by UK forests**
<http://jncc.defra.gov.uk/page-6058>.

In 2016, forests in the UK are estimated to have removed the equivalent of 23.9 million tonnes (Mt) of carbon dioxide (CO₂) from the atmosphere (Figure D1bii). Cumulatively, since 1990, the equivalent of 587 Mt of CO₂ has been removed by UK forests (Figure D1bi).

The proportion of removals by broadleaf woodland has increased since the time series began, accounting for 41% (9.8 Mt) of the estimated removals in 2016 compared to 34% (5.9 Mt) of the removals in 1990 (Figure D1bii).

Figure D1bi. Cumulative net removals of greenhouse gases by UK forests, 1990 to 2016.



Notes:

1. The bar graph shows the cumulative net removals of greenhouse gases (carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O)) from the atmosphere by forests in the UK, expressed as million tonnes of CO₂ equivalent (Mt CO₂e).
2. Revised in 2015 to reflect improved modelling of greenhouse gas emissions and removals.
3. Revised in 2017 due to improvements made to the forestry sector of the 1990 to 2015 Land Use, Land Use Change and Forestry greenhouse gas inventory.
4. Revised in 2018 due to improvements in the 'CARBINE' model used to calculate the forest carbon stock figures for the 1990 to 2016 Land Use, Land Use Change and Forestry greenhouse gas inventory (see background section for more details). These results are therefore not directly comparable with those in previous publications.

Source: BEIS Land Use, Land Use Change and Forestry greenhouse gas inventory.

UK Biodiversity Indicator D1c: Status of pollinating insects

<http://jncc.defra.gov.uk/page-6851>.

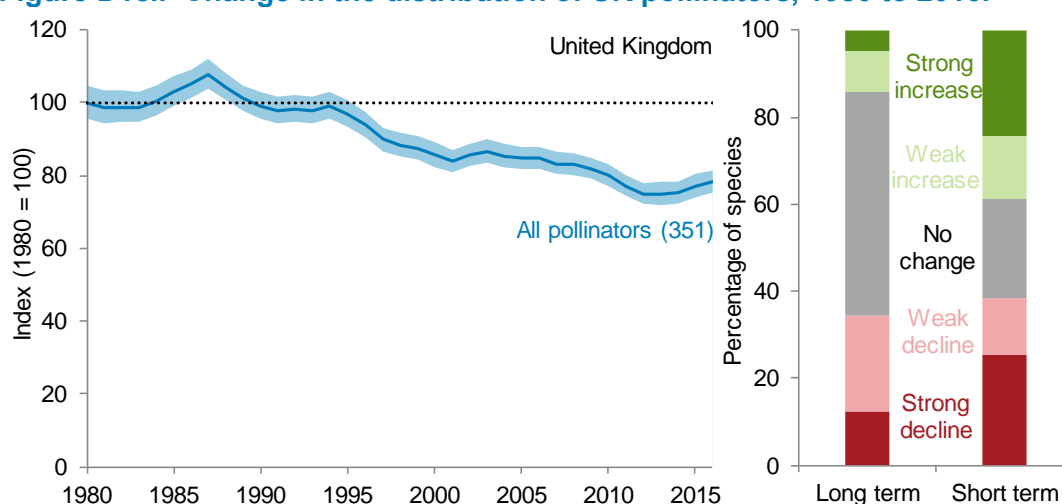
There was an overall decrease in the pollinators indicator from 1987 onwards. In 2016, the indicator had declined by 22% compared to the value in 1980. The long-term trend was assessed as a decline.

Between 2011 and 2016 the indicator showed a minor increase of 2%, however given the uncertainty, the short-term trend was assessed as stable.

Over the long term, 14% of pollinator species became more widespread (5% showed a strong increase), and 34% became less widespread (13% showed a strong decrease). The ratio between increasing and decreasing species was more balanced over the short term, with 39% of species increasing and 38% of species decreasing.

As individual pollinator species become more or less widespread, the communities in any given area become more or less diverse, and this may have implications for pollination as more diverse communities are, in broad terms, more effective in pollinating a wider range of crops and wild flowers. Despite the inter-annual variation, the overall trend for pollinators remains downward.

Figure D1ci. Change in the distribution of UK pollinators, 1980 to 2016.



Notes:

1. Based on a total of 351 pollinators, comprising 137 wild bee species and 214 hoverfly species.
2. The graph shows the unsmoothed composite indicator trend with variation around the line (shaded) within which we can be 90% confident that the true value lies (credible interval).
3. The bar chart shows the percentage of species within the indicator that have increased, decreased or shown no change in occupancy, based on set thresholds of change.
4. This indicator is not directly comparable with the previous publication as the Bayesian modelling methods have been improved and 38 species (10 wild bees and 28 hoverfly species) have been removed from the analysis.

Source: Bees, Wasps & Ants Recording Society; Hoverfly Recording Scheme; Biological Records Centre (supported by Centre for Ecology & Hydrology and Joint Nature Conservation Committee).

Please describe any other tools or means used for assessing progress

<p>UK Biodiversity Indicator B7: Surface water status http://jncc.defra.gov.uk/page-4250.</p>
<p>Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).</p> <p>BEIS (2018). UK Greenhouse Gas Inventory, 1990 to 2016: Annual Report for submission under the Framework Convention on Climate Change, Brown P, Broomfield M, Cardenas L, Choudrie S, Kilroy E, Jones L, MacCarthy J, Passant N, Thistlethwaite G, Thomson A, Wakeling D, Buys G, Gilhespy S, Glendining M, Gluckman R, Hampshire K, Henshall P, Hobson M, Malcolm H, Manning A, Matthews R, Milne A, Misselbrook T, Moxley J, Murrells T, Salisbury E, Walker C, Watterson J. http://naei.beis.gov.uk/reports/reports?report_id=954.</p> <p>UK National Ecosystem Assessment (2011) The UK National Ecosystem Assessment: Technical Report. UNEP-WCMC, Cambridge. http://uknea.unep-wcmc.org/.</p> <p>UK National Ecosystem Assessment Follow-on (2014) The UK National Ecosystem Assessment Follow-on: Synthesis of the Key Findings. UNEP-WCMC, LWEC, UK. http://uknea.unep-wcmc.org/.</p>
<p>Level of confidence of the above assessment</p> <p><input type="checkbox"/> Based on comprehensive evidence</p> <p><input checked="" type="checkbox"/> Based on partial evidence</p> <p><input type="checkbox"/> Based on limited evidence</p>
<p>Please provide an explanation for the level of confidence indicated above.</p> <p>The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.</p>
<p>Adequacy of monitoring information to support assessment</p> <p><input type="checkbox"/> Monitoring related to this target is adequate</p> <p><input checked="" type="checkbox"/> Monitoring related to this target is partial (e.g. only covering part of the area or issue)</p> <p><input type="checkbox"/> No monitoring system in place</p> <p><input type="checkbox"/> Monitoring is not needed</p>
<p>Please describe how the target is monitored and indicate whether there is a monitoring system in place</p> <p>The Aichi Targets are monitored through the UK biodiversity Indicators (http://jncc.defra.gov.uk/page-1824). These are updated regularly and a compendium is published annually.</p>

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity 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% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
- ☐ On track to achieve target
- ☒ Progress towards target but at an insufficient rate
- ☐ No significant change
- ☐ Moving away from target
- ☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target has two main components. It requires that the contribution from ecosystems to carbon stocks has been enhanced; and that 15% of degraded ecosystems have been restored.

The assessment considers the contribution of natural, semi-natural and agricultural ecosystems to carbon stocks using information from the Land Use, Land Use Change and Forestry inventories. For the target to be met these habitats should be in favourable condition (for wildlife conservation) and carbon stocks should be increasing. It has not been possible to directly measure whether 15% of degraded ecosystems have been restored – there are some difficult definitional issues in deciding at what point in time a degraded ecosystem is restored following management intervention, including, for example, the baseline against which to assess success.

The UK has ambitious future targets on the reduction of carbon emissions and in the Clean Growth Strategy set out actions to achieve these. The importance of key ecosystems, namely peatlands and woodland, in the sequestration of carbon is

recognised. There has been significant progress in enhancing carbon stocks through the management of terrestrial ecosystems in the UK. The Land Use, Land Use Change and Forestry greenhouse gas inventories show that the contribution of terrestrial ecosystems to reducing greenhouse gas emissions since 1990, particularly from the forestry sector, and as arable land has been converted to grassland. A number of initiatives are being implemented to help restore key ecosystems and enhance their contribution to biodiversity and carbon storage, including peatland and woodland restoration projects – see elsewhere in this report for details of successes in rewetting peatlands by blocking drainage ditches and re-establishing vegetation cover. There is also a growing understanding of the role of marine ecosystems as blue carbon sinks in the UK.

Progress is assessed as insufficient as further work is required to understand the actual and potential contributions of wetland and marine ecosystems to climate mitigation. In addition, evidence suggests that a significant proportion of key habitats and ecosystems remain in a degraded state for wildlife in the UK.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes the current condition of key ecosystems and carbon stocks in the UK and examples of restoration work being undertaken to enhance their resilience and carbon storage potential. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK ecosystems and carbon stocks

Terrestrial and marine ecosystems play an important role in carbon capture and adaptation to climate change in the UK. Depending on the management practices in place, these ecosystems can either be a net source or sink of greenhouse gas emissions.

National Inventories of human-induced sources and sinks of greenhouse gases are submitted by Parties, including the UK, to the United Nations Framework Convention on Climate Change (UNFCCC) every year and also to report on progress in meeting Kyoto Protocol commitments. The Land Use, Land Use Change and Forestry (LULUCF) sector of the inventory provides estimates of the annual rate of emissions and removals of greenhouse gases by UK ecosystems across six land use categories: Forest Land, Cropland, Grassland, Wetlands, Settlements, Other Land and Harvested Wood Products. The total estimated net emissions of direct greenhouse gases from the LULUCF sector changed from a sink of 2 MtCO₂e in 1990 to a sink of 15 MtCO₂e in 2016. Emissions in the land use sector are subject to substantial uncertainty as understanding of the underlying science of earth systems develops. The land use categories which have the greatest effect on the net LULUCF emissions/removals are forest land (a net sink) and cropland (a net source). The size of the Forest land sink increased by 40% between 1990 and 2010 but has levelled off in recent years due to a reduction in rates of afforestation and the earlier substantial afforested area reaching maturity. Emissions from cropland have decreased by 25% since 1990.

At a UK level, under the current predictions the LULUCF sector is estimated to remain a net sink under all projected scenarios until at least 2050, although at a declining level from the mid-2020s onwards (Thomson *et al.* 2017). The decline is driven by the

decreasing sink in the Forest Land category due to large numbers of trees being thinned or reaching maturity (some 35-50 years since planting) and hence being harvested, and a relatively low planting rate during the 1980s and 1990s.

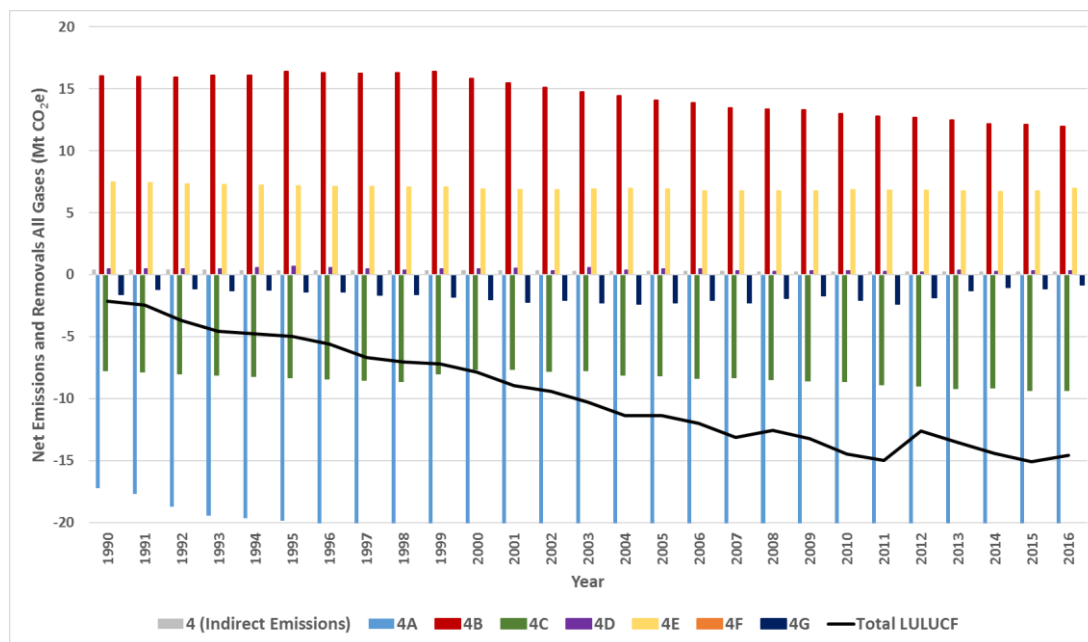


Figure 15.1. LULUCF emissions and removals (Mt CO₂e) from the UK 1990-2016 for Forest Land (4A), Cropland (4B), Grassland (4C), Wetlands (4D), Settlements (4E), Other Land (4F), Harvested Wood Products (4G), and Other (4H) (Source: BEIS 2018).

There is a growing understanding of the importance of marine carbon stores, or Blue Carbon, in the UK. An assessment of carbon budgets and potential blue carbon stores in Scotland's coastal and marine environment has highlighted the role of marine ecosystems as significant carbon sinks. Deposition of organic carbon is estimated to be 7.2 MtC/yr and inorganic carbon 0.5 MtC/yr in Scotland's marine sediments. The main producer of carbon entering long-term storage in sediments is phytoplankton sequestering 3.9 MtC/yr, with coastal plants potentially contributing a further 1.8 MtC/yr. Habitat-forming species on the coast (seagrasses, saltmarsh, bivalve beds), are highly productive but their contribution to the overall carbon budget is very small because of the limited extent of each habitat. Maerl beds and cold-water coral reefs contribute 0.5MtC of inorganic carbon to the standing stock. While their growth rates are relatively slow providing small annual sequestration capacity of inorganic carbon, their longevity (centuries) means that sequestered carbon is locked away at geological time scales. Sea lochs contain 0.33 MtC and have a sequestration capacity for sediment organic carbon of 0.07 MtC/yr.

The NERC-Defra Shelf Sea Biogeochemistry Programme (SSB), 2013-2018 (see https://www.uk-ssb.org/shelf_seas_report.html) focused on scientific understanding of the shelf seas around Britain: the key processes that maintain their status, variability and response to impacts (climate and human); their potential to remove and store carbon ('blue carbon'); and the lessons for policy in monitoring, managing and valuing these precious habitats. Some more detail is provided in the assessment of Target 10.

Ecosystem restoration

The UK's peatlands and woodlands make a major contribution to biodiversity in and also have a valuable role in carbon storage. For example, by integrating peatland restoration into greenhouse gas mitigation strategies in England it is estimated that emissions reductions of approximately 2.4 Mt CO₂-e per year could be achieved across a 40-year timeframe (Natural England 2010). The UK's woodlands provide a cost-effective and powerful form of emission abatement, and could capture 10% of the total greenhouse gas emissions over the next 40 years at less than £100/t CO₂ equivalent (Matthews & Broadmeadow 2009, Quine *et al.* 2011). The UK are therefore making a concerted effort to restore degraded peatland and woodland and enhance their contribution to climate change mitigation and adaptation.

Peatland restoration

Peatlands cover 11% of England's land area (c.1.5 million hectares), more than 20% of Scotland (c.2 million hectares), 4.5% of Wales, and 12% of Northern Ireland. Over 70% of England's peatlands are visibly damaged with a larger area affected by atmospheric pollution (Natural England 2010), 70% of blanket bog and 90% of raised bog in Scotland has been damaged (SNH 2015), at least three-quarters of the Welsh peatland area (ASC 2016a) and more than 85% of Northern Ireland's peatland area (ASC 2016b) has been negatively impacted. This degradation typically results in drainage and lowered water tables causing oxidation of peat as carbon dioxide and loss via water pathways in the forms of particulate and dissolved organic carbon. The poor state of the biodiversity of the UK's peatland is reflected in the last round of EU Habitats Directive reporting, which reported the status of all relevant peatland habitats (including Bogs and Fens) as 'Bad', and several with a prognosis of 'Declining' (JNCC 2013). As a result, the UK's peatlands are currently estimated to be a significant net source of greenhouse gas emissions.

Targeted restoration on peatland is underway across the UK with a focus on restoring natural peatland biota, functions and characteristics. Peatland restoration usually involves implementing measures to stabilise eroding surfaces, re-establish vegetation cover, and raise and stabilise the water table to restore peat-forming conditions. Restoration of degraded peatlands can reduce carbon losses to the atmosphere and the water environment through restoring anaerobic conditions and preventing loss via erosional processes. Peatland restoration programmes in the UK are typically funded through: national Agri-Environment Schemes and funding for management of protected sites and specific grants for peatland restoration; EU funding (e.g. EU-LIFE); private companies (e.g. peat extraction/water/horticulture companies); and NGOs. The UK is exploring the use of tools such as the UK Peatland Code and Payment for Ecosystem Services to promote corporate sponsorship and increase access to private-sector philanthropy (Bonn *et al.* 2014).

Further information on peatland restoration programmes in the UK can be found as a case study in Section II of the report.

Woodland restoration

The current area of woodland in the UK is estimated to be 3.17 million hectares (Forestry Commission 2018). This represents 13% of the total land area in the UK, 10% in England, 15% in Wales, 18% in Scotland and 8% in Northern Ireland. Woodland cover in the UK is substantially less than the global average of 30% and the EU average of 37% (FAO 2005). Nevertheless, following significant historic deforestation, the total area of woodland in the UK has more than doubled since 1945, with positive trends in woodland extent seen throughout the country (Forestry Commission 2017, Forestry Commission 2003). These positive trends in woodland extent are mirrored by an increase in the

cumulative net removal of greenhouse gases by UK forests since 1990 (UK Biodiversity Indicator D1b). In 2016, forests in the UK are estimated to have removed the equivalent of nearly 24 million tonnes (Mt) of CO₂ from the atmosphere. Cumulatively, since 1990, the equivalent of nearly 600 Mt of CO₂ has been removed by UK forests. Native woodland, and in particular native broadleaf woodland, is important for its biodiversity in the UK. It is therefore encouraging that the proportion of removals by broadleaf woodland has increased since the time series began, accounting for 41% (9.8 Mt) of the estimated removals in 2016 compared to 34% (5.9 Mt) of the removals in 1990.

A number of woodland restoration initiatives are taking place across the UK. The UK Government in England has committed to supporting the development of a new Northern Forest (HM Government, 2018). This project will see 500 million trees being planted over 25 years, roughly equating to 25,000 hectares of new woodland, and is discussed further within the assessment of Target 5 in Section III of the report.

In Scotland, native woodlands have seen particularly focussed efforts. For example, at Abernethy, Creag Meagaidh and Glen Feshie, a partnership of neighbouring land managers have committed to an ambitious 200-year vision, Cairngorms Connect, to enhance habitats, species and ecological processes, including native woodlands to their natural limits, over 600 km² within the Cairngorms National Park (<http://cairngormsconnect.org.uk/>). The volunteer-led re-wilding projects at Carrifran Wildwood managed by the Borders Forest Trust has also led to over 300 hectares of woodland being planted in a bid to restore native woodland in the south of Scotland (<http://www.carrifran.org.uk/>).

In addition, the ecological resilience of woodland is being enhanced through the management of forest pathogens in Wales discussed below.

Preventative and adaptive action to manage tree health and improve ecological resilience, Wales

Phytophthora ramorum is a fungus-like pathogen which causes extensive damage and mortality to a wide range of trees. In the past four years, over 650 hectares of larch have been clear-felled in the Afan valley, which equates to well over 15% of the forest area, and felling work is still ongoing. The outbreak of *P. ramorum* across Wales, not just at Afan, has been the largest outbreak of a tree disease in Great Britain since the Dutch elm disease epidemic in the 1970s. It has required a huge amount of planning and resources to achieve the level of felling required at Afan, in accordance with bio-security protocols, to try and limit the spread the disease as far as possible.

The felling has taken its toll on the visual, landscape and amenity aspects of the valley but these will recover in time. Natural Resources Wales (NRW), who manages the public forest estate on behalf of Welsh Government, are trying to make the most of what has happened by implementing changes that will make the forest more diverse and therefore ecologically resilient to future threats such as climatic change. The climate globally and in Wales is predicted to change with wide-ranging implications for all ecosystems, including woodlands. Some of the projected changes are potentially so significant that they could completely change the extent, nature and condition of the woodlands and forests in Wales, both recently planted and ancient in origin, and this will have an impact on the ecosystem services that they them. The main risks for forestry in Wales are related to changes in forestry productivity and land suitability; changes in the type, extent, frequency and impact of pests, pathogens and invasive species; and changes in the frequency and/or magnitude of extreme weather and wildfire events.

Through an increased tree restocking programme NRW are working to re-establish woodlands at Afan as quickly as possible. NRW are planting a wider range of species, including broadleaves, making sure that the provenance of these species is capable of adapting to future climatic change. NRW are also looking to manage areas of the forest using Low Impact Silvicultural Systems which will enhance opportunities for biodiversity. Taken together, these actions should improve the structural, species and genetic diversity of the forest and improve habitat connectivity, making the forest more resilient to future threats, including pests and diseases.

NRW is also involved in developing and implementing broader biosecurity work with partners to ensure that threats from pests and pathogens do not become 'ecological tipping points'. Recovery of damaged woodland ecosystems is a priority but equally important are measures to raise awareness of tree pest and disease symptoms, causes and actions, such as NRW's 'Keep it Clean' campaign (<https://naturalresources.wales/guidance-and-advice/environmental-topics/woodland-management/tree-health-and-biosecurity/biosecurity/?lang=en>).

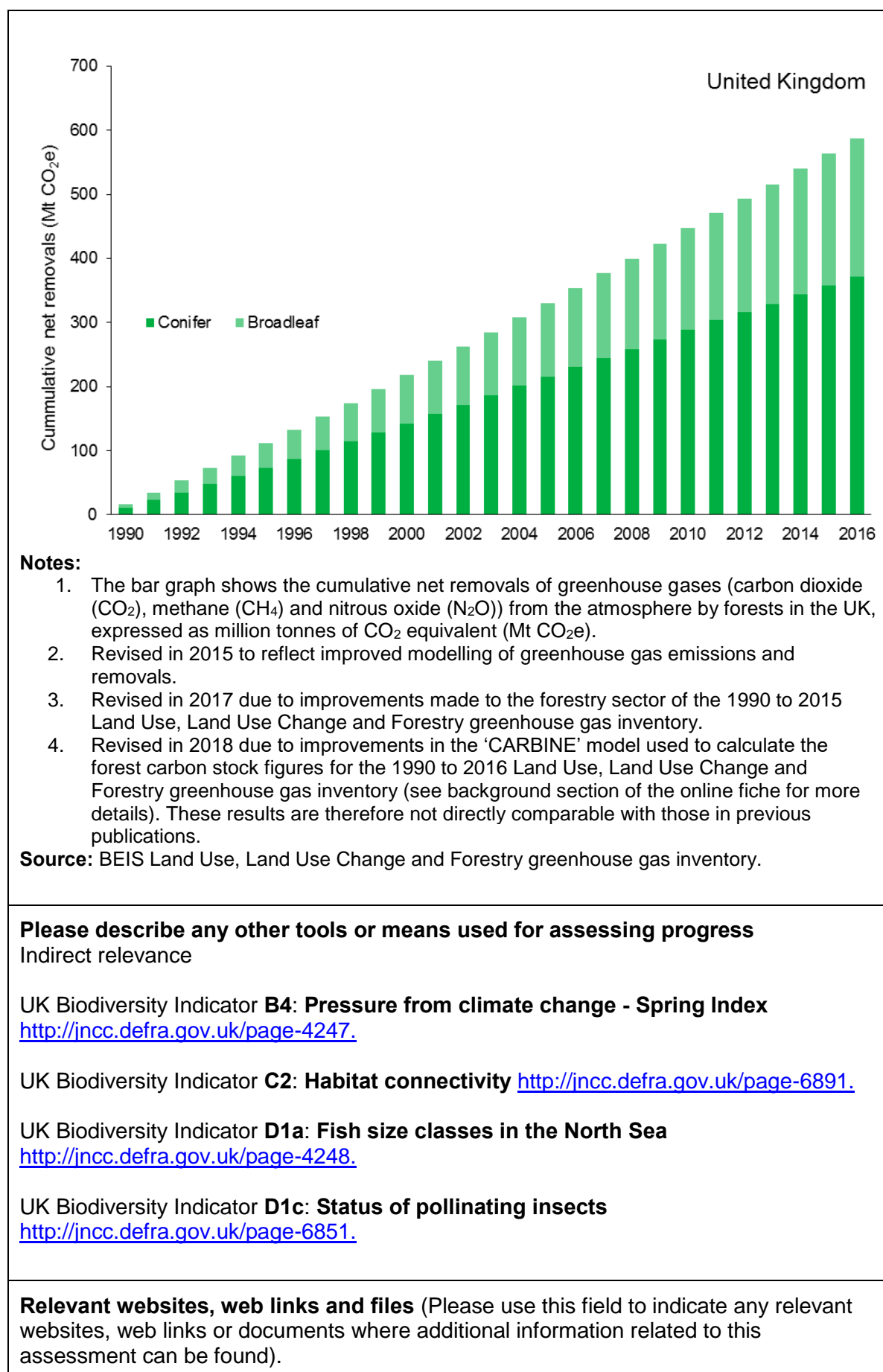
Indicators used in this assessment

UK Biodiversity Indicator **D1b: Removal of greenhouse gases by UK forests**
<http://jncc.defra.gov.uk/page-6058>.

In 2016, forests in the UK are estimated to have removed the equivalent of 23.9 million tonnes (Mt) of carbon dioxide (CO₂) from the atmosphere (Figure D1bii). Cumulatively, since 1990, the equivalent of 587 Mt of CO₂ has been removed by UK forests (Figure D1bi).

The proportion of removals by broadleaf woodland has increased since the time series began, accounting for 41% (9.8 Mt) of the estimated removals in 2016 compared to 34% (5.9 Mt) of the removals in 1990 (Figure D1bii).

Figure D1bi. Cumulative net removals of greenhouse gases by UK forests, 1990 to 2016.



Department of Energy and Climate Change (DECC) (2018) UK Greenhouse Gas Inventory, 1990 to 2016, Brown P, Broomfield M, , Buys G, Cardenas L, Kilroy E, MacCarthy J, Murrells T, Pang Y, Passant N, Ramirez Garcia J, Thistlethwaite G, Webb N. Available from: https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1804191054_ukghgi-90-16_Main_Issue1.1_UNFCCC.pdf.

Thomson, A., Buys, G., Moxley, J., Malcolm, H., Henshall, P. & Broadmeadow, M. (2017). Projections of emissions and removals from the LULUCF sector to 2050. Centre for Ecology and Hydrology, Project Code: NEC04637. Available from: https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1703161052_LULUCF_Projections_to_2050_Published_2017_03_15.pdf.

FAO (Food and Agriculture Organization) (2005) Global Forest Resources Assessment 2005. FAO, Rome.

Forestry Commission (2003) National Inventory of Woodlands and Trees. Great Britain. Forestry Commission, Edinburgh.

Forestry Commission (2018) Forestry Statistics 2017 [viewed on 23/12/2018] Accessed from: <https://www.forestresearch.gov.uk/tools-and-resources/statistics/forestry-statistics/forestry-statistics->.

Gardiner, B.A., Palmer, H. & Hislop, A.M. (2006) The principles of using wood for shelter. Information Note 81, Forestry Commission, Edinburgh.

Matthews, R.W. & Broadmeadow, M.S.J. (2009) The potential of UK forestry to contribute to Government's emissions reduction commitments. Combating climate change—a role for UK forests (eds D.J. Read, P.H. Freer-Smith, J.I.L. Morison, N. Hanley, C.C. West & P.R. Snowdon) pp. 139–161. The Stationery Office, Edinburgh.

Quine, C., Cahalan, C., Hester, A., Humphrey, J., Kirby, K., Moffat, A. & Valatin, G. (2011) Chapter 8: Woodlands *in*: The UK National Ecosystem Assessment Technical Report. UK National Ecosystem Assessment, UNEP-WCMC, Cambridge.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity 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.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

The UK signed the Nagoya Protocol in 2011. It was then implemented into UK law through The Nagoya Protocol (User Compliance) Regulations 2015. The Department of Business, Energy and Industrial Strategy (BEIS) have been appointed the competent authority responsible for the implementation of the Nagoya Protocol in the UK. They are

also responsible for awareness raising and training of UK-based users of genetic resources, supporting users to access resources in line with national access legislation and complying with relevant EU Regulation.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes national legislation and initiatives in place to support the implementation of the Nagoya Protocol.

UK initiatives

The Nagoya Protocol came into being in 2010 putting more detail to the ABS principles from the Convention of Biological Diversity in a legally binding way. The Protocol aims to promote the conservation and sustainable use of biodiversity by ensuring that any benefits derived from genetic research are fairly shared with the owners of those genetic resources.

The UK Government signed the Protocol on 23 June 2011, thereby making a political commitment to ratify it. It was later adopted by European legislation through 'Regulation (EU) No 511/2014' and came into force on 12 October 2014. This was then implemented into UK law through The Nagoya Protocol (User Compliance) Regulations 2015. This legislation applies, in the main, to a number of sectors including; food and beverage, pharmaceutical, cosmetic and personal care, animal breeding, plant breeding, biotechnology, bio-control and academia.

Prior to ratification, the UK established the Department for Environment, Food and Rural Affairs (Defra) as the National Focal Point and subsequently appointed BEIS as the Competent Authority. BEIS are responsible for the implementation of the Nagoya Protocol in the UK through enforcement of Regulation (EU) No. 511/2014 on compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation in the European Union, and the supporting Implementing Regulation (EU) 2015/1866. BEIS are also responsible for awareness raising and training of UK-based users of genetic resources, supporting users to access genetic resources in line with national access legislation and comply with the EU Regulation. Defra has maintained the UK profile on the ABS-Clearing House with up to date information and processes are in place for the transmission of checkpoint communiques to the Clearing House as required.

In order to support businesses and others working in these sectors the UK government undertook a consultation (Defra, 2015) on implementation of the Nagoya Protocol. The UK has input into the development of the EU Horizontal Guidance (EC 2016) on compliance measure for users of the Protocol.

Kew, the Natural History Museum London, and RBGE have been at the forefront of developments in the non-commercial scientific research community to develop best practice guidelines to support effective implementation of the Nagoya Protocol. Kew has already developed an institutional ABS Toolkit (www.cbd.int/abs/submissions/icnp-3/EU-Kew-letter.pdf) and an internal staff guide to collecting, use and supply of genetic resources and traditional knowledge.

Indicators used in this assessment <input checked="" type="checkbox"/> No indicator used
Please describe any other tools or means used for assessing progress
Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found). <p>Defra. 2015. Consultation on implementing the Nagoya Protocol in the UK A summary of responses and the government reply. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415474/nagoya-consult-sum-resp.pdf</p> <p>European Commission (EC). 2016. Guidance document on the scope of application and core obligations of Regulation (EU) No 511/2014 of the European Parliament and of the Council on the compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation in the Union (2016/C 313/01). Accessed from: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52016XC0827(01)&from=EN.</p>
Level of confidence of the above assessment <input type="checkbox"/> Based on comprehensive evidence <input checked="" type="checkbox"/> Based on partial evidence <input type="checkbox"/> Based on limited evidence
Please provide an explanation for the level of confidence indicated above. <Text entry>
Adequacy of monitoring information to support assessment <input type="checkbox"/> Monitoring related to this target is adequate <input type="checkbox"/> Monitoring related to this target is partial (e.g. only covering part of the area or issue) <input checked="" type="checkbox"/> No monitoring system in place <input type="checkbox"/> Monitoring is not needed
Please describe how the target is monitored and indicate whether there is a monitoring system in place <p>The UK currently does not have a monitoring system for the implementation of the Nagoya Protocol as it is still in its early stages.</p> <p>Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)</p> <p><Add link> <Add file></p>

Aichi Biodiversity 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.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

The four UK countries have together developed and are implementing the UK Post-2010 Biodiversity Framework which describes how the work of each of the countries joins up with work at a UK level to contribute to the Strategic Plan for Biodiversity 2011-2020 and to the EU Biodiversity Strategy. In addition, the countries have together developed the UK Marine Strategy in response to the European Union's Marine Strategy Framework Directive, which sets out the actions that the UK will take to achieve Good Environmental Status in its marine waters by 2020. Each of the four metropolitan UK countries, plus some UK's Overseas Territories and Crown Dependencies, have developed and are implementing their own biodiversity strategies. The strategies include further priorities and are supported by additional measures and indicators, reflecting the countries' different responsibilities, needs, views and environmental circumstances.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

NBSAPs and any additional biodiversity strategies currently being implemented in the UK. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK initiatives

UK Post-2010 Biodiversity Framework

The UK Post-2010 Biodiversity Framework was published on 17 July 2012 (JNCC & Defra 2012). It was produced by JNCC and Defra, on behalf of the Four Countries' Biodiversity Group, through which the environment departments of all four governments in the UK work together.

The Framework covers the period from 2011 to 2020 and was developed in response to two main drivers: the CBD's Strategic Plan for Biodiversity 2011-2020 and its 5 strategic goals and 20 'Aichi Biodiversity Targets', published in October 2010; and the EU Biodiversity Strategy released in May 2011.

The Framework shows how the work of the four UK countries joins up with work at a UK level to achieve the 'Aichi Biodiversity Targets' and the aims of the EU biodiversity strategy. It identifies the activities required to complement the country biodiversity strategies, and where work in the country strategies contributes to international obligations. In total, 23 areas of work have been identified where all the countries have agreed that they want to contribute to, and benefit from, a continued UK focus. An Implementation Plan (<http://jncc.defra.gov.uk/page-6583>) was produced in November 2013, which was updated and revised in June 2018. Reporting (<http://jncc.defra.gov.uk/page-7105>) on progress with the Implementation Plan is also undertaken.

The development of the Framework reflects a revised direction for nature conservation, towards an approach which aims to consider the management of the environment as a whole, and to acknowledge and take into account the value of nature in decision-making. The Framework sets out the common purpose and shared priorities of the UK and the four countries, and, as such, is a hugely important document, which is owned, governed, and implemented by the four countries.

UK Marine Strategy

The UK Marine Strategy has been developed together by the UK Government and the Devolved Administrations. The strategy is the UK's response to the European Union's Marine Strategy Framework Directive and sets out the actions that the UK will take to achieve Good Environmental Status in its marine waters by 2020. The strategy is presented in three parts:

- An initial assessment of the UK's seas and characteristics, targets and indicators of Good Environmental Status (GES) in UK seas;
- The monitoring programmes for measuring progress towards Good Environmental Status (GES) in UK seas; and
- The measures that contribute towards Good Environmental Status (GES) in UK seas.

UK National Pollinator Strategies and Pollinator Monitoring Scheme

Each of the UK countries have developed their own pollinator strategy and are working together to develop a UK Pollinator Monitoring Scheme. Further information is provided in Target 14's assessment in Section III of the report.

Country initiatives

England

The most recent England biodiversity strategy, 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' was published by Defra on 19 August 2011 (Defra, 2011), and a progress update was provided in July 2013. 'Biodiversity 2020' provides a picture of how England is implementing its international and EU commitments. It sets out the strategic direction for biodiversity policy for the next decade on land and at sea. In January 2018, Defra published the 25 Year Environment Plan with

a commitment to develop a new Nature Strategy to build upon the lessons learnt from the implementation of Biodiversity 2020 and fulfil post-2020 commitments to the CBD.

Scotland

The '2020 Challenge for Scotland's Biodiversity - a strategy for the conservation and enhancement of biodiversity in Scotland' was published on 19 June 2013 (Scottish Government 2013), and is Scotland's response to its international and European environmental obligations. It is a supplement to 'Scotland's Biodiversity: It's in Your Hands' which was published in 2004 and set out a 25-year strategy for the conservation and enhancement of biodiversity in Scotland (Scottish Executive, 2004). The two documents together comprise the Scottish Biodiversity Strategy. Scottish Natural Heritage have also conducted interim assessments of Scotland's progress towards the Aichi Targets (SNH 2016 & 2017).

Wales

The Nature Recovery Action Plan for Wales, published in 2015, sets out how Wales will address the Convention on Biological Diversity's (CBD) Strategic Plan for Biodiversity and the associated Aichi Biodiversity Targets. It sets out the commitment to biodiversity in Wales, the issues that need to be addressed, and the objectives for action. It sets out how current and proposed action, particularly through the new framing of the Well-being of Future Generations (Wales) Act, and Environment (Wales) Act will contribute to reversing the loss of biodiversity in Wales.

Northern Ireland

'Valuing Nature - A Biodiversity Strategy for Northern Ireland to 2020' was published on 1 July 2015. This strategy replaces the previous Northern Ireland Biodiversity Strategy, which was published in August 2002 (DOENI, 2015). Additional information about biodiversity in Northern Ireland is also available from 'Biodiversity Northern Ireland'.


Overseas Territories and Crown Dependencies

The Convention on Biological Diversity (CBD) has been extended to 6 OTs and 2 CDs (British Virgin Islands, Cayman Islands, Gibraltar, South Georgia & South Sandwich Islands and St Helena, Ascension & Tristan da Cunha, Falkland Islands; and Isle of Man and Jersey). Some of the UK OTs and CDs are in the process of developing or have developed a Biodiversity Strategy and/or National Biodiversity Action Plan, including the following:


- Jersey released its first Biodiversity: a Strategy for Jersey in 2000.
- The Isle of Man recently published its own Biodiversity Strategy: Managing our Natural Wealth, The Isle of Man's First Biodiversity Strategy, which runs from 2015-2025.
- South Georgia and the South Sandwich Islands recently released their National Biodiversity Action Plan which runs from 2016-2020.
- The Biodiversity Action Plan for the Tristan da Cunha Islands was published in 2012 and is currently being updated.
- Ascension Island published its National Biodiversity Action Plan in 2015.
- The Cayman Islands Biodiversity Action Plan was produced in 2009.
- Gibraltar's Biodiversity Action Plan was published in 2006 and formally adopted in 2012. Terrestrial aspects of the BAP were recently consolidated into the Gibraltar Nature Reserve Management Plan published in 2016. Gibraltar has also

<p>produced specific plans for its Marine Protected Areas such as the Southern Waters of Gibraltar Management Scheme in 2012. A revised version of the plan, incorporating the MPAs designated in 2014 in British Gibraltar Territorial Waters, is being published in 2018.</p> <ul style="list-style-type: none"> • The Falkland Islands have a vision for the environment as set out in the Falkland Islands Biodiversity Framework (2016-30).
<p>Indicators used in this assessment</p> <p><input checked="" type="checkbox"/> No indicator used</p>
<p>Please describe any other tools or means used for assessing progress</p> <p><Text entry></p>
<p>Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).</p> <p>JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). 2012. UK Post-2010 Biodiversity Framework. July 2012. Available from: http://jncc.defra.gov.uk/page-6189.</p> <p>Defra. 2011, Biodiversity 2020: A strategy for England's wildlife and ecosystem services. Accessed from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf.</p> <p>Defra. 2013. A simple guide to Biodiversity 2020 and progress update .Accessed from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/225300/pb14009-biodiversity2020-progress-guide-20130730.pdf.</p> <p>Scottish Executive. 2004. 'Scotland's Biodiversity: It's in Your Hands. Accessed from: http://www.gov.scot/Resource/Doc/25954/0014583.pdf.</p> <p>Welsh Assembly Government. 2006. Environment Strategy for Wales. Accessed from: https://gov.wales/docs/desh/publications/060517environmentstrategyen.pdf.</p> <p>Scottish Government. 2013. 2020 Challenge for Scotland's Biodiversity. Accessed from: http://www.gov.scot/Resource/0042/00425276.pdf.</p> <p>Scottish Natural Heritage (SNH) (2016) Scotland's Biodiversity Progress to 2020 Aichi Targets. Accessed from: https://www.cbd.int/doc/world/gb/gb-nr-oth-p1-en.pdf</p> <p>Scottish Natural Heritage (SNH) (2017) Scotland's Biodiversity Progress to 2020 Aichi Targets. Accessed from: https://www.cbd.int/doc/world/gb/gb-nr-oth-p2-en.pdf.</p> <p>DOENI. 2015. Valuing Nature - A Biodiversity Strategy for Northern Ireland to 2020. Accessed from: https://www.daera-ni.gov.uk/sites/default/files/publications/doe/natural-policy-biodiversity-strategy-to-2020-2015.pdf.</p>
<p>Level of confidence of the above assessment</p> <p><input checked="" type="checkbox"/> Based on comprehensive evidence</p> <p><input type="checkbox"/> Based on partial evidence</p>

<input type="checkbox"/> Based on limited evidence
<p>Please provide an explanation for the level of confidence indicated above.</p> <p>The assessment is based upon the UK's comprehensive record of the publication of biodiversity strategies, including reports on their progress.</p>
<p>Adequacy of monitoring information to support assessment</p> <p><input checked="" type="checkbox"/> Monitoring related to this target is adequate</p> <p><input type="checkbox"/> Monitoring related to this target is partial (e.g. only covering part of the area or issue)</p> <p><input type="checkbox"/> No monitoring system in place</p> <p><input type="checkbox"/> Monitoring is not needed</p>
<p>Please describe how the target is monitored and indicate whether there is a monitoring system in place</p> <p>The UK maintains a comprehensive record of the publication of biodiversity strategies, including reports on their progress.</p> <p>Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)</p> <p>Country Biodiversity Strategies http://jncc.defra.gov.uk/page-5701.</p>

<p>Aichi Biodiversity Target 18</p>  <p><i>By 2020, the traditional knowledge, innovations and practices of indigenous and local communities that are 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 in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.</i></p>
<p>Category of progress towards the implementation of the selected target:</p> <p><input type="checkbox"/> On track to exceed target</p> <p><input type="checkbox"/> On track to achieve target</p> <p><input type="checkbox"/> Progress towards target but at an insufficient rate</p> <p><input type="checkbox"/> No significant change</p> <p><input type="checkbox"/> Moving away from target</p> <p><input type="checkbox"/> Unknown</p>
<p>Date the assessment was done:</p> <p>18 January 2019.</p>
<p>Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).</p>

In the UK and Overseas Territories there are no indigenous peoples and local communities (IPLCs) as defined in Article 8j of the Convention and Target 18 has therefore not been assessed. The needs, knowledge and practices of IPLCs are recognised and integrated into the UK's international work.
Indicators used in this assessment <input type="checkbox"/> No indicator used
Please describe any other tools or means used for assessing progress <Text entry>
Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).
Level of confidence of the above assessment <input type="checkbox"/> Based on comprehensive evidence <input type="checkbox"/> Based on partial evidence <input type="checkbox"/> Based on limited evidence
Please provide an explanation for the level of confidence indicated above.
Adequacy of monitoring information to support assessment <input type="checkbox"/> Monitoring related to this target is adequate <input type="checkbox"/> Monitoring related to this target is partial (e.g. only covering part of the area or issue) <input type="checkbox"/> No monitoring system in place <input type="checkbox"/> Monitoring is not needed
Please describe how the target is monitored and indicate whether there is a monitoring system in place Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

Aichi Biodiversity Target 19  <p><i>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.</i></p>
Category of progress towards the implementation of the selected target: <input type="checkbox"/> On track to exceed target <input checked="" type="checkbox"/> On track to achieve target <input type="checkbox"/> Progress towards target but at an insufficient rate

- ☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target requires *action* to make data available and undertake research, and *outcomes* around knowledge sharing and its application. Progress on this target has been assessed against both whether initiatives to make data available, undertake research, share information and build knowledge are implemented as well as effectiveness of these initiatives at improving the knowledge and science base.

The UK is a world leader in scientific research and is developing the use of innovative technologies to inform biodiversity conservation. Open data policy means that Government data relating to biodiversity in the UK are available by default rather than by request. The UK has made significant progress with data management and knowledge sharing systems, which continue to increase in size (for example the National Biodiversity Network includes over 219 million observations of wildlife), helping to improve the application of biodiversity knowledge. In addition, the UK has a range of research and knowledge sharing networks to help foster collaboration and the integration of science and policy to ensure the success of conservation and sustainability efforts.

The assessment is judged to be sufficiently on track on the basis that a number of initiatives are in place to improve the knowledge and science base. Furthermore, evidence indicates the availability of data and information in the UK has substantially increased over the last decade.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes examples of UK scientific excellence, the development of new biodiversity conservation technologies and knowledge sharing initiatives. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK initiatives

UK research excellence

The Research Excellent Framework (2014) rated 76% of the research submitted as 'world leading' or 'internationally excellent'. UK academic research productivity is 3.6 times the world average. In 2014, the UK represented 4.1% of the world's researchers, and accounted for 15.2% of the world's most highly-cited articles.

UK Research and Innovation (UKRI) (<https://www.ukri.org/>) is a new body which works in partnership with universities, research organisations, businesses, charities, and government to create the best possible environment for research and innovation to flourish. Operating across the whole of the UK with a combined budget of more than £6 billion, UKRI brings together the seven Research Councils, Innovate UK and Research England. UKRI aims to support and help connect the best researchers and innovators with customers, users and the public, and invest public money in research to maximise its impact for citizens, in the UK and across the world.

The information provided is to illustrate the strength of UK research, in the absence of specific information being available for the quality and funding of research relating to biodiversity.

Valuing Nature Programme

The Valuing Nature Programme (<http://valuing-nature.net/>) is a five-year funded network designed to promote and develop interdisciplinary research capacity in the economic, societal and cultural value of biodiversity, natural resources and ecosystem services, facilitate the integration of such approaches in policy and practice in the public and private sectors. The programme is developing the Valuing Nature Network to help build an interdisciplinary research community capable of working across the natural, biological and social sciences, and the arts and humanities.

Making Earth Observation work for biodiversity and ecosystem services

The UK is developing the environmental application of open access imagery data gathered by the Sentinel satellites as part of the European Union's (EU) Copernicus Programme. The increasing availability of Earth Observation data has significant potential to inform environmental policy and operational evidence through the mapping of habitat condition and human activity, as well as other applications.

The UK's Department for Environment, Food & Rural Affairs and JNCC funded Making Earth Observation Work for UK Biodiversity (MEOW) project has been established to explore the rationale for adopting EO habitat mapping across the UK. This in turn has led to further EO projects, including the Natural England Living Maps and the Welsh Government Living Wales projects that are producing detailed habitat maps derived from imagery data. In addition, Defra have established an Earth Observation Centre of Excellence, a collaboration with organisations across the Defra network and the devolved administrations, which has developed a roadmap for integrating expertise across different environmental policy areas to enhance the use of EO data by 2020.

Further information on how the UK is using EO observation technology to map natural capital in its Overseas Territories can be found in Target 2 of Section III of this report.

National Biodiversity Network

The National Biodiversity Network (NBN) is a collaborative partnership between the UK government and country agencies, environmental agencies, local records centres, UK wildlife conservation organisations, and voluntary groups. It is run by the NBN Trust, a charitable organisation whose members collect and share biological data, initially via the NBN Gateway (until 31st March 2018) and now through the NBN Atlas. The vision of the NBN is that "Biological data collected and shared openly by Network members are central to the UK's learning and understanding of its biodiversity and are critical to all decision-making about nature and the environment". Its main objectives are to: share

standardised high quality, structured biological data; engage broader audiences, including the public, in data recording and expand awareness of the value and availability of biological data and information; and provide a long-term sustainable platform for collation of UK-wide biodiversity data.

Launched in 2000, the NBN continues to revise and update its approach to knowledge sharing and published its new five-year strategy in July 2015. The number of records within the NBN Atlas continues to increase (UK Biodiversity Indicator E1). It now contains just under 220 million records (as of 30/05/2018) and is the largest biodiversity databases in the country. National citizen science programmes such as the Great British Bee Count submit collected data to the network raising awareness of the NBN Atlas while generating biodiversity data on a regular basis. While there are still taxonomic and geographical gaps in knowledge and data coverage, the NBN has teamed up with the Chartered Institute of Ecology and Management (CIEEM) in 2015 to extend knowledge exchange opportunities and awareness among the private sector, with a particular focus on environmental consultancies. To facilitate the flow of data from the private sector to the NBN Atlas, the NBN Trust has worked with CIEEM to develop a free online data-management platform specifically for environmental consultants (www.consultantsportal.uk) and offers free training and support in its use.

In Wales, a dedicated portal page on the NBN Atlas Wales enabling data for invasive non-native to be searched using species lists or individual species (wales-species-inns.nbnatlas.org). This allows distribution of species to be viewed and downloaded according to interest for example according to legislation or of special interest to Wales. It is probable that similar portals will be developed for the other countries of the UK.

Global Biodiversity Information Facility

The Global Biodiversity Information Facility (GBIF) is an international network and research infrastructure funded by the world's governments and aimed at providing open access to worldwide biodiversity data. The National Biodiversity Network (NBN) is the UK's GBIF node. The UK is the second largest data publisher on GBIF and the fifth biggest user of GBIF data. GBIF data has been used to inform UK research in a variety of areas, including climate change, invasive species, conservation, human health and agriculture.

Intergovernmental Platform on Biodiversity and Ecosystem Services

The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) was established in 2012 by the world's governments as a mechanism for strengthening the global science-policy interface for biodiversity and ecosystem services.

IPBES members are committed to building the platform as the leading intergovernmental body for assessing the state of the planet's biodiversity, its ecosystems and the essential services they provide to society.

IPBES responds to requests for scientific information related to biodiversity and ecosystem services from Governments, relevant multilateral environmental agreements and United Nations bodies, as well as other relevant stakeholders. Its first Work Programme started in 2014, and IPBES has already adopted a number of policy relevant assessments, as follows:

- A Thematic Assessment on Pollinators, Pollination and Food Security,
- A Methodological Assessment on Scenarios and Modelling for Biodiversity and Ecosystem Services, and

- Four Regional Assessments on Biodiversity and Ecosystem Services (for Africa; the Americas; Asia-Pacific; and Europe and Central Asia).

In April 2019 the Platform is expected to adopt its Global Assessment on Biodiversity and Ecosystem Services; and at its most recent Plenary in March 2018, agreed to take forward further assessment on valuation of nature, sustainable use of wild species, and invasive alien species.

Since 2016 IPBES has been Chaired by Professor Sir Robert Watson, nominated to the role by the UK government. A further 34 UK nominated experts have been engaged in delivering the Platform's work programme. And since 2012, the UK government has provided US\$3.3m to the IPBES Trust Fund.

Ecosystems Knowledge Network

The Ecosystems Knowledge Network (<https://ecosystemsknowledge.net/>) is a resource for anyone wanting to share knowledge or learn about the ecosystems approach. The project aims to stimulate knowledge exchange and practical learning across the UK and assist organisations and groups to understand how an ecosystems approach can help build sustainable communities.

Knowledge Exchange Schemes

A number of UK environmental research institutions have knowledge exchange schemes with business, non-governmental organisations and government bodies, including the Natural Environment Research Council and the British Ecological Society. The purpose of the of schemes is to foster wider links and mutual understanding between the environmental research community and the different sectors, while promoting their use of high quality scientific evidence. Further information can be found at <https://nerc.ukri.org/funding/available/schemes/kefellows/> and <https://www.britishecologicalsociety.org/policy/opportunities/>.

Marine science and evidence

Significant progress has been made in improving and sharing the science base for the marine environment in the UK. A large number of marine surveys have been undertaken to collect data on benthic habitats, including in Marine Protected Areas which for which very limited evidence was previously available. All benthic data from Government funded surveys, and some additional datasets, are shared publicly in the regularly updated Marine Recorder database published on the JNCC website (<http://jncc.defra.gov.uk/page-1599>). These datasets are fed into the NBN Atlas (previously the NBN Gateway). New data have helped to improve the UK part of EUSeaMap, a modelled map of seabed habitats (<http://www.emodnet.eu/seabed-habitats>). Seabird data are available publicly through Seabirds Monitoring Programme database hosted by JNCC (<http://jncc.defra.gov.uk/smp/>). Scottish marine data are also available through Marine Scotland Maps NMPI (<https://marinescotland.atkinsgeospatial.com/nmpi/>) in line with the Scottish Government open data network. UK marine monitoring data are fed into the OSPAR data and information management system <https://odims.ospar.org>. Although there has been progress in sharing and applying evidence, there still remain gaps in knowledge of marine ecosystems. There is limited knowledge of the full extent and functioning of habitats and the scale and impacts of biodiversity loss, particularly offshore. An offshore benthic monitoring programme is being developed, but time series data to feed into assessments is not yet available. The OSPAR intermediate assessment highlights

specific knowledge gaps for each of the indicators used (<https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017>).

Overseas Territories and Crown Dependencies

Montserrat Virtual Museum of Natural History

The Montserrat Virtual Museum of Natural History (MVMNH) is a novel scheme to capture information on the island's terrestrial biodiversity collected by researchers and to share it with island residents or wider users through an online database. Ohio State University and Montana State University are working with the Montserrat National Trust and the UK Overseas Territories Conservation Forum, with the support of the UK Government's Darwin Initiative to create the MVMNH. The original narrow concept to deliver insect data from an inventory of the Centre Hills funded by the RSPB, Durrell Wildlife Trust and Montana State University's Montana Agriculture Experiment Station was expanded after consultation with the Montserrat community to provide a platform that can serve a broader range of information across all terrestrial biodiversity on the island. The MVMNH has started cataloguing information on thousands of insect specimens. A library of related documents linked to these insect specimens and the species they represent will be developed next, followed by entries for wider biodiversity elements.

Indicators used in this assessment

UK Biodiversity Indicator **E1: Biodiversity data for decision making**

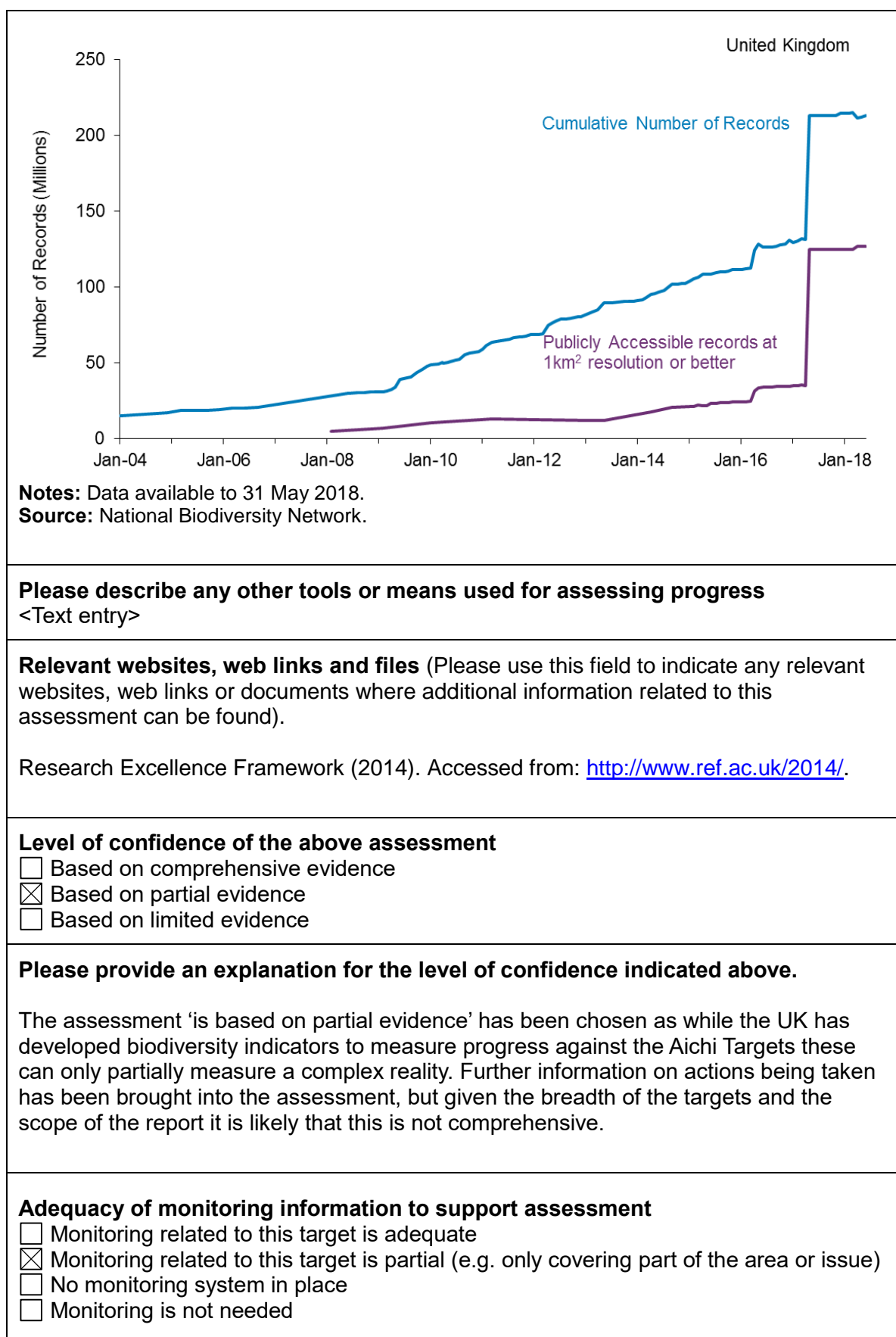
<http://jncc.defra.gov.uk/page-6073>

- a. Cumulative number of records
- b. Number of publicly accessible records at 1km² resolution or better

The number of records within the National Biodiversity Network Gateway has increased from 15 million at the start of 2004 to 68.7 million at the start of 2012, and to 131.3 million at the end of March 2017, at which time the Gateway closed and was replaced by the NBN Atlas. Since the start of the NBN Atlas in April 2017 there has been an increase of 81.9 million records to the end of May 2018.

The number of publicly accessible records which are at 1km² resolution or better increased from 10.5 million at the start of January 2010, to 35.2 million at the end of March 2017 in the National Biodiversity Network Gateway. The NBN Atlas which started in April 2017 has 126.9 million records at the end of May 2018 which are at 1km² resolution or better.

Figure E1i. Records added to the National Biodiversity Network, 2004 to 2018.



Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Aichi Biodiversity Target 20



By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation should increase substantially from the current levels.

Category of progress towards the implementation of the selected target:

- ☐ On track to exceed target
- ☐ On track to achieve target
- ☒ Progress towards target but at an insufficient rate
- ☐ No significant change
- ☐ Moving away from target
- ☐ Unknown

Date the assessment was done:

18 January 2019.

Additional information (Please provide information on the evidence used in the assessment of this target, drawing upon relevant information provided in section II, including obstacles in undertaking the assessment).

Assessment

This target requires *action* to mobilise financial resources to support the implementation of the Strategic Plan for Biodiversity 2011–2020 particularly to help developing countries to meet their commitments.

The UK has mobilised significant resources in support of the Strategic Plan for Biodiversity 2011–2020. The UK financial contribution in support of biodiversity in developing countries, especially for least developed countries, has risen from a baseline of £77.4m p.a between 2006 and 2010 to over £180m in 2015. Since 2015 the UK has announced a range of new funds for international biodiversity. For example, the UK is

investing £5.8bn to support International Climate Finance between 2016 and 2021, which is helping to halt deforestation and help communities to protect and restore forests. The programme has supported the inclusion in Marine Protected Areas of over four million square kilometers of marine environment across the UK Overseas Territories. International financing is therefore assessed as progressing and on track.

The overall assessment of insufficient is an acknowledgement that whilst international financing has increased, expenditure indicators show a fall in Government spend on biodiversity in the UK. Each of the UK countries has plans in place to mainstream biodiversity into other sectors and to mobilise resources from the private sector, and further work is required to capture the full scale of investment in domestic biodiversity.

Evidence used to support this assessment is provided below, including any indicators or initiatives. Environmental policy is devolved in the UK. Evidence is therefore provided at the appropriate level of the UK or UK countries to which it is relevant. Additional evidence is provided for the UK's Overseas Territories and Crown Dependencies where available.

Evidence used includes expenditure on domestic and international biodiversity and examples of initiatives to encourage wider sources of biodiversity funding. A detailed account of the UK Biodiversity Indicators relevant to this target is provided in the *Indicators used in this assessment* section below.

UK expenditure

The UK Government has a number of domestic and international biodiversity funding streams that support the implementation of the Convention and progress towards the Aichi targets; described in further detail below along with work being undertaken to encourage wider contributions from private sector, non-governmental organisations, foundations and academia.

International biodiversity financial resource mobilisation

As required under the Convention, the UK reports periodically through the financial reporting framework to provide information on the UK's financial contribution to achieving the global financial targets under Target 20. The last report was submitted by the UK in 2018 and the figures for Official Development Assistance and Other Official Flows are presented in table 20.1. It is noteworthy that in 2015 the UK invested £137 million in Official Development Assistance and £44 million in Other Official Flows. The UK is due to provide the next iteration of the financial report in due course. For updated and more detailed figures resource mobilisation in the UK, see the relevant section of the CBD website.

Data presented in table 20.1 and figure E2ii capture the international financial flows most closely related to conservation of biodiversity. There are however additional funding streams that contribute to the achievement of Aichi targets but have not been captured to date.

For example, the UK is at forefront of action to tackle the illegal trade in wildlife globally; the UK's Illegal Wildlife Trade fund has so far allocated approximately £18.5million to projects, supporting progress on Aichi target 12 though only aspects of this are covered in the data. Furthermore, the UK is a world leader in research including on the natural environment demonstrating progress towards target 19 as well as underpinning action to achieve the Aichi targets more broadly, not all is captured within the figures. The UK is

currently reviewing its reporting of international biodiversity financial flows, and aims to provide this additional information in future reports.

Table 20.1. Financial resources (£ millions) provided by the UK in support of biodiversity in developing countries, in particular least developed countries and small island developing States, as well as countries with economies in transition. Data are provided for Official Development Assistance and Other Official Flows between 2006 to 2015.

Year	ODA	OOF	Total
2006	25	41	66
2007	29	42	71
2008	23	41	64
2009	44	32	76
2010	73	36	109
2011	105	39	144
2012	49	41	90
2013	49	43	92
2014	142	46	188
2015	137	44	181

Domestic biodiversity financial resource mobilisation

In 2016/17, £445 million of UK public sector funding was spent on biodiversity in the UK; a real-term decrease of 9% since 2015/16 and of 17% over the last 5 years (UK Biodiversity Indicator E2). Non-governmental organisation spending on UK biodiversity has shown a steady increase since records recently began, to £234 million in 2016/17. Spending on international biodiversity has increased both in the long-term and short term; totalling £76 million in 2016/17.

In addition, funding from the private and voluntary sector is not captured in the CBD report process.

The UK biodiversity indicator E2 is acknowledged to be a partial picture of the resources available from the UK to other countries. The figures are estimates of UK public sector spending on biodiversity which are sourced from a wide range of Government organisations; departmental annual reports and expert contacts in the relevant organisations. The figures are likely to be an underestimate, because some biodiversity spend is integrated into wider programmes, and not accounted for separately. In addition, data for certain programmes are only available in some years.

UK initiatives

Private sector, non-governmental organisations, foundations and academia funding

The UK has taken measures to encourage both the private sector and non-governmental organisations, foundations and academia to provide international support for the implementation of the Strategic Plan for Biodiversity 2011 – 2020.

There are a number of commitments in the London Declaration and the Kasane statement (see the text on 'illegal wildlife trade' below) that commit signatory countries to ensure that the private sector acts responsibly, in relation to wildlife products; to engage with the transport sector and support an international Task Force on the transport

industry and illegal wildlife trade (IWT) and to engage with the financial sector on putting the issue of financial crime related to the IWT on their agendas.

Voluntary code funding

There are a number of examples of voluntary codes that are attracting investment in biodiversity. Work is already underway through implementation of the Peatland Code, which is a mechanism by which businesses can help fund peatland restoration projects across the UK. Carefully designed to ensure environmental credibility, the Peatland Code is a voluntary standard that quantifies carbon emission reductions of restored peatlands, so that businesses can invest in pre-selected projects with confidence that their funds will return clear carbon benefits, enabling them to meet corporate social responsibility targets.

The UK's Woodland Carbon Code is a voluntary standard for woodland creation projects where claims are made about the carbon dioxide they sequester. Independent valuation and verification to this standard provides assurance and clarity about the carbon savings of these sustainably managed woodlands.

Government funded initiatives

United for Wildlife Transport Taskforce

The UK Government's Foreign and Commonwealth Office is a signatory to the United for Wildlife Transport Taskforce Buckingham Palace Declaration and a member of the United for Wildlife International Taskforce on the transportation of illegal wildlife products, made up of high-level leaders from the transport industry together with representatives from across the world of conservation. The Taskforce published the Buckingham Palace Declaration in March 2016 that will help to break the chain between suppliers and consumers and lead to a tangible and significant reduction in the volume of illegal wildlife trade products.

International Sustainability Unit

HRH The Prince of Wales's International Sustainability Unit has also facilitated a working group of representatives of the UK and international banking and finance industry to examine how they can best integrate tackling the money-laundering and corruption that is associated with the illegal wildlife trade and other environmental crimes into their operations. The Group produced a set of recommendations as an input to the Kasane Conference on the illegal wildlife trade in Botswana in March 2015.

International Climate Fund

The UK has invested £115m from the International Climate Fund (ICF) to the BioCarbon Fund Initiative for Sustainable Forest Landscapes (ISFL). The ISFL is a multilateral fund supported by donor governments and managed by the World Bank. The ISFL's objective is to reduce greenhouse gas emissions from the land sector, from deforestation and forest degradation in developing countries, and from sustainable agriculture, as well as to promote smarter land-use planning, policies and practice. One of the key elements of the ISFL is leveraging partnerships with other public sector initiatives and private sector actors. There is a strong focus on private sector engagement, including, for example, collaborating on sustainability approaches.

Commonwealth Clean Ocean Alliance

The UK and Vanuatu have lead establishing the Commonwealth Clean Ocean Alliance (CCOA) to tackle plastic pollution in the ocean. These ambitions are being supported by up to £66.4 million funding packages to boost global research and help countries across the Commonwealth stop plastic waste from entering the oceans in the first place. The UK, alongside Canada, launched the Global Plastics Action Partnership to help deliver the goals of the Alliance and further bring businesses, governments and organisations together to develop country action plans to address the plastic problem. Through which the UK have funded £2.4 million project to tackle global plastic pollution in rivers, deltas and oceans with three initial projects to be launched in Southeast Asia, West Africa and a Small Island Developing State. This has already received support and match funding from Coca Cola, Pepsico Foundation and Dow Chemicals.

Accounting for Natural Capital

The UK, through the Joint Nature Conservation Committee, has undertaken several projects highlighting natural capital concepts – which incorporates biodiversity – of interest to business. One such project is: Realising Nature's Value in UK Business which identified motivations and barriers to accounting for natural capital in three business sectors.

The Darwin Initiative

The Darwin Initiative is the UK Government's grant scheme focused on preserving and increasing biodiversity in developing countries. Developed countries that are Parties to the Convention on Biological Diversity (CBD) have a legal obligation to provide funding to enable developing countries to implement their obligations under the CBD. The UK delivers this obligation through The Darwin Initiative. Since its establishment in 1992 at the Rio Earth Summit, The Darwin Initiative has funded 1,123 projects in 159 countries and awarded £153m. The Darwin Initiative has for high level priorities, reflecting the most pressing biodiversity issues for developing countries and the global community. These are: habitat loss or degradation, climate change, invasive species and over exploitation.

A complete list of Darwin Projects can be found online at:
[https://www.gov.uk/government/groups/the-darwin-initiative.](https://www.gov.uk/government/groups/the-darwin-initiative)

In addition, through the Darwin Plus initiative (also known as The Overseas Territories Environment and Climate Fund), the UK Government provides funding for:

- environmental projects in UK Overseas Territories, and
- fellowships for UK Overseas Territories (OT) Nationals to increase their knowledge and ability to meet long-term strategic outcomes for the natural environment in UK Overseas Territories.

Blue Belt Programme

The Blue Belt Programme supports the delivery of the UK Government's commitment to enhance marine protection of over four million square kilometres of marine environment across UK Overseas Territories (UKOTs). It is providing up to £20 million between 2016-2020 to:

- Improve scientific understanding of the marine environment;
- Develop and implement evidence-based, tailored marine management strategies, including novel and effective approaches to surveillance and enforcement across these very remote and sparsely populated areas; and

- Ensure management is sustainable and long term.

Illegal Wildlife Trade Challenge Fund

The UK Government is leading the world in tackling international wildlife crime, protecting life on land through the prevention of trafficking and poaching. In October 2018, the UK Government convened the largest Illegal Wildlife Trade (IWT) Conference to date. Over 1,300 took part, including over 400 organisations and representatives from over 70 countries. Over 50 countries, including greater Latin American representation, reaffirmed their commitment to countering illegal wildlife trade and set out further steps they will be taking. As such, the UK Government's international agenda has reinjected momentum into the fight against IWT. This has been supported by the announcement of over £40 million in funding, and as of November 2018, the UK have allocated £18.5m to projects combating illegal wildlife trade through their IWT Challenge Fund.

Country initiatives

England

Between 2012 and 2015, Defra funded three rounds of pilot projects to both improve the environment *and* generate revenue. The pilots offered valuable evidence of the opportunities and challenges associated with innovative funding approaches. Pioneering schemes have since emerged from water companies, and environmental NGOs working with businesses and other organisations willing to fund environmental improvements because 25 Year Environment Plan benefits accrue to them. More recently, a report (Ricardo-AEA 2017) for Defra identified projects and initiatives involving private sector expenditure that protect or enhance natural capital; The Aldersgate Group also published a paper (Aldersgate Group 2017) exploring the current state of play in the natural capital finance market and ways to increase investment.

In England's 25 Year Environment Plan, an ambition was set out to broaden the funding base for biodiversity and wider natural capital and increasing private sector investment in natural capital will be a crucial part of the mix. The development of natural capital thinking, data and tools will usher in more opportunities to generate revenue from projects that improve the natural environment. Measuring the benefits of natural capital improvements will sharpen the business case for private sector investment and help to unlock new markets, funding streams and private finance for natural environment projects. The Government will take steps to encourage private sector investment wherever possible, targeting public funds at projects that provide purely public goods. In the 25 Year Environment Plan the Government committed to explore the potential for a Natural Environment Impact Fund and encouraging private sector investment. The proposed fund could draw in capital from a range of sources and issue repayable finance, at low interest and over a long repayment period, to organisations for development and implement projects with the potential to enhance natural capital assets and generate revenue to in order to repay the finance.

In England the UK Government wants to build on the momentum for more private sector financing and drive further progress in the use of market mechanisms that capture the value of natural capital. Defra will work with a range of partners on stimulating innovation in designing and implementing projects that can improve the natural environment and generate revenue to pay for project costs.

The UK Government has also established a Green Business Council in England for advice on actions by government to encourage, incentivise and create the right

conditions for private sector innovation in green enterprise and environmental entrepreneurialism and options on developing new natural capital markets – for example, in exploring how more revenue streams could be generated to make natural capital assets investable.

The right mix of public and private funding and financing for projects that protect and enhance natural assets will be crucial to the successful delivery of this ambitious 25 Year Environment Plan. To date, such projects have typically been resourced through subsidies and grants from government and the EU, the Heritage Lottery Fund (HLF) and philanthropic foundations as well as local authorities, environmental organisations and private sector investment, notably by water companies.

For example, in England, 'Back from the Brink' will be inspiring a nation to discover, value and act for threatened species. Natural England is leading this £7.7M partnership with a range of NGO and delivery partners, funded by the Heritage Lottery Fund (£4.6M) and others. It is working to prevent the extinction of threatened species in England. By pooling expertise and developing new ways of working it will put over 100 priority species on the road to recovery by 2020. Water companies as well as public bodies responsible for the road and rail network have published their own biodiversity strategies and are taking action to secure biodiversity improvements by 2020.

Indicators used in this assessment

UK Biodiversity Indicator **E2: Expenditure on UK and international biodiversity**

<http://jncc.defra.gov.uk/page-4251>.

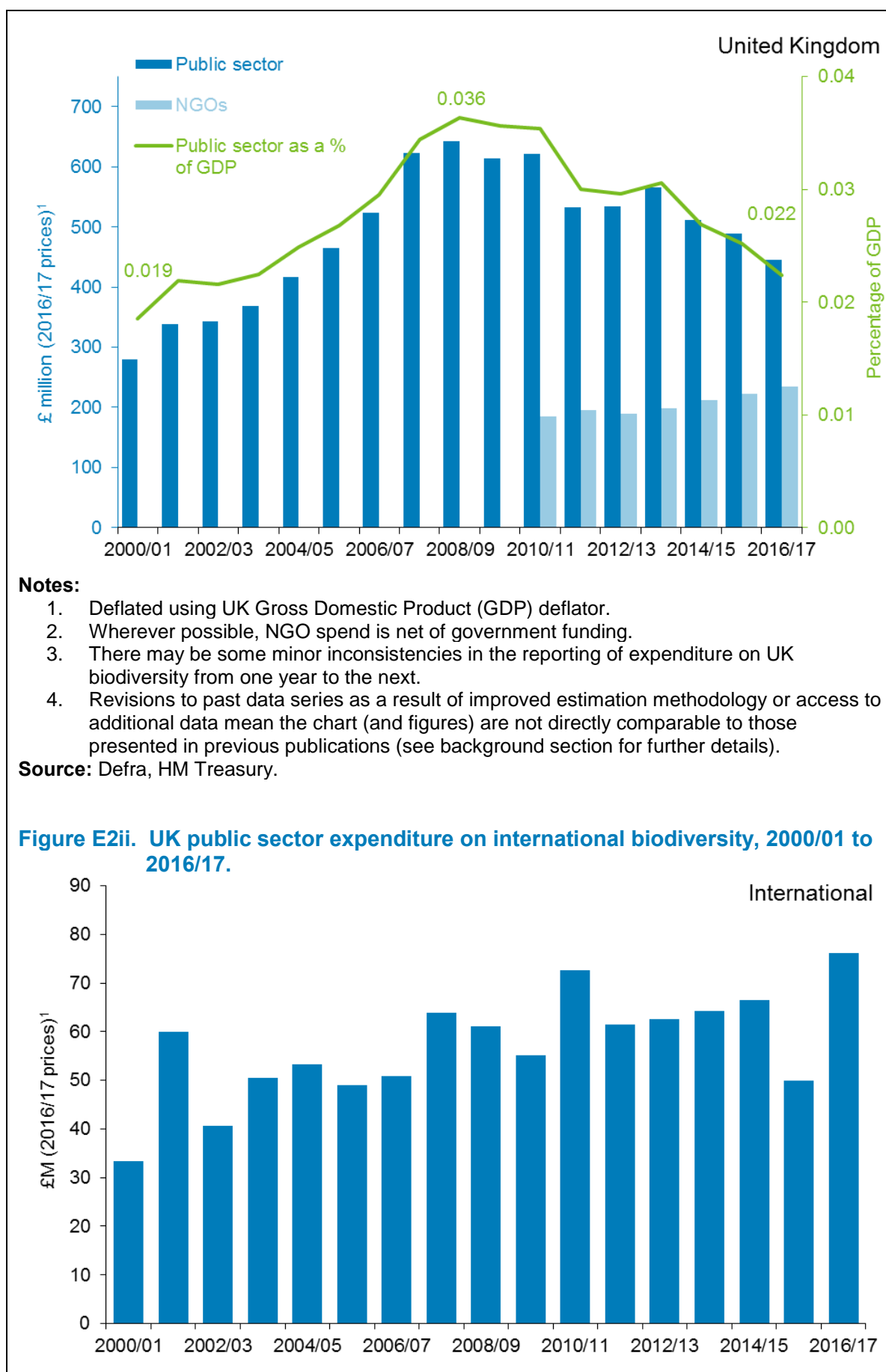
- a. Public sector expenditure on UK biodiversity
- b. Non-Governmental organisation expenditure on UK biodiversity
- c. UK expenditure on international biodiversity

In 2016/17, £445 million of UK public sector funding was spent on biodiversity in the UK; a real-term decrease of 9% since 2015/16 and of 17% over the last 5 years.

Since 2000/01, public sector funding for UK biodiversity relative to gross domestic product (GDP) has fluctuated between 0.02% and 0.04%.

Spending on biodiversity in the UK by non-governmental organisations (NGOs) with a focus on biodiversity and/or nature conservation was £234 million (net of government funding) in 2016/17; a real-term increase of 5% since 2015/16 and of 20% over the last 5 years. This is likely to be an underestimate as not all NGOs can be included.

Figure E2i. Expenditure on biodiversity in the UK, 2000/01 to 2016/17.



Notes:

1. Deflated using UK Gross Domestic Product (GDP) deflator.
2. There may be some minor inconsistencies in the reporting of expenditure on international biodiversity from one year to the next.
3. Most of the large fluctuations between years are due to the irregular nature of contributions to the Global Environment Facility (GEF), for example, there were large payments in 2001/02 and 2007/08, 2 payments in 2010/11 and no payments in 2015/16.
4. Revisions to past data series as a result of improved estimation methodology or access to additional data (in particular, the timing and magnitude of some large GEF payments) mean the chart (and figures) are not directly comparable to those presented in previous publications.

Source: Defra, HM Treasury.

The UK biodiversity indicator E2 is acknowledged to be a partial picture of the resources available from the UK to other countries. The figures are estimates of UK public sector spending on biodiversity which are sourced from a wide range of Government organisations; departmental annual reports and expert contacts in the relevant organisations. The figures are likely to be an underestimate, because some biodiversity spend is integrated into wider programmes, and not accounted for separately. In addition, data for certain programmes are only available in some years.

In 2016/17, UK public sector funding for international biodiversity totaled £76 million; a real-term increase of 24% over the last 5 years. Whilst this indicator shows that international expenditure has also increased by 128% since the time series began in 2000/01 and by 24% in the latest year, both these changes have been artificially inflated by the irregular nature of contributions to the Global Environment Facility (GEF) and should, therefore be treated with caution.

Please describe any other tools or means used for assessing progress

<Text entry>

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to this assessment can be found).

Aldersgate Group (2017) Increasing investment in natural capital. Available from: <https://www.cusp.ac.uk/wp-content/uploads/2017-11-Increasing-investment-in-natural-capital.pdf>.

Convention on Biological diversity (2018) Financial Reporting Framework: Reporting on baseline and progress towards 2015, United Kingdom of Great Britain and Northern Ireland. Available from: <https://chm.cbd.int/database/record/206697>.

Ricardo-AEA (2017) Systematic review of projects to improve the natural environment that have attracted private investment. Defra research project: BE0129. Available from: <http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=One&Completed=0&ProjectID=19886>.

Level of confidence of the above assessment

- ☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The assessment 'is based on partial evidence' has been chosen as while the UK has developed biodiversity indicators to measure progress against the Aichi Targets these can only partially measure a complex reality. Further information on actions being taken has been brought into the assessment, but given the breadth of the targets and the scope of the report it is likely that this is not comprehensive.

Adequacy of monitoring information to support assessment

- ☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Aichi Targets are monitored through the UK biodiversity Indicators (<http://jncc.defra.gov.uk/page-1824>). These are updated regularly and a compendium is published annually.

Relevant websites, web links and files (Please use this field to indicate any relevant websites, web links or documents where additional information related to the monitoring system can be found)

UK Biodiversity Indicator webpages:

<http://jncc.defra.gov.uk/page-1824>.

<http://jncc.defra.gov.uk/page-4229>.

<http://jncc.defra.gov.uk/page-4233>.

Section IV. Description of the national contribution to the achievement of each global Aichi Biodiversity Target

Using the template below, please describe your country's contribution towards the achievement of each global Aichi Biodiversity Target. This template should be replicated for each of the Aichi Biodiversity Targets.

For Parties whose national targets are identical to the Aichi Biodiversity Targets, some of this information may be captured in sections II and III above. Please provide additional descriptions of your country's national contribution to the achievement of each global Aichi Biodiversity Target.

Aichi Biodiversity 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported the implementation of Target 1, including through the following (this is not an exhaustive list):

The Darwin Initiative

Darwin Initiative projects, which deliver against this target include:

- Project 19004, delivered by Fauna and Flora International (FFI), which built capacity in participatory conservation and applied research to international standards in the next generation of Liberia's natural resource managers through enhanced university education, practical field experience and mentoring from international researchers.
- Project 19008, delivered by the University of Sussex, which trained ten village assistants and 18 para-ecologists to support research in the Wanang Conservation Area in Papua New Guinea (PNG) and produced guides for focal plant and animal taxa for local people, visiting researchers and PNG government departments.
- Project 21002, by the Royal Botanic Garden Edinburgh (RBGE), which trained 19 people in mycological taxonomy and established the first and only fungarium in Lao PDR.

A complete list of Darwin Projects can be found online at:

<https://www.gov.uk/government/groups/the-darwin-initiative>.

Royal Botanic Garden Edinburgh

Programmes delivered by the Royal Botanic Garden Edinburgh (RBGE), include:

- A project in Tanzania that has raised awareness on the importance of forests in 100 schools, reaching over 36,000 children (<http://tanzanianforests.com/>). An animated film highlighting the diversity and importance of dry forests in South America has also reached wide audiences promoting public understanding of biodiversity (<https://stories.rbge.org.uk/archives/15525>).
- Work with communities in Nepal to develop bilingual “Plants & You” species profiles, putting authoritative knowledge of plants derived from the scientific Flora of Nepal, combined with identification tools and economic importance, into the hands of local communities, enabling them to make informed livelihood choices, and raising awareness on the threats of invasive plants to biodiversity and the value of healthy forests in sustaining livelihoods.
- Work in Afghanistan and Iraq to raise the awareness of the values and sustainable use of biodiversity in communities, reaching over 1,200 people in schools and communities (informal awareness raising was also conducted in Tajikistan and Yemen).
- RBGE runs its internationally renowned flagship *Taxonomy and Biodiversity of Plants MSc*, which has been running for 25 years, and has trained students from more than 50 countries. Overseas students have obtained funding, amongst others, through funding opportunities linked to specific countries, the British Council, overseas development programmes, such as the Darwin Initiative, the Shell Centenary award, the Alban Programme for Latin American students and the Rotary Club.

Other Initiatives

Knowledge Exchange Schemes:

<https://www.britishecologicalsociety.org/policy/opportunities/>.

Natural History Museum, Biodiversity awareness review:

<http://www.nhm.ac.uk/content/dam/nhmwww/about-us/visitor-research/Biodiversity%20Lit%20review.pdf>.

Based on the description of your country’s contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi Biodiversity Target 2



By 2020, at the latest, the 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 2, including through the following (this is not an exhaustive list):

The Darwin Initiative

Darwin Initiative projects, which deliver against this target include:

- Project 19013, delivered by International Institute for Environment and Development (IIED), which aimed to build knowledge and capacity of the Uganda Poverty and Conservation Learning Group to effectively influence biodiversity conservation policy, decision-makers and practitioners at national and local levels.
- Project EIDPO047, also delivered by IIED, which looked at how biodiversity-development mainstreaming plans incorporated into project countries' revised NBSAPs are implemented, measured and reciprocated in national development plans and processes.
- Project 19018, delivered by the University of Greenwich, which aimed to improve public and private policies that recognize the role of agroforests in meeting the objectives of the CBD in Guatemala.

A complete list of Darwin Projects can be found online at:

<https://www.gov.uk/government/groups/the-darwin-initiative>.

Royal Botanic Garden Edinburgh

Programmes delivered by the Royal Botanic Garden Edinburgh (RBGE), include:

- Work in Nepal with 750 households to adopt alternative energy sources, and improved cooking stove technologies, resulting in reduced use of firewood and enhanced health and well-being from smokeless living environments. This included promotion of the use of invasive plant biomass as an energy source, raising awareness of the threats of invasive plants to biodiversity.
- Work in Afghanistan that has delivered alternative fuel interventions to ameliorate habitat degradation through unsustainable harvesting in five communities reaching 1,000 people, and trained local stakeholders to monitor the effects on health and biodiversity.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these

contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi Biodiversity 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi Biodiversity 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 4, including through the following (this is not an exhaustive list):

The Darwin Initiative

Darwin Initiative projects, which deliver against this target include:

- Project 21004 in Bolivia, led by Wildlife Conservation Society (WCS), which looked at sustainable ranching and land-use planning in Bolivia (small ranches) and in Paraguay (large ranches) with conservation and development impacts evaluated and compared.
- Project 19025, led by the University of Huddersfield, which worked in the areas of Amora Gedel and Kontir Berhan in Ethiopia, aiming to ensure that 'wild coffee' forests are conserved and providing sustainable livelihood benefits through participatory forest management by the local communities with full government support.
- Project 22006, led by Royal Botanic Gardens, Kew, which works in Ethiopia with five coffee cooperatives (950 members, 2,500 households) in the Yayu Biosphere Reserve, helping them move to sustainable and resilient livelihoods whilst conserving local biodiversity.
- Project 20007, led by Bristol Zoological Society, which considered the identification, implementation and evaluation of key factors necessary to establish a pro-poor sustainable wildlife-harvesting model in south eastern Cameroon. The aim was to reduce multi-dimensional poverty amongst poor communities living in and around the Dja Biosphere Reserve (DBR) by enabling them to earn an income legally, and to contribute to long-term food security whilst reducing the unregulated take of wildlife in the region. Lessons learned will feed into the development of an updated DBR Management Plan and will provide data to support the integration of planning for sustainable wildlife management into national development policy.

A complete list of Darwin Projects can be found online at:
<https://www.gov.uk/government/groups/the-darwin-initiative>.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi Biodiversity Target 5



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

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 5, including through the following (this is not an exhaustive list):

The Darwin Initiative

A complete list of Darwin Projects can be found online at: <https://www.gov.uk/government/groups/the-darwin-initiative>.

Royal Botanic Garden Edinburgh

A programme delivered by the Royal Botanic Garden Edinburgh (RBGE):

- Work in Tanzania to protect coastal forests, which are of global importance for biodiversity and support the livelihoods of adjacent communities. RBGE and local partners have published a report and organised two major workshops with government partners to identify future conservation strategies for this region.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi Biodiversity 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 impact on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 6, including through the following (this is not an exhaustive list):

The Darwin Initiative

Darwin Initiative projects, which deliver against this target include:

- Project 24030, led by Birdlife International, which aims to control an invasive aquatic plant for improved biodiversity and livelihoods by working in Lukanga Swamp, a Zambian Important Bird and Biodiversity Area, which is infested with the invasive waterweed *Salvinia molesta*, leading to impoverished biodiversity and fish stocks. This project will control the weed by introducing *Cyrtobagous salviniae*, a weevil, thereby improving conditions for waterbirds, other biodiversity and the livelihoods of >2,500 fishermen households.

- Project 20015, led by International Institute for Environment and Development (IEED), which aimed to deliver an improved mechanism for ensuring sustainable management of Hilsha fishery in Bangladesh, incorporating incentives conditional on compliance with fishing restrictions and other provisions of management plans.

A complete list of Darwin Projects can be found online at:
<https://www.gov.uk/government/groups/the-darwin-initiative>.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi Biodiversity Target 7



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

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 7, including through the following (this is not an exhaustive list):

The Darwin Initiative

Darwin Initiative projects, which deliver against this target include:

- Project 2102, delivered by The James Hutton Institute, which emphasised the sustainable nature of gathering mycorrhizal fungi from standing forest, rather than species which only grow for a few years on cleared, burnt forest land.
- Project 20024, delivered by Birdlife International, which worked in Fiji to support work to designate natural forest in Fiji as either a Permanent Forest Estate or a Protected Area under the terms of Fiji's Forest Policy.

A complete list of Darwin Projects can be found online at:

<https://www.gov.uk/government/groups/the-darwin-initiative>.

Other Initiatives

Hevea brasiliensis is the world's major source of natural rubber for the annual production of >1 billion tyres. A recent paper led by the Royal Botanic Garden Edinburgh identified situations where rubber planting may be economically unsustainable and lead to loss of natural capital and ecosystem services.

<https://www.sciencedirect.com/science/article/pii/S0959378015000801>. Research such as this contributes to better understanding of sustainability and can therefore inform decision making by both the private and public sectors.

JNCC's Global Impacts Programme (<http://jncc.defra.gov.uk/default.aspx?page=4213>) is concerned primarily with identifying patterns and trends for imported biomass. Key groups of imported biomass have been identified based on their potential for biodiversity impacts through land use change and other drivers.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi Biodiversity Target 8



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

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 8, including through the following (this is not an exhaustive list):

The Darwin Initiative

Darwin Initiative projects, which deliver against this target include:

- Project 21005, led by Royal Botanic Gardens, Kew, which supported the sustainable use and cultivation of pesticide plants for organic cotton production, leading to increased income generation among target communities, and reducing the loss of plant biodiversity in southern Mali.
- Project 20018, led by Pesticide Action Network, aimed to improve capacity of Ethiopian scientists, farming communities, government agencies and other stakeholders wishing to adopt an ecosystem approach to:
 - (a) identify key sites at risk from the harmful environmental effects of agrochemical use;
 - (b) monitor, measure and understand such impacts close to biodiversity-rich wetlands;
 - (c) develop and implement practical solutions based on agroecological farming; and
 - (d) align policies with biodiversity conservation goals.

A complete list of Darwin Projects can be found online at:

<https://www.gov.uk/government/groups/the-darwin-initiative>

Other Initiatives

In April 2018 the UK and co-chair Vanuatu announced the Commonwealth Clean Oceans Alliance (CCOA), a ground-breaking initiative working with Commonwealth partners to reduce marine plastic pollution. The CCOA calls on other countries to pledge action on plastics, be this by a ban on microbeads, a commitment to cutting down on single use plastic bags, or other steps to eliminate avoidable plastic waste. To help deliver this, the UK committed an ambitious package of up to £66.4 million of UK aid to drive research and innovation and stop plastic from entering the oceans in the first place. As part of this funding package the UK contributes £25 million towards the Commonwealth Marine Plastics Research and Innovation Challenge Fund, which will support researchers to address marine plastics from a scientific, technical and social perspective. Canada and India have joined the UK and become founding members.

The UK Government, alongside Canada, launched the Global Plastics Action Partnership (GPAP) to help deliver the goals of the Alliance and further bring businesses, governments and organisations together to develop country action plans to address the plastic problem. Through GPAP, the UK have funded a £2.4million project to tackle global plastic pollution in rivers, deltas and oceans with three initial projects to be launched in Southeast Asia, West Africa and a Small Island Developing State. This has already received support and match funding from Coca Cola, Pepsico Foundation and Dow Chemicals.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi 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 of invasive alien species.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 9, including through the following (this is not an exhaustive list):

The Darwin Initiative

A Darwin Initiative project, which delivers against this target include:

- Project 24030, led by Birdlife International, which aims to control an invasive aquatic plant for improved biodiversity and livelihoods by working in Lukanga Swamp, a Zambian Important Bird and Biodiversity Area, which is infested with the invasive waterweed *Salvinia molesta*, leading to impoverished biodiversity and fish stocks. This project will control the weed by introducing *Cyrtobagous salviniae*, a weevil, thereby improving conditions for waterbirds, other biodiversity and the livelihoods of >2,500 fishermen households.

A complete list of Darwin Projects can be found online at: <https://www.gov.uk/government/groups/the-darwin-initiative>.

Royal Botanic Garden Edinburgh

Programmes delivered by the Royal Botanic Garden Edinburgh (RBGE), include:

- Work in 15 community forests in Nepal, involving more than 3,700 people to improve the management and control of invasive plants. This has resulted in the clearance of invasive plants from 250 ha of infested land, and the use of invasive plant biomass to produce char for biochar and densified bioenergy products. The management of invasive plants has been incorporated into Community Forest User Group management plans, and national assessments of 26 invasive plant species has been undertaken, supporting national-level action by the Government of Nepal.
- Contributing to the Global Register of Introduced and Invasive Species (GRIIS) Checklist for both mainland Yemen and Soqatra.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

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Aichi Biodiversity 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 10, including through the following (this is not an exhaustive list):

The Darwin Initiative

Darwin Initiative projects, which deliver against this target include:

- Project 14007, led by the Marine Conservation Society, which aimed to deliver Community Action for Sustainable use and Conservation of Coral Reefs in Malaysia. Outputs included Biodiversity conservation (no-take) zones in place and enforcement operating. Species and habitats 'at risk' and requiring special protection identified. Measures in place to protect 'at risk' species and habitats, and enforcement operating.
- Project 20017, led by Wildlife Conservation Society, which aims to strengthen the capability of Kenyan communities to conserve coral reefs.

A complete list of Darwin Projects can be found online at:

<https://www.gov.uk/government/groups/the-darwin-initiative>.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

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Aichi Biodiversity Target 11



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 landscape and seascape.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 11, including through the following (this is not an exhaustive list):

The UK Foreign and Commonwealth Office (FCO) and the Department for Environment, Food and Rural Affairs (DEFRA) are actively involved in the formal negotiations to develop a new international agreement under the UN Convention on the Law of the Sea on the Conservation and Sustainable use of **Marine** Biological Diversity of Areas Beyond National Jurisdiction.

The Darwin Initiative

A Darwin Initiative project, which delivers against this target is:

- Project 25006, led by IIED and Flora and Fauna International, which aims to enhance the equity and effectiveness of Protected Area Conservation in Kenya, Liberia, Malawi, and Uganda.

A complete list of Darwin Projects can be found online at:

<https://www.gov.uk/government/groups/the-darwin-initiative>.

Royal Botanic Garden Edinburgh

Programmes delivered by the Royal Botanic Garden Edinburgh (RBGE), include:

- Dry forests in Latin America are amongst the world's most threatened tropical forests; less than 10% of their original extent remains in many countries. The Latin American Seasonally Dry Tropical Forest Floristic Network (DRYFLOR; <http://www.dryflor.info/>), included more than 50 scientists and conservationists from across Latin American and the Caribbean and was led from the Royal Botanic Garden Edinburgh (RBGE). The DRYFLOR network developed a database of dry forest tree species, based upon 1,602 inventories across Latin America and the Caribbean. The work identified areas with high levels of species diversity and endemism to guide conservation interventions: <http://science.sciencemag.org/content/sci/353/6306/1383.full.pdf?ijkey=cQY9ba3I5CcL2&keytype=ref&siteid=sci>.
- Since May 2014 scientists at RBGE have described 144 new species, ranging from diatoms to rainforest trees. A total of 18,716 species were covered in checklists, including the first taxonomically verified checklist of plants of the lowland Amazon rain forest. In addition, 1,216 species were covered in floristic and monographic works, including guides to economically useful trees of Peru and a revision of the dipterocarps of Thailand.
- RBGE is the main partner in a project funded by IUCN and Botanic Gardens Conservation International (BGCI) to assess the conservation status of all species of Sapotaceae and Zingiberaceae by 2019.
- RBGE has worked with in-country partners in the Middle East to identify areas important for plant diversity, and to plan protected areas and protected area management. *Important Plant Areas* (IPA) have been identified in Yemen (Soqatra), Saudi Arabia, Iraq, Oman and Lebanon and *Key Biodiversity Areas* (KBA) in Iraq with a national network of 82 sites.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

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Aichi Biodiversity 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 12, including through the following (this is not an exhaustive list):

The Convention on International Trade in Endangered Species of Wild Fauna and Flora

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is one of the key mechanisms through which the UK Government acts to protect endangered species of animals and plants.

CITES uses a globally agreed system of licensing, including for import and export, or commercial use, of CITES 'specimens'. This is administered in the UK by the Animal and Plant Health Agency (APHA). Defra leads on CITES policy, with the Joint Nature Conservation Committee (JNCC) and the Royal Botanic Gardens, Kew (RBG Kew) providing scientific advice.

The UK enforces CITES through the Control of Trade in Endangered Species Regulations 1997 (as amended) – COTES. This enables the enforcement authorities, both the Police and UK Border Force, to take action against CITES offences committed.

In addition, UK Border Force can use its powers under the Customs and Excise Management Act 1979 to enforce against CITES offences at the border. The UK takes a strategic approach to tackling wildlife crime and has six UK wildlife crime priorities agreed by a Strategic assessment biennially. The UK Wildlife Crime Tasking and Co-ordination Group is chaired at Chief Constable level. CITES is one of the six priorities with particular focus on European Eel; Illegal Trade in Raptors; Ivory; Medicinal & Health Products; Reptiles; Rhino Horn and Timber.

Defra co-funds the National Wildlife Crime Unit, a police-led unit which gathers intelligence and supports local UK police forces in tackling wildlife crime, focusing on the six priorities. Funding from Defra and the other funding partners, including Home Office, the Scottish Government and the National Police Chiefs Council, is secured until 2020.

Combating Illegal Wildlife Trade

Illegal wildlife trade is an urgent global issue, which not only threatens some of the world's most iconic species with extinction, but also damages sustainable economic growth and the livelihoods of vulnerable people in rural communities. In October 2018 the UK hosted the fourth in a series of global conferences on illegal wildlife trade. The conference declaration <https://www.gov.uk/government/topical-events/london-conference-on-the-illegal-wildlife-trade-2018/about> affirms the participant's determination to tackle illegal wildlife trade as serious transnational organised crime, to work in partnership, and to reduce demand.

The UK has also enhanced global efforts to combat the poaching and trafficking of protected species. As of November 2018, the UK, through the Illegal Wildlife Trade Challenge Fund has allocated £18.5 million to 61 projects to combat the trade in illegal wildlife. Data from the UK Border force suggest that interceptions of endangered species products at UK customs points have increased from 563 in 2013 to over 1,000 in 2017. Although it is not clear if this is due to a genuine rise in traded goods or improved detection, it does underline a need for ongoing action to which the UK is responding. During the Illegal Wildlife Trade Conference 2018, the Government established the Ivory Alliance 2024. This coalition will be chaired by the UK's Environment Secretary, and will focus on tackling demand and lobbying for domestic market closure. The Ivory Alliance 2024 will work with partners globally to secure at least 30 new commitments to domestic ivory bans by the end of 2020 and for tougher enforcement against those caught breaking the law. The UK has already set itself as a global leader on this issue, with a domestic ivory ban announced in April 2018, one of the world's toughest bans on ivory.

The Darwin Initiative

A complete list of Darwin Projects can be found online at: <https://www.gov.uk/government/groups/the-darwin-initiative>.

Royal Botanic Garden Edinburgh

Programmes delivered by the Royal Botanic Garden Edinburgh (RBGE), include:

- RBGE initiated the third complete assessment of the global conservation status of the world's 625 conifer species. RBGE and partners have initiated conservation and restoration programmes for a globally critically endangered conifer in Lao PDR.
- In Nepal RBGE worked on three species of *Taxus*, surveying their status in the wild, bringing them into cultivation and seeds stored in gene banks, and conducting national Red List assessment to inform government policy. In addition,

RBGE ran a Red List Assessment training course with government partners to help establish a Plant Specialist Group to cover the Himalayan region.

- RBGE has led two major workshops to facilitate the IUCN Red Listing of all the endemic plant species of the Arabian Peninsula (7 countries, 850 taxa) as part of the Sharjah International Conservation Forum for Arabian Biodiversity. RBGE contributed to 182 plant assessments in the 2015 IUCN publication *The status and distribution of freshwater biodiversity in the Arabian Peninsula* and delivered training on Red listing to over 80 people in Iraq and Lebanon.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

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Aichi Biodiversity Target 13



By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III and V for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 13, including through the following (this is not an exhaustive list):

The Darwin Initiative

A Darwin Initiative project, which delivers against this target is:

- Project 23007, led by International Union for Conservation of Nature (IUCN). This project works with local communities, NGOs and governmental agencies to facilitate the implementation of the Nagoya Protocol, the International Treaty on Plant Genetic Resources for Food and Agriculture, and Convention on Biological Diversity through in situ and ex situ conservation of crop wild relatives in Mesoamerica.

A complete list of Darwin Projects can be found online at:
<https://www.gov.uk/government/groups/the-darwin-initiative>.

Royal Botanic Garden Edinburgh

A programme delivered by the Royal Botanic Garden Edinburgh (RBGE):

- Since 2014, RBGE has supported global seedbank collections by taxonomically verifying 370 collections and identifying collection gaps in 52 crop wild relatives to aid seed collecting efforts. RBGE scientists have reviewed the native distribution of 253 crop wild relatives in checklists in Andean South America, and described eight new crop wild relatives to science (work focuses on potato, tomato and eggplant).

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

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Aichi Biodiversity 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 14, including through the following (this is not an exhaustive list):

The Darwin Initiative

Darwin Initiative projects, which deliver against this target include:

- Project 24026, led by Royal Holloway University. This project integrates Traditional Knowledge (TK) into Guyana's Conservation Policy-Making and Practice, biodiversity policy for poverty reduction, by evaluating TK integration using case studies focused on protected areas management, building institutional capacity in TK integration, and developing a National Action Plan for TK. Development of a participatory, transparent and evidence-based process for traditional knowledge integration which meets biodiversity and poverty alleviation goals, will be reflected in national policy and can be replicated elsewhere.
- Project 2102, led by The James Hutton Institute, which included a study of fungal poisonings. Record keeping is patchy in Laos but 15-20 deaths per annum are thought to occur, mostly among the poorest. A preliminary, central advice system was established to allow doctors to identify the type of poisoning, and thus to give the appropriate treatment.
- Project 18007, "Collaborative conservation of critical Kerinci-Seblat National Park buffer zone forest", led by Fauna and Flora International (FFI). This project will develop and implement a new model of collaborative forest management that will empower forest edge communities to secure legal protection, and participate in the management, of the biodiversity-rich forest resources and ecosystem services on which they depend; facilitate local understanding of, and access, to sustainable and equitable finance streams; and transfer the skills necessary to empower local NGOs to replicate the approach.

A complete list of Darwin Projects can be found online at:

<https://www.gov.uk/government/groups/the-darwin-initiative>.

Other Initiatives

The UK funded the Ecosystem Services for Poverty Alleviation (ESPA <http://www.espa.ac.uk/about/espa>) research programme between 2009 and 2018; a nine year global interdisciplinary research programme that aimed to give decision-makers and natural resource users the evidence they need to address the challenges of sustainable ecosystem management and poverty reduction. The programme was developed by the UK government in response to the findings of the 2005 Millennium Ecosystem Assessment that substantial gains in human well-being in recent decades have been achieved at the expense of high and often irreversible levels of ecosystem degradation.

The UK is also supporting the implementation of 'Wealth Accounting and the Valuation of Ecosystem Services' (WAVES <https://www.wavespartnership.org/>) to establish environmental accounts in six to ten countries, develop guidelines for ecosystem accounting, and promote environmental accounting.

The Joint Nature Conservation Committee (JNCC) is working on a number of projects across Latin America that are using the natural capital concept to inform ecosystem-

based management approaches in sustainable agricultural production that is part of the UK supply chain. Projects include viticulture in Chile, asparagus production in Peru and Banana plantations in Colombia. JNCC technical expertise is contributing to the use of open source Earth Observation data in spatial planning, ecosystem modelling, ecosystem service mapping, agro-biodiversity management, and assessment of certification schemes.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

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Aichi Biodiversity 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% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 15, including through the following (this is not an exhaustive list):

The Darwin Initiative

Darwin Initiative projects, which deliver against this target include:

- Project 23031, led by Royal Botanic Garden Edinburgh, which will use invasive plant biomass for alternative, carbon-sensitive bioenergy sources to improve

livelihoods, reduce poverty, conserve biodiversity and offset carbon in Nepal. This will safeguard and restore biodiversity, creating carbon sensitive alternative sources of bioenergy and soil improvement, and enhancing livelihoods and wellbeing.

- Project 25001 “Preventing Borneo’s peatland fires to protect health, livelihood and biodiversity”, led by the University of Exeter, which will address Borneo’s biodiverse peat-swamp forests being destroyed by annual fires. These cause huge public health problems and destroy large swathes of rainforest, while releasing carbon and contributing to climate change. The project will restore drained and deforested peatlands and encourage behaviour change amongst local communities, while simultaneously tackling fire impacts.

A complete list of Darwin Projects can be found online at:

<https://www.gov.uk/government/groups/the-darwin-initiative>.

Based on the description of your country’s contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

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Aichi Biodiversity 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 16, including through the following (this is not an exhaustive list):

After signing the Nagoya Protocol in 2011, the UK implemented it into UK law through the Nagoya Protocol (User Compliance) Regulations 2015. This legislation applies to a number of sectors including food and beverage; pharmaceutical; cosmetic and personal care; animal and plant breeding; biotechnology; bio-control and academia. In order to support businesses and others working in these sectors, the UK government undertook a consultation in 2015 on implementation of the Protocol.

The Royal Botanic Gardens, Kew, the Natural History Museum London, and the Royal Botanic Garden Edinburgh, have been at the forefront of developments in the non-commercial scientific research community towards establishing best practice guidelines to support effective implementation of the Nagoya Protocol. RBG Kew has developed an institutional Access and Benefit-Sharing (ABS) Toolkit and an internal staff guide to collection, use and supply of genetic resources and traditional knowledge.

The Darwin Initiative

A Darwin Initiative project, which delivers against this target is:

- Project 24017, “Access and Benefit Sharing in Practice: Community, Science and Policy”, led by the University of Cape Town in sub-Saharan Africa. Through this project a Community of Practice will be developed around access and benefit sharing (ABS) to provide advice, act as a conduit for voices currently under-represented in ABS policy processes, and develop conceptual and practical tools to help governments, researchers, and local communities deal with challenges and more effectively engage with ABS. An ABS Community of Practice is developed and using tools to support governments, researchers, industry and local communities meet the needs of poor producer communities and biodiversity conservation.

A complete list of Darwin Projects can be found online at:

<https://www.gov.uk/government/groups/the-darwin-initiative>.

Based on the description of your country’s contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

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Aichi Biodiversity 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi Biodiversity Target 18

By 2020, the traditional knowledge, innovations and practices of indigenous and local communities that are 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

In the UK and Overseas Territories there are no indigenous peoples and local communities (IPLCs) as defined in Article 8j of the Convention and Target 18 has

therefore not been assessed. The needs, knowledge and practices of IPLCs are recognised and integrated into the UK's international work.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 18, including through the following (this is not an exhaustive list):

The Darwin Initiative

Through the Darwin Initiative the UK funds biodiversity conservation projects that support developing countries reduce poverty and gender inequality. The Darwin Initiative uses criteria and guidance to ensure all projects take account of the needs of local communities, the welfare and wellbeing of local people, and gender equality. This integration is tested through monitoring and evaluation of projects.

The November 2015 newsletter for the Darwin Initiative, highlighted a number of Darwin Projects that have been based around traditional knowledge. This newsletter is available online at: <http://www.darwininitiative.org.uk/assets/uploads/2014/05/November-Darwin-Newsletter-Traditional-knowledge.pdf>.

Two specific projects, which deliver against this target are:

- Project 19020 "Responding to fish extirpations in the global marine biodiversity epicentre", led by University of Newcastle Upon Tyne, which identified vulnerable reef finfish species, modelled changes in reef finfish abundances, enhanced local capacity in local resource management, reconciled conservation needs with sustainable livelihoods, and recommended policy from local to international level.
- Project 24026, led by Royal Holloway University. This project integrates Traditional Knowledge (TK) into Guyana's Conservation Policy-Making and Practice, biodiversity policy for poverty reduction, by evaluating TK integration using case studies focused on protected areas management, building institutional capacity in TK integration, and developing a National Action Plan for TK. Development of a participatory, transparent and evidence-based process for traditional knowledge integration which meets biodiversity and poverty alleviation goals, will be reflected in national policy and can be replicated elsewhere.

A complete list of Darwin Projects can be found online at: <https://www.gov.uk/government/groups/the-darwin-initiative>.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi Biodiversity 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.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 19, including through the following (this is not an exhaustive list):

Global Biodiversity Information Facility

The Global Biodiversity Information Facility (GBIF) is an international network and research infrastructure funded by the world's governments and aimed at providing open access to worldwide biodiversity data. The National Biodiversity Network (NBN <https://nbn.org.uk/>) is the UK's GBIF node. The UK is the second largest data publisher on GBIF and the fifth biggest user of GBIF data. GBIF data has been used to inform UK research in a variety of areas, including climate change, invasive species, conservation, human health and agriculture.

Intergovernmental Platform on Biodiversity and Ecosystem Services

The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES, <https://www.ipbes.net/>) was established in 2012 by the world's governments as a mechanism for strengthening the global science-policy interface for biodiversity and ecosystem services. IPBES members are committed to building the platform as the leading intergovernmental body for assessing the state of the planet's biodiversity, its ecosystems and the essential services they provide to society.

IPBES responds to requests for scientific information related to biodiversity and ecosystem services from Governments, relevant multilateral environmental agreements and United Nations bodies, as well as other relevant stakeholders. Its first Work Programme started in 2014, and IPBES has already adopted a number of policy relevant assessments, as follows:

- A Thematic Assessment on Pollinators, Pollination and Food Security,

- A Methodological Assessment on Scenarios and Modelling for Biodiversity and Ecosystem Services, and
- Four Regional Assessments on Biodiversity and Ecosystem Services (for Africa; the Americas; Asia-Pacific; and Europe and Central Asia).

In April 2019 the Platform is expected to adopt its Global Assessment on Biodiversity and Ecosystem Services; and at its most recent Plenary in March 2018, agreed to take forward further assessment on valuation of nature, sustainable use of wild species, and invasive alien species.

Since 2016 IPBES has been Chaired by Professor Sir Robert Watson, nominated to the role by the UK government. A further 34 UK nominated experts have been engaged in delivering the Platform's work programme. And since 2012, the UK government has provided US\$3.3m to the IPBES Trust Fund.

Natural Environment Research Council (NERC) Funding

NERC currently supports over 1,100 grants, fellowship and training grants to a value of £231m for UK and international multidisciplinary research on the physical, biological and climatic processes directly relevant to, and which benefit and improve understanding of, the land-based environment. This includes research on the biology of land-based animals, plants and micro-organisms; biodiversity and taxonomy, soil science; and technology to allow improved understanding of the natural environment, such as earth observation and remote sensing.

As well as its Discovery Science mechanism, NERC funds a wide portfolio of awards through a number of strategic programmes delivered through a variety of funding mechanisms. These programme are often multidisciplinary and both nationally and internationally focussed, and address major environmental societal challenges. Recent examples of calls have provided £5.5m for research on bio-resources in Columbia, £8.5m on human-modified tropical forests and £13m on the UK focussed Biodiversity and Ecosystem Service Sustainability (BESS) programme <https://ecosystemsknowledge.net/bess>, and £8m on the Soil security programme <https://nerc.ukri.org/research/funded/programmes/soilsecurity/>.

Biodiversity Indicators, Monitoring and Surveillance

Indicators for the UK and England were developed to report on progress towards the goals and targets set out in the Convention on Biological Diversity's Strategic Plan for Biodiversity 2011-2020. These UK Biodiversity Indicators (www.jncc.defra.gov.uk/ukbi) have been refined and reviewed to improve their relevance and accuracy and new indicators developed to fill gaps. Although not comprehensive, the indicators are useful for summarising and communicating broad trends in the status of habitats, species and the pressures that affect them. The indicators make use of data on the status and trends of habitats and species, much of which is collected by volunteers and coordinated by the Joint Nature Conservation Committee (JNCC).

The 25 Year Environment Plan (<https://www.gov.uk/government/publications/25-year-environment-plan>) sets out the ambition to develop a new set of metrics to measure progress towards the goals outlined in the plan. These metrics are currently in development.

Royal Botanic Garden Edinburgh (RBGE)

The Herbarium at RBGE holds nearly three million specimens. Between May 2014 and May 2018 RBGE has databased over 200,000 specimens bringing the total databased to nearly 900,000. In addition, RBGE has imaged over 180,000 specimens, bringing the total number of specimens which have been imaged at high resolution and freely available online to over 437,000. The number of specimen record data downloads between May 2014 and May 2018 was close to 2.8 million.

RBGE has been involving members of the public in transcribing digitised specimens, and have now completed 14 “expeditions” on the DigiVol site of the Atlas of Living Australia. This is a total of 21,300 specimens transcribed by 107 volunteers. RBGE has also made expert verified information on Begoniaceae, Sapotaceae and Zingiberaceae available via its online resource centres.

RBGE have also run Darwin project 19007 “Building capacity for in-situ conservation in Iraq”, which addressed the lack of available plant data to inform conservation planning in Iraq and aimed to build capacity for surveying and managing biodiverse-rich areas.

Based on the description of your country’s contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Aichi Biodiversity Target 20



By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation should increase substantially from the current levels.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

Please see Section III for a description of how the UK has contributed to the achievement of this target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

On a global level, the UK has supported implementation of Target 20, including through the following (this is not an exhaustive list):

The Global Environment Facility

The UK Government has provided £210m for the 6th replenishment of the Global Environment Facility 6 programme, running from 2014 until 2018. In 2018, the Department for International Development pledged to provide up to £250m over the next four years to support the GEF's efforts to tackle marine plastic pollution and illegal wildlife trade in its 7th replenishment stage.

International Climate Finance

In response to the global challenge posed by climate change, the Government has established International Climate Finance. This is a UK government commitment to support developing countries to respond to the challenges and opportunities of climate change. The UK is investing £5.8b of International Climate Finance between 2016 and 2021.

Within International Climate Finance, work supports halting deforestation, and helping communities to protect and restore forests that support important diversity and fragile ecosystems whilst using land in ways that improve productivity. As a part of this, the Forest Governance, Markets and Climate Programme has been established, with a budget of £250m from 2011 to 2021. This aims to bring about governance and market reforms that reduce the illegal use of forest resources and benefits vulnerable people who depend on forests for their livelihood. The Programme tackles illegal logging and the trade in illegally-produced timber products. The focus of the upcoming third and final phase (2018 to 2021) will be focused on institutionalising and embedding sustainable processes and practices.

The Darwin Initiative

The Darwin Initiative is a competitive grant scheme focused on preserving and increasing biodiversity - animal and plant species and their habitats - in developing countries. Since its establishment in 1992 at the Rio Earth Summit, Darwin has funded 1,123 projects in 159 countries, with £153m awarded by HMG.

Projects funded under the Darwin Initiative must support sustainable development in developing countries for the poverty reduction. Applications for funding must define the project's contribution to economic development and welfare, whether direct or indirect. All applicants must also consider whether and how their project will contribute to reducing gender inequality. Applicants are encouraged to design interventions that proactively contribute to increased equality, and to provide indicators disaggregated by gender where possible. Successful projects must refer to the actions undertaken for equality when reporting.

A complete list of Darwin Projects can be found online at:
<https://www.gov.uk/government/groups/the-darwin-initiative>.

Commonwealth Marine Economies (CME) Programme

Announced by the Prime Minister and launched in 2016, the £26m UK Foreign and Commonwealth Office (FCO) led CME Programme (<https://www.gov.uk/guidance/commonwealth-marine-economies-programme>), is supporting 17 Commonwealth Small Island Developing States (SIDS) in the Pacific and Caribbean in identifying the potential of, and developing, their marine economies in a sustainable, resilient and integrated way. Funded through the UK Government's Conflict, Stability and Security Fund, the Programme promotes growth, innovation, jobs and investment whilst safeguarding healthy seas and ecosystems.

Working in partnership with SIDS governments, the CME Programme aims to provide access to data and technical support regarding natural assets to ensure that marine resources belonging to Commonwealth SIDS are better understood and managed. Through the preparation and implementation of Maritime Economy Plans, the programme will enable the development of sustainable and growing maritime economies in Commonwealth SIDS that create jobs, drive national economic growth, reduce poverty, ensure food security and build resilience by mitigating any associated environmental and economic risks.

The Programme is being delivered by a partnership of world-leading expertise in marine science from UK government and private sector organisations: United Kingdom Hydrographic Office (UKHO), the Centre for Environment, Fisheries and Aquaculture Science (Cefas), the National Oceanography Centre (NOC) and Atkins. The Programme is also helping deliver the UK's global commitments to the marine environment and tackling climate change (SDG 14, Paris Climate Change Accord, UN Convention on Biological Diversity), in addition to meeting the UK's commitment to supporting development of SIDS. This will also have a positive effect on helping the SIDS achieve the CBD targets by providing them with the tools and knowledge to manage their marine areas and resources sustainably.

SIDS in scope of the CME Programme are, in the Caribbean: Antigua & Barbuda, Belize, Dominica, Grenada, Guyana, Jamaica, Saint Lucia, St Vincent & the Grenadines; and in Pacific: Fiji, Kiribati, Nauru, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.

Protection of the marine environment

The UK Government is committed to leading efforts to protect the marine environment and are taking a range of actions to tackle both land-based and sea-based sources of marine litter.

The UK and co-chair Vanuatu announced the Commonwealth Clean Oceans Alliance (CCOA, http://www.blue-growth.org/Blue_Growth_Media_A_To_Z/CCOA_Commonwealth_Clean_Oceans_Alliance.htm), a ground-breaking initiative working with Commonwealth partners to reduce marine plastic pollution. To help deliver this, the UK committed an ambitious package of up to £66.4 million of UK aid to drive research and innovation and stop plastic from entering the oceans in the first place. As part of this funding package the UK contributes £25 million towards the Commonwealth Marine Plastics Research and Innovation Challenge Fund, which will support researchers to address marine plastics from a scientific, technical and social perspective. Canada and India have joined the UK and become founding members.

The Government, alongside Canada, launched the Global Plastics Action Partnership (GPAP, <https://www.weforum.org/press/2018/09/beyond-bags-bottles-and-straws-new->

[partnership-to-tackle-plastic-waste-from-source-to-sea](#)) to help deliver the goals of the Alliance and further bring businesses, governments and organisations together to develop country action plans to address the plastic problem. Through GPAP, the UK have funded a £2.4million project to tackle global plastic pollution in rivers, deltas and oceans with three initial projects to be launched in Southeast Asia, West Africa and a Small Island Developing State. This has already received support and match funding from Coca Cola, Pepsico Foundation and Dow Chemicals.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:

In the UK the Office for National Statistics (ONS) is responsible for the development and collection of UK data on the Sustainable Development Goals indicators and for reporting UK progress towards them. The ONS has published UK data for Sustainable Development Goal indicators at <https://sustainabledevelopment-uk.github.io/>. The progress report can be found at <https://sustainabledevelopment-uk.github.io/reporting-status/>.

A Technical Note on Biodiversity and the 2030 Agenda for Sustainable Development can be found here: <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

Section V. Description of the national contribution to the achievement of the targets of the Global Strategy for Plant Conservation

Using the template below, please describe your country's contribution towards the achievement of the targets of the Global Strategy for Plant Conservation. This template should be replicated for each of the 16 targets of the Global Strategy for Plant Conservation.

V. Description of the national contribution to the achievement of the targets of the Global Strategy for Plant Conservation

Does your country have national targets related to the GSPC Targets?

☐ Yes. Please provide details on the specific targets below:

<Text entry>

or:

☒ No, there are no related national targets

Please provide information on any active networks for plant conservation present in your country.

There are many national and local plant conservation networks in the UK, working together on biological recording, disease prevention, wildlife conservation, protected sites, research and public education.

Plantlife International <https://www.plantlife.org.uk/uk> coordinates Plant Link networks in England, Scotland and Wales bringing together non-governmental organisations, statutory agencies, specialist societies and individuals interested in and working towards the conservation of wild plants and delivery of the GSPC. See: <http://www.plantlife.org.uk/uk/our-work/working-partners/plantlink> and the report against progress <http://www.plantlife.org.uk/uk/our-work/publications/global-strategy-plant-conservation-review-uks-progress-towards-2020>.

The Botanical Society of Britain and Ireland <https://bsbi.org/> co-ordinates volunteer recording of vascular plants and stoneworts in the UK and Ireland, through a network of county recorders. The first atlas of the British and Irish flora, published in 1962, pioneered the use of 'dot-maps' aligned to the OS grid. A [repeat atlas](http://www.brc.ac.uk/plantatlas/) (<http://www.brc.ac.uk/plantatlas/>) was published in 2002 based on fieldwork carried out from 1987-1999. BSBI is now producing a third atlas, Atlas 2020, which will be published after fieldwork has been completed in 2019 (<https://bsbi.org/atlas-2020>).

People across the UK have been recording their observations of wildlife for hundreds of years. By providing information on when and where they found a particular species they make a valuable contribution to national distribution datasets collated by volunteer-led schemes and societies. In addition to the recording of vascular plants by the Botanical Society of Britain and Ireland, there are a variety of plant recording schemes for other taxonomic groups run through national societies, including:

- British Bryological Society: <http://www.britishbryologicalsociety.org.uk/>;
- British Mycological Society: <https://www.britmycolsoc.org.uk/mycology/frdbi>;
- British Lichen Society: <http://www.britishlichensociety.org.uk/>;
- British Phycological Society: <https://brphycsoc.org/>;
- Fungus Conservation Trust: <http://www.abfg.org/>;

- Slime Mould Recording Scheme: <http://www.brc.ac.uk/scheme/slime-mould-recording-scheme>.

These records are brought together and made available for a wide variety of uses through local records centres, the national Biological Records Centre (<http://www.brc.ac.uk/>), and the National Biodiversity Network (<https://nbnatlas.org/>). The National Biodiversity Network is a collaborative partnership created to exchange biodiversity information. It is a charity, with a membership including many UK wildlife conservation organisations, government, country agencies, environmental agencies, local environmental records centres and many voluntary groups. The NBN Atlas, which is the UK node for the Global Biodiversity Information Facility, contains more than 219 million records. Of these just under 19.5 million records are of plants, and 3.8 million records are of fungi.

Please describe the major measures taken by your country for the implementation of the Global Strategy for Plant Conservation. (Parties can report on actions taken to implement these targets if they are not covered in sections II, III or IV)

The information below builds on that provided in Appendix 3 of the UK's 5th National Report to the CBD. Examples of implementation of the strategy is given under each of the targets, but it should be noted that this is a set of examples rather than a fully comprehensive report.

Category of progress towards the target of the Global Strategy for Plant Conservation at the national level:

Objective I: Plant diversity is well understood, documented and recognized

GSPC Target 1

An online flora of all known plants.

- ☒ On track to achieve target at national level
☐ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

This assessment is based primarily on the UK's significant contribution to the development of online documentation of the world's flora. The UK has also made a substantial additional contribution to scientific and public understanding of the value of plant diversity, through its national and international science programmes.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of UK's contribution to global on-line flora:

UK institutions are among those leading the implementation of Target 1 at the global level. The Royal Botanic Garden Edinburgh (RBGE), and Royal Botanic Gardens, Kew

(RBG Kew) and the Natural History Museum (NHM) are partners of World Flora Online (WFO - <http://worldfloraonline.org/>), an international consortium of more than 40 botanic gardens and taxonomic institutions mobilising information on the world's plants through an online portal by 2020. In response to GSPC 2020 Target 1, and building on GSPC 2010 Target 1 (an online list of all known plants), a prototype version of WFO (<http://worldfloraonline.org>) was launched at the XIX International Botanical Congress, Shenzhen, in July 2018. WFO is aimed at conservationists, and supports work on other GSPC and Aichi targets.

RBG Kew has published an online portal for its plant species information: *Plants of the World Online* (<http://www.plantsoftheworldonline.org/>) With over 8.5 million items, RBG Kew's Herbarium and Fungarium house the largest and most diverse botanical and mycological collections in the world. They represent over 95% of known flowering plant genera and more than 60% of known fungal genera but only 20% of this knowledge is currently online.

Examples of the UK's contribution internationally:

As the British flora has become increasingly well documented in a general sense, taxonomic work has focussed on issues that prevent effective policy delivery. For example, RBGE has worked on the following projects:

1. Resolving the identities of poorly understood species that are protected under legislation, using DNA-barcoding approaches for bryophytes and lichens (*Calicium corynellum*, *Pseudocyphellaria* and *Orthodontium* species);
2. Inventory targeted to habitats that are of international conservation importance (temperate rainforest), or that are threatened by climate change and form part of national policy response, e.g. monitoring of snowbed specialist species contributing to Scotland's Climate Change Adaptation Programme;
3. Development of new technologies to streamline biodiversity-environmental testing, e.g. molecular detection of water quality indicators to support water quality assessments – for example diatoms for the EU Water Framework Directive.

GSPC Target 2

An assessment of the conservation status of all known plant species, as far as possible, to guide conservation action.

- ☒ On track to achieve target at national level
☐ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

The assessment is based on the UK's progress with conservation status assessments of native plants. Assessments for all vascular plants, lichens, bryophytes and some fungi are complete. A new plant monitoring scheme is being implemented, and a third Atlas of British Flora is due to be published in the next couple of years. Information is also presented below on new analysis techniques using Bayesian statistics allow trends to be calculated for many of UK species, including a selection of bryophytes and lichens. The UK has also made a substantial contribution to international plant status assessments.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

The Joint Nature Conservation Committee (JNCC) have carried out a population status assessment of all vascular plants in the UK following IUCN criteria. Further information can be found at: <http://jncc.defra.gov.uk/page-3354>. Red Lists have been completed at the Great Britain level for lichens (Woods and Coppins 2012; <http://jncc.defra.gov.uk/page-6197>) and bryophytes (Hodgetts 2011; <https://rbg-web2.rbge.org.uk/bbs/Activities/field%20bryology/FB103/FB103%20Conservation%20News.pdf>). The first official fungal Red List for Great Britain covering the 68 taxa of the family *Boletaceae* has been published (Ainsworth *et al.* 2013; <http://jncc.defra.gov.uk/page-6497>).

In addition to IUCN assessments, official lists of species of importance for nature conservation have been published for each UK country (Natural Environmental and Rural Communities Act 2006 – Section 41 (England), Environment (Wales) Act 2016 section 7, Northern Ireland Priority Species List, Scottish Biodiversity List). The lists include vascular and non-vascular plants and are being used to focus biodiversity action, survey and research, as well as having material consideration in planning issues. Indicators based on these lists – known as ‘priority species’ in domestic policy, have been developed to identify changes in abundance and distribution over time.

UK Biodiversity Indicator C4b – Status of UK priority species : Distribution (<http://jncc.defra.gov.uk/page-6850>) is based on Bayesian analysis of the occupancy (distribution) of species listed on one or more of the four country biodiversity lists. The taxonomic coverage is broad; in the background section of the online fiche information on bryophyte and lichen distribution data are provided. These show stability in the distribution of bryophyte species, and an increase in the distribution of lichen species.

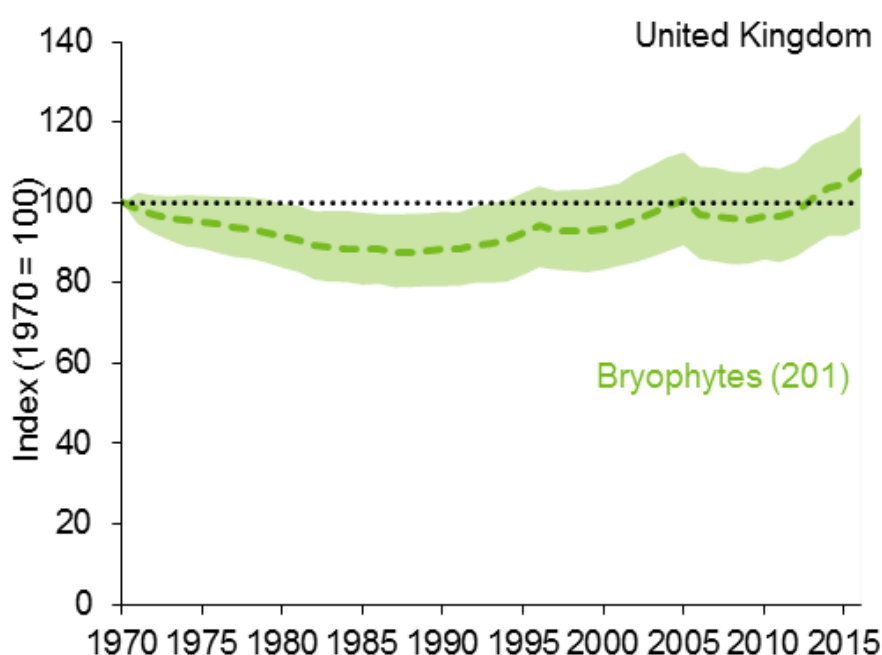


Figure 2.1. Change in distribution of 201 bryophyte priority species, 1970 to 2016.

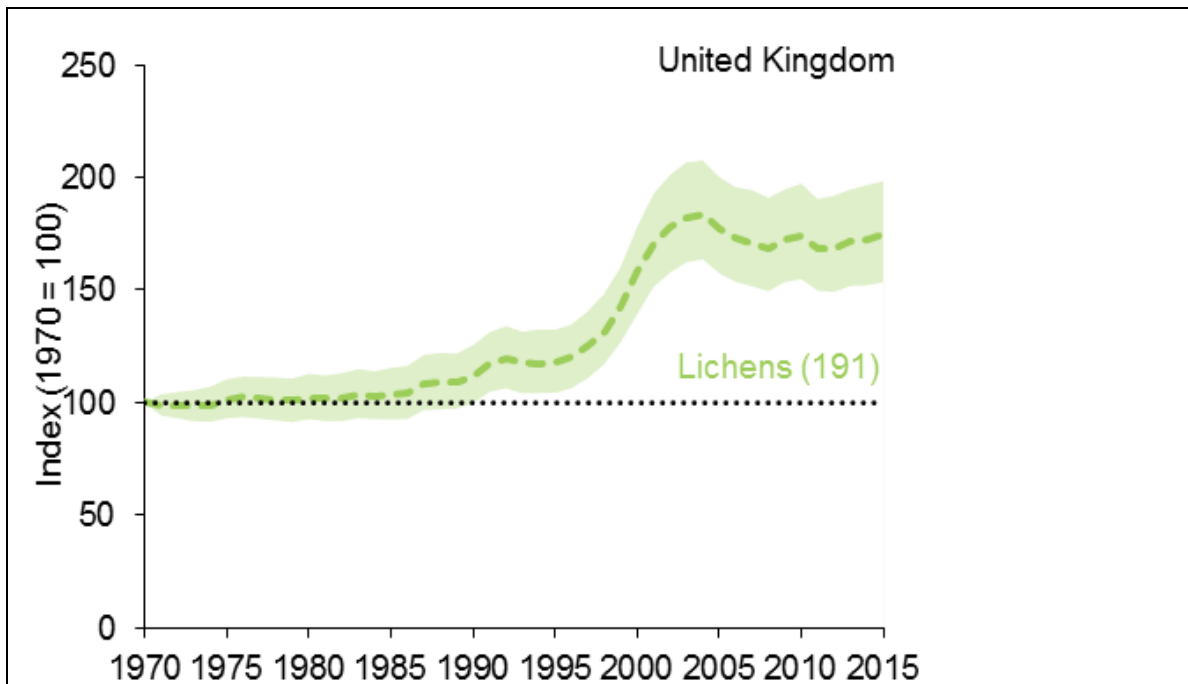


Figure 2.2. Change in distribution of 191 lichen priority species, 1970 to 2016.

Notes (figures 2.1 and 2.2):

1. The graphs show the number of species included in brackets, the unsmoothed indicator trend (dotted line) and variation around the line (shaded) within which we can be 90% confident that the true value lies.
2. All species in the indicator are present on one or more of the country priority species lists (Natural Environmental and Rural Communities Act 2006 – Section 41 (England), Environment (Wales) Act 2016 section 7, Northern Ireland Priority Species list, Scottish Biodiversity List).

Source: Biological records data collated by a range of national schemes and local data centres. Plant status assessments are also driving conservation action in the UK. An example of this is the development of climate resilient management plans by RBGE in collaboration with Scottish Natural Heritage for the Glasdrum NNR, with respect to internationally-important epiphytes.

The National Plant Monitoring Scheme (<https://www.npms.org.uk/>) designed by the Botanical Society of Britain and Ireland (BSBI), Centre for Ecology & Hydrology (CEH), Plantlife and Joint Nature Conservation Committee (JNCC) will provide relative abundance data for around 400 indicator species – which will be more equivalent to the data underpinning the birds, bats and butterfly indicators – allowing a more comparable indicator of plant diversity and habitat trends to be developed. (See also UK indicator C7 <http://jncc.defra.gov.uk/page-6886>).

UK organisations have invested the production of Atlases to support future threat assessments. The first atlas of the British and Irish flora, published in 1962 by the Botanical Society of Britain and Ireland <https://bsbi.org/>, pioneered the use of ‘dot-maps’ aligned to the OS grid. A [repeat atlas](http://www.brc.ac.uk/plantatlas/) <http://www.brc.ac.uk/plantatlas/> was published in 2002 based on fieldwork carried out from 1987-1999. BSBI is now producing a third atlas, Atlas 2020, the fieldwork for which is due to be completed in 2019 (<https://bsbi.org/atlas-2020>).

The BSBI Threatened Plants project (<https://bsbi.org/threatened-plants-project>) collated detailed distribution records and carried out surveys of a random sample of populations of a targeted list of rare plant species across Great Britain and Ireland to improve

knowledge of the ecology of the species covered by the project and reasons for their decline.

Examples of the UK's contribution internationally:

RBG Kew is a Red List partner (<http://www.iucnredlist.org/partners/partners>) and has established a Plant Assessment Unit (<https://www.kew.org/science/projects/kew%E2%80%99s-plant-assessment-unit>) to co-ordinate and accelerate red listing of plants. The collaboration aims to deliver at least 28,000 assessments by 2020.

A key publication assessing Target 2 is: Bachman*, S.P., Nic Lughadha*, E.M. & Rivers, M.C. (2017). Quantifying progress toward a conservation assessment for all plants. *Conservation Biology* **32**, 516-524. <https://doi.org/10.1111/cobi.13071> *RBG Kew authors. The authors consolidated digitally available plant conservation assessments and reconciled their scientific names and assessment status to predefined standards to provide a quantitative measure of progress toward this target. The data set is accessible online (ThreatSearch https://www.bgci.org/threat_search.php) and is a baseline that can be used to directly support other GSPC targets and plant conservation action.

GSPC Target 3

Information, research and associated outputs, and methods necessary to implement the Strategy developed and shared.

- ☒ On track to achieve target at national level
☐ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

The Royal Botanic Gardens, Kew, Royal Botanic Garden Edinburgh, and the National Museum of Wales have international reputations for science, and are taking extensive and effective action to make data, mapping and assessment tools widely available and to engage the public in conservation science. The UK has a long history of plant research and publications, ranging from the publication of the first British flora (the Cambridge Catalogue) by John Ray over 350 years ago, through to the first Atlas of the British Flora in 1962, a revised Vascular Plant Red List in 2005, to the publication of genetic barcodes for all vascular plants in Wales in 2012 – a world first, which has then been followed up in the rest of the UK. Information on the distribution of species can be found online via the National Biodiversity Network Atlas <https://nbnatlas.org/>, and the BSBI website <https://bsbi.org/maps-and-data>. Plant Link UK, and the country Plant Links provide means for sharing and disseminating information and methods (<http://www.plantlife.org.uk/uk/our-work/working-partners/plantlink/plant-link-uk-plink-uk>).

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

Major developments have been made in DNA-based species identification. DNA barcoding of the British vascular plant flora is now completed from a collaboration led by

National Botanic Garden of Wales and RBGE. This has extended the initial data set on the flora of Wales to UK coverage. This provides a baseline resource for DNA-based plant identification. This work builds on wider UK input towards the leadership of the International Barcode of Life project, and its application to biodiversity discovery and species identification: <http://rstb.royalsocietypublishing.org/content/371/1702>

Information on the distribution of species can be found online via the National Biodiversity Network Atlas <https://nbnatlas.org/>, and the BSBI website <https://bsbi.org/maps-and-data>. Plant Link UK, and the country Plant Links provide means for sharing and disseminating information and methods (<http://www.plantlife.org.uk/uk/our-work/working-partners/plantlink/plant-link-uk-plink-uk>). Other plant recording schemes are described at the beginning of this section of the report.

RBGE has developed publicly-available toolkits (climate scenarios) and climate impacts reports for major taxonomic groups (e.g. lichens). Additionally, working to support the Habitats and Species Working Group of the Scottish Biodiversity Strategy, the full list (1,947 species) of Scottish conservation priority species has been aligned to EUNIS habitat types in which they occur / on which they depend (linking species with landscape management) as well as to relevant policy instruments for forestry, agriculture, town and country planning etc. This has provided a spatially-explicit and searchable database that links a species' occurrence with management action. These searchable data are now available and under trial on the National Biodiversity Atlas of Scotland (scotland.nbnatlas.org).

A new Scottish Code and Best Practice Guidelines for Conservation Translocations was produced in 2014, led by RBGE and SNH, on behalf of the 27 organisations of the National Species Reintroduction Forum. This involved input from the land-use, conservation and science sectors. The Code and Guidelines have been produced to guide conservation translocations in Scotland and to minimise conflicts. For 'low risk' translocations, they serve as a checklist of issues to consider, and provide a mechanism for translocations to proceed in a careful and thorough fashion, aiming to maximise the chances of success, without the need for excessive bureaucracy and paperwork. Where the translocation has legal constraints, or the potential for negative impacts on people, biodiversity or the wider environment, the code and guidelines outline the process for planning, consultation, and evaluation of benefits and risks to inform the decision of whether (and how) to proceed: www.snh.gov.uk/translocation-code.

Examples of the UK's contribution internationally:

At the Royal Botanic Gardens, Kew, active collection of data is pursued on priority useful plants such as crop wild relatives, plants vital for food security, pollination strategies vital for food security, livelihoods and human health. For example, in 2013, RBG Kew and Ethiopian partner Environment and Coffee Forest Forum (ECFF) embarked on the project *Building a climate resilient coffee economy for Ethiopia*, with the aim of providing a strategy based on a rigorous assessment of the influence of climate change on coffee producing areas and wild coffee forests. A climate resilient strategy was developed in close partnership with stakeholders, including government and non-government bodies, coffee producers and industry representatives. The strategy, and other project outputs, will provide the understanding and awareness required to sustain the Ethiopian coffee industry in relation to climate change, land-use, and the coffee value-chain, to identify what is needed to ensure climate resilience (<https://www.kew.org/science/projects/building-a-climate-resilient-coffee-economy-for-ethiopia>).

RBG Kew regularly publishes field guides and other resources

(<https://www.kew.org/science/who-we-are-and-what-we-do/publications>) to help partners implement the GSPC. Examples include:

1. Upson, R., Myer, B., Floyd, K., Lee, J. & Clubbe, C. (2017). Field Guide to the Introduced Flora of South Georgia. 55pp. Royal Botanic Gardens, Kew, Richmond.
2. State of the Worlds Plants: Willis, K.J. (ed.) State of the World's Plants 2017. Report. Royal Botanic Gardens, Kew (<https://stateoftheworldsplants.com/>)
3. Protocols to support UK Oversea Territories to restore and rehabilitate species and habitats e.g. Dani Sanchez, M., *et al.*, Conserving and restoring the Caicos pine forests: The first decade, Plant Diversity (2018), <https://doi.org/10.1016/j.pld.2018.05.002>

Objective II: Plant diversity is urgently and effectively conserved

GSPC Target 4

At least 15 per cent of each ecological region or vegetation type secured through effective management and/or restoration.

- ☐ On track to achieve target at national level
☒ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

The UK's climate, landscape, and geology combine to support a broad range of plant communities. A large proportion of the good quality habitat that remains is protected by statutory designations such as Sites of Special Scientific Interest (Areas of Special Scientific Interest in Northern Ireland). The vast majority of such sites have management plans that are actively being implemented, however it takes time to restore land in unfavourable condition back to favourable condition – for that reason the condition of many areas is classed as 'unfavourable recovering'. There is therefore evidence of protecting and improving the condition of many species and habitats. However, some habitat types, especially in uplands, have a significant proportion of their resource outside protected sites. It has not been possible to make an assessment of the proportion involved, or whether this habitat is managed effectively through agri-environment schemes or woodland management programmes. It is therefore not possible to say whether progress has been sufficient, hence the choice of the 'insufficient but progressing' category. Implementation of GSPC Target 4 should also be seen in the context of implementation of Aichi Target 15 – see Section III of this report for a description of work to restore woodlands and peatlands.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

UK biodiversity indicator C3a <http://jncc.defra.gov.uk/page-4239> – on the status of habitats of European importance shows that in 2007, 5% of 77 UK habitats listed on

Annex I of the Habitats Directive were in favourable conservation status, decreasing to 3% in 2013. The conservation status of 48% of habitats was unfavourable-improving in 2007, decreasing to 31% in 2013. The conservation status of 30% of the habitats was unfavourable-declining in 2007, decreasing to 25% in 2013. A new assessment is due to be completed in 2019.

UK biodiversity indicator C1c <http://jncc.defra.gov.uk/page-4241> provides information on the condition of terrestrial and coastal features on Areas or Sites of Special Scientific Interest (A/SSSIs). A/SSSIs are designated for their 'features' – habitats or species which give them their scientific interest. Each country assesses the condition of features and reports either the area or the number of features in favourable or unfavourable-recovering ("recovering") condition. Plants are features of interest both directly where species are notified in their own right, but also as part of the habitats that are more commonly the notified features on protected areas. The percentage of features, or area, of A/SSSIs in favourable or unfavourable-recovering condition increased from 67% in 2005, to 86% in 2013, and remained stable at 85% in 2018. The proportion of features or area of land in unfavourable-recovering condition has increased from 14% in 2005 to 35% in 2018. These changes reflect improved management of sites, but may also be affected by a greater number of sites/features having been assessed over time. More detail of the UK protected areas indicator is provided in the assessment of Target 11 in Section III of the report.

Action is in place to ensure that plants are not only protected, but also to restore and enhance plant diversity on protected sites. For example, to help deliver the Scottish Biodiversity Strategy Route Map to 2020, RBGE has undertaken translocations to reinforce existing populations, or establish new populations, for multiple Target 8 species including *Cicerbita alpina* and *Polygonatum verticillatum*, as well as Scotland's montane willows (Cairngorm National Park). Translocation work has recently been extended to the recovery of oceanic bryophyte and lichen epiphytes for native oakwood sites recovered from Rhododendron infestation, in collaboration with the Forestry Commission (Loch Lomond and Trossachs National Park).

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.

- ☒ On track to achieve target at national level
☐ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

This assessment is based primarily on the extent of action to protect and manage plant diversity in the UK, although the UK has also made significant contributions to the identification and protection of plants overseas. There are 165 Important Plant Areas (IPAs, Plantlife: <http://www.plantlife.org.uk/uk/nature-reserves-important-plant-areas/important-plant-areas>) in the UK; more than 90% of which are protected at least in part through statutory designations such as Sites of Special Scientific Interest and Special Area of Conservation. Plants will form some of the features of interest for which sites are notified both directly where species are notified in their own right, but also as part of the habitats that are more commonly the notified features on protected areas. The percentage of features, or area, of A/SSSIs in favourable or unfavourable-recovering

condition increased from 67% in 2005, to 86% in 2013, and remained stable at 85% in 2018. The proportion of features or area of land in unfavourable-recovering condition has increased from 14% in 2005 to 35% in 2018. These changes reflect improved management of sites, but may also be affected by a greater number of sites/features having been assessed over time.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

The UK's 5th National Report contained an analysis of the overlap of Important Plant Areas (IPAs) with Sites of Special Scientific Interest (Areas of Special Scientific Interest in Northern Ireland): as at December 2012, 155 of the IPAs overlapped with A/SSSIs. As an example of such protection, the Atlantic Rainforest Alliance is a new network of agencies, NGOs and research institutes working with landowners towards effective delivery of Scotland's west coast IPA.

UK biodiversity indicator C1c <http://jncc.defra.gov.uk/page-4241> provides information on the condition of terrestrial and coastal features on Areas or Sites of Special Scientific Interest (A/SSSIs). A/SSSIs are designated for their 'features' – habitats or species which give them their scientific interest. Each country assesses the condition of features and reports either the area or the number of features in favourable or unfavourable-recovering ("recovering") condition. Plants will form some of the features of interest both directly where species are notified in their own right, but also as part of the habitats that are more commonly the notified features on protected areas. The percentage of features, or area, of A/SSSIs in favourable or unfavourable-recovering condition increased from 67% in 2005, to 86% in 2013, and remained stable at 85% in 2018. The proportion of features or area of land in unfavourable-recovering condition has increased from 14% in 2005 to 35% in 2018. These changes reflect improved management of sites, but may also be affected by a greater number of sites/features having been assessed over time. More detail of the UK protected areas indicator is provided in the assessment of Target 11 in Section III of the report.

Examples of the UK's contribution internationally:

RBG Kew has a huge amount of experience in working with partners to support protected area management. Examples include:

- The Itremo Massif project in Madagascar: <http://www.kew.org/science-conservation/research-data/science-directory/projects/itremo-massif-protected-area-project>.
- Working with Angolan Protected Areas Expansion Strategy: <http://www.kew.org/science-conservation/research-data/science-directory/projects/assessing-plant-conservation>.

RBG Kew has been working with Plantlife to accelerate the rate at which Important Plant Areas are identified in the Tropics and are well underway with a Tropical Important Plants Areas (TIPAs) programme (www.kew.org/science/who-we-are-and-what-we-do/strategic-outputs-2020/tropical-important-plant-areas), including in the Caribbean UK Overseas Territories (<https://www.kew.org/science/projects/tropical-important-plant-areas-in-the-british-virgin-islands-bvi-tipas>).

GSPC Target 6

At least 75 per cent of production lands in each sector managed sustainably, consistent with the conservation of plant diversity.

- ☐ On track to achieve target at national level
☒ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

The assessment is based on progress with uptake of sustainable management practices in UK forestry and agriculture (which has grown over the last 10-20 years, although remains below 75%. Progress is therefore assessed as towards the target, but insufficient, although some conditions, such as the UK Forest Standard, apply to all areas, irrespective of uptake of specific incentive schemes. Since 2007, the proportion of UK woodland certified as sustainably managed has been about 43%. The area of land in targeted Agri-environment schemes has however declined since 2010; in 2017 2.8 million hectares (16% of the usable agricultural area of 17.5 million hectares) was managed within a higher-tier agri-environment scheme.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

Agri-environment schemes require land managers, including farmers, to implement environmentally beneficial management and to demonstrate good environmental practice on their land. The higher-level or targeted schemes promote environmental management aimed to: conserve wildlife; maintain and enhance landscape quality and character; protect the historic environment and natural resources; and promote public access and understanding of the countryside. UK Biodiversity Indicator B1a – area of land in agri-environment schemes (<http://jncc.defra.gov.uk/page-4242>) shows that in 2017, the total area of land in higher-level or targeted agri-environment agreements in the UK was 2.8 million hectares: 1.4 million hectares in England; 0.4 million hectares in Wales; just under 1.0 million hectares in Scotland; and 0.1 million hectares in Northern Ireland. Fluctuations in areas of land under agri-environment agreements over time can occur as a result of the introduction of new schemes and the ending of previous scheme agreements. Existing agreements will continue until they expire.

UK Biodiversity Indicator B1b – Area of forestry land certified as sustainably managed (<http://jncc.defra.gov.uk/page-4243>) shows that in March 2018, there were 1.38 million hectares of certified woodland across the UK, representing 43% of the total woodland area. The proportion of woodland certified as sustainably managed has remained stable since 2007. The total area certified can change if new woodlands are certified, if existing certificates are not renewed, or if there is a time lag in renewal of an existing certificate.

Examples of the UK's contribution internationally:

Many of RBG Kew's projects have focused on agroforestry, including Forest Future Bolivia, (<https://tropicalbotany.wordpress.com/>) and Sustainable agroindustry in Peru (<http://www.kew.org/science-conservation/research-data/science->

[directory/projects/conservation-restoration-and](#)). RBG Kew has been at the forefront of developments in the non- commercial scientific research community to develop best practice guidelines to support effective implementation of the Nagoya Protocol. RBG Kew has developed an institutional Access and Benefit Sharing Toolkit (www.cbd.int/abs/submissions/icnp-3/EU-Kew-letter.pdf) and an internal staff guide to collecting, use and supply of genetic resources and traditional knowledge.

GSPC Target 7

At least 75 per cent of known threatened plant species conserved in situ.

- ☐ On track to achieve target at national level
☒ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

This assessment is based on the UK's progress with securing favourable condition or positive management to the suite of protected sites, although it has not been possible to say whether the quantitative target has been met. The 2018 update of the Great Britain red list assessment of vascular plants concluded that 329 species were in the categories Extinct in the Wild, Critically Endangered, Endangered or Vulnerable. Twenty-one UK plant and lichenised fungi species are listed on the annexes of the EU Habitats Directive. The UK national report on the Habitats Directive in 2013 concluded that 29% of the plant species assessed were in favourable or improving conservation status. Across the UK, lists of species have been developed to guide conservation work. There are 2,890 species in total when the four Country lists are combined. Of these 1,786 species (62%) are plants, fungi or lichens. Plants are the designated feature on many of the UK's protected areas, both directly as individual species, and as components of habitats. Most of these species are likely to be on protected sites, and where they are features of interest, will have management in place to ensure their conservation. It is not however possible to state how many sites exist for particular species, hence the assessment of 'progressing but insufficient'.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

The UK's climate, landscape, and geology combine to support a broad range of plant communities. Plants are the designated feature on many of the UK's protected areas, both directly as individual species, and as components of habitats. A large proportion of the good quality habitat that remains is protected by statutory designations such as Sites of Special Scientific Interest (Areas of Special Scientific Interest in Northern Ireland). The vast majority of such sites have management plans that are actively being implemented, however it takes time to restore land in unfavourable condition back to favourable condition – for that reason the condition of many areas is classed as 'unfavourable recovering'.

UK Biodiversity Indicator C3b – Percentage of UK species of European Importance in favourable or improving conservation status (<http://jncc.defra.gov.uk/page-6566>) is based on an assessment of the status of the species listed on the Annexes of the EU Habitats

Directive. It is possible to extract the plant and lichenised fungi subset of this indicator as shown in Figure 7.1. This suggests a more negative picture for plants and fungi than for all taxa, with 50% favourable or improving in 2007, down to 29% in 2013. This contrasts with the overall UK Indicator, which had a short term positive trend with 44% favourable or improving in 2007, and 48% in 2013. This analysis is based on only 21 plant or fungi taxa (in 2013), so is a very small proportion of the UK's threatened species, and should not be assumed to represent the status of other plants and fungi in UK. A new assessment is due to be completed in 2019.

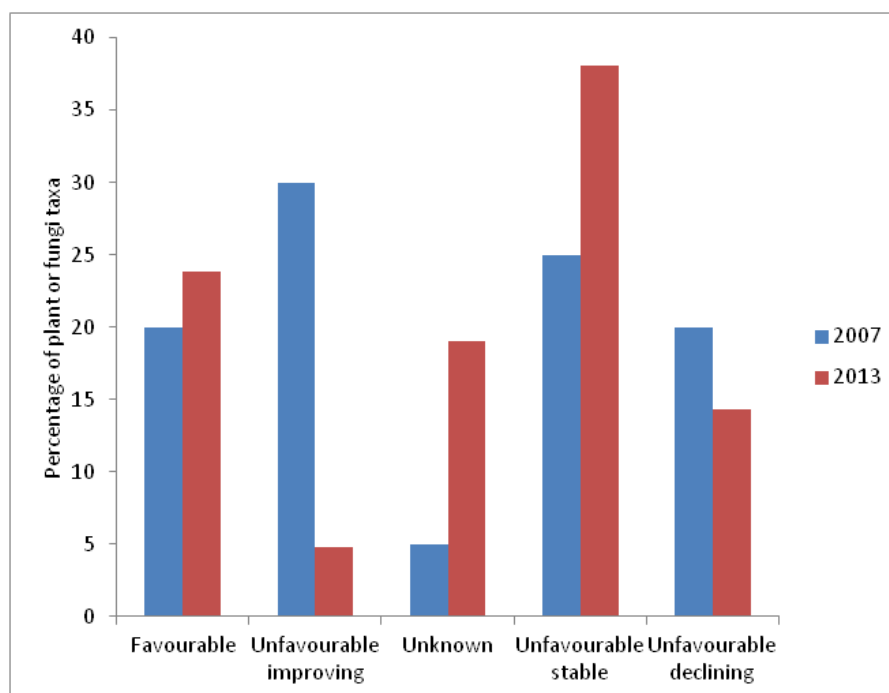


Figure 7.1. Percentage of UK plant or fungal taxa of European importance in improving or declining conservation status in 2007 and 2013.

Notes:

7. The chart is based on species listed on Annexes II, IV and V of the Habitats Directive, but excluding vagrants.
8. The aim of the Habitats Directive is to achieve favourable conservation status for the species and habitats listed in its Annexes. An assessment of status and trends for each species and habitat is undertaken every 6 years. Trends in unfavourable conservation status allow identification of whether progress is being made, as it will take many years for some habitats and species to reach favourable conservation status.

Source: UK Habitats Directive (Article 17) reports 2007 and 2013.

A IUCN Redlist of Vascular Plants in Great Britain

(http://jncc.defra.gov.uk/pdf/pub05_speciesstatusvpredlist3_web.pdf) was published in 2005. Since then it has been annually updated, and the results consolidated into the Conservation Designations spreadsheet managed by Joint Nature Conservation Committee – details at <http://jncc.defra.gov.uk/page-3408>. An update for 2018 is in press: The Vascular Plant Red Data List for Great Britain (2018). BSBI, RBG Kew, RBG Edinburgh, Plantlife, Natural History Museum, London. BSBI News (in press). Within the 2018 figures, 329 species were assessed as Extinct in the Wild, Critically Endangered, Endangered or Vulnerable (Table 7.1).

Table 7.1. Numbers of taxa in the Vascular Plant Red Data List for Great Britain by IUCN category, 2018.

IUCN Category	Total	GB status	Global status (endemics)
Globally Extinct			
Regionally Extinct	18	18	
Extinct in Wild	3	3	
Critically Endangered	42	29	13
Endangered	110	92	18
Vulnerable	223	205	18
Near Threatened	92	88	4
Least Concern	1317	1290	27
Data Deficient	57	50	7
Not Evaluated	72	72	
	1,934	1,847	87

In addition to IUCN assessments, official lists of species of importance for nature conservation have been published for each UK country (Natural Environmental and Rural Communities Act 2006 – Section 41 (England), Environment (Wales) Act 2016 section 7, Northern Ireland Priority Species List, Scottish Biodiversity List) (Table 7.2). The lists include vascular and non-vascular plants and are being used to focus biodiversity action, survey and research, as well as having material consideration in planning issues.

Table 7.2. Numbers of plant species included in the combined four countries list of priority species.

Algae	269	9.3%
Bryophytes	301	10.4%
Fungi	262	9.1%
Lichens	545	18.9%
Vascular plants	409	14.2%
	1,786	61.8%

Examples of the UK's contribution internationally:

One in five plants are estimated to be threatened (SOTWP, <https://stateoftheworldsplants.com/>) and RBG Kew works with partners worldwide to identify risks and provide assessment material and data to the IUCN Red List programme. By determining the risk of extinction for plant species RBG Kew can set conservation targets appropriately. RBG Kew has a Red Listing unit in addition to other teams creating and reviewing assessments.

The Red List assessments feed into a wider initiative at RBG Kew called Tropical Important Plant Areas (TIPAs), a conservation designation which also links to Key Biodiversity Areas allowing national governments to prioritise their conservation accordingly. A key criterion for identifying TIPAs is the presence of threatened species (Darbyshire, I., *et al.* Important Plant Areas: revised selection criteria for a global approach to plant conservation. *Biodivers Conserv* (2017) 26: 1767-1800. <https://doi.org/10.1007/s10531-017-1336-6>). Identifying and conserving TIPAs will conserve the constituent threatened species *in situ*.

RBGE has facilitated the IUCN Red Listing of all the endemic plant species of the Arabian Peninsula (7 countries, 850 taxa) as part of the Sharjah International Conservation Forum for Arabian Biodiversity.

GSPC Target 8

At least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes.

- ☒ On track to achieve target at national level
☐ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

The assessment is based on progress with ex-situ conservation of the UK flora, although the UK has also made a substantial contribution to ex-situ conservation of flora worldwide. RBG Kew's Millennium Seed Bank UK Programme comprises a suite of projects to secure *ex situ* collections of the UK Flora and to make these available for use in recovery and restoration programmes. As of March 2018 the Millennium Seed Bank held 7,435 wild-origin and regenerated (cultivated) collections from the UK, comprising 2,077 native and archeophyte taxa. This represents 75% of the UK's total native and archeophyte flora and 78% of threatened taxa. Seeds are made available for species recovery and habitat restoration projects.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

Collecting seed for the Millennium Seed Bank is carried out by RBG Kew staff and by a wide range of collaborating organisations and individuals. Work to collect outstanding taxa continues, including very rare or highly specialised species, taxonomically complex microspecies and those that do not reliably produce seed in the UK. These collections are made available for use in science and conservation, including for use in recovery and restoration projects. Between 2012 and 2017 small samples were made available via the MSB seed list from 154 collections for environmental purposes including regeneration, reintroduction and habitat restoration projects. Furthermore, during 2011-2018 RBG Kew has worked with 31 partners to provide plant material and technical expertise to 57 projects for species recovery and habitat restoration.

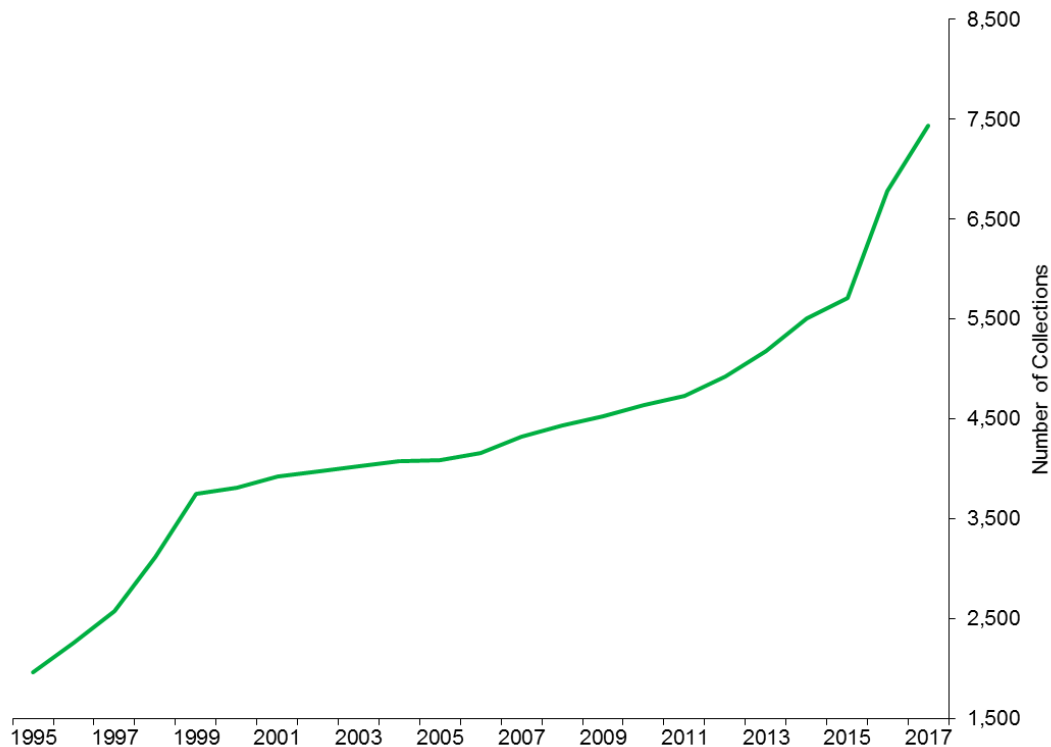


Figure 8.1. Number of UK seed collections in the Millennium Seed Bank, 1995 to 2017.

Notes: Data up to 1 March 2018.

Source: Royal Botanic Gardens, Kew.

Furthermore, in Scotland, this target was exceeded by 2014 with 86% of threatened vascular plant species native to Scotland held as ex-situ living collections by RBGE. Amongst these, eleven have been reintroduced and are now subject to long-term monitoring. Experimental work is extending this Target to the ex-situ protection of the most threatened cryptogamic plants, initially tested through population rescue for *Pseudocyphellaria intricata* at Benmore Botanic Garden.

Collaborative ex-situ planting programmes to support international conifer conservation in 70 new public sites throughout the British Isles since 2014 have been developed by RBGE. These sites are receiving interpretation materials, and some of them attract significant visitor numbers, for example >30 Million annually in Battersea Park.

Examples of the UK's contribution internationally:

This *ex situ* conservation programme has been extended to the UK Overseas Territories and seed collecting is taking place in most territories. As of September 2018, 1,113 collections from the UKOTs have been banked at the Millennium Seedbank (MSB), representing 595 taxa, including 90 strict endemics, many more regional endemics. 65 of 95 species (67%) assessed as globally threatened have been banked, though a large proportion of the flora is yet to be assessed, either globally or at the national level. See Samara Issue 31 (<http://www.brc.ac.uk/plantatlas/>). 20% of these collections are available via the MSB Seed List (<http://apps.kew.org/seedlist/>).

GSPC Target 9

70 per cent 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.

- ☐ On track to achieve target at national level
☒ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

The UK is relatively rich in wild relatives of crops, landraces of cereal, vegetable and fruit crops, and traditional orchard trees. Defra funds a number of plant genebanks, including the national fruit collection and UK vegetable genebank. During the first five years of the UK National Tree Seed Project 10 million seeds from 60 native tree species have been collected. In addition, thousands of taxa are held in national plant collections, covering a range of horticultural species and cultivars. A study of the UK National Tree Seed Project's collections of Ash (*Fraxinus excelsior*) suggests that over 90% of the UK genetic diversity of this species has been conserved by the project. The UK has not undertaken an assessment of how many crops are stored within its genebanks, and is not therefore able to assess if that is above or below 70%. However the UK genebanks do contain considerable number of accessions of crop plants, so the assessment of 'progressing' has been made. At a global scale, the Millennium Seed Bank holds accessions for 200 taxa related to 25 of 29 of the world's most important crops.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

Maintaining genetic diversity of UK plants is important for conservation of biological diversity, as well as for economic and cultural reasons. The UK is a Party to the International Treaty on Plant Genetic Resources for Food and Agriculture, and has also committed to a five-point action plan in response to the Foresight (2011) report on the future of food and farming (Environmental Audit Committee 2011) which includes actions on conserving plant genetic resources.

UK Biodiversity Indicator C9b – Plant Genetic Resources – Enrichment Index (<http://jncc.defra.gov.uk/page-6573>), is a proxy measure of genetic diversity based upon the assumption that genetic diversity increases (to a greater or lesser extent) with originality of accessions, which is estimated based on: the number of species collected; the number of accessions collected; the number of countries collected from; and the area from which collection took place. The indicator is based on an analysis of the UK contribution to the EURISCO database.

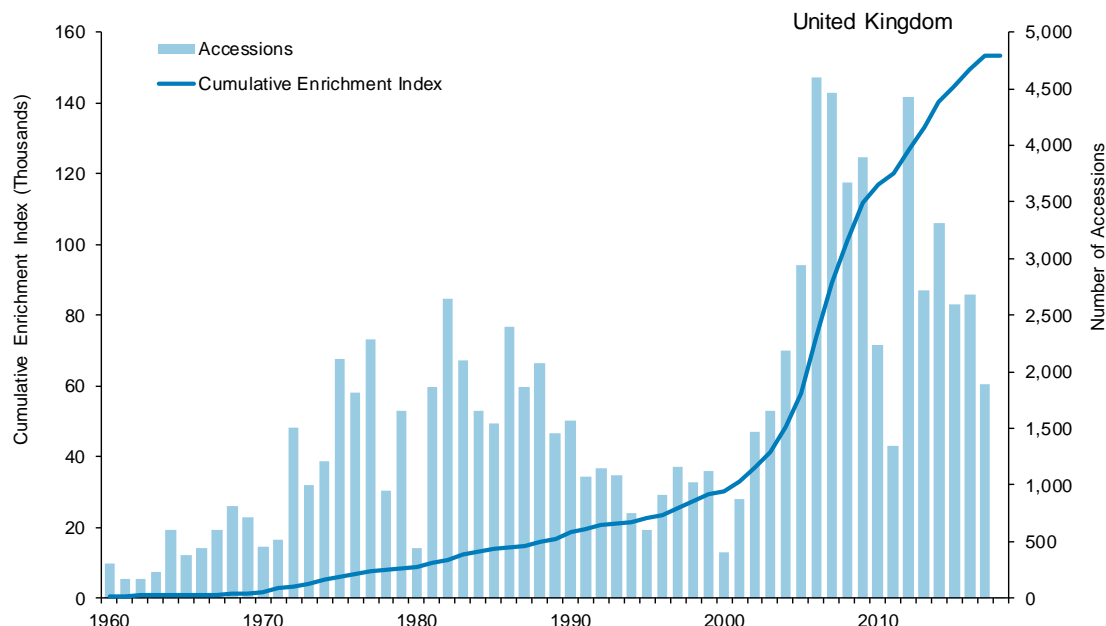


Figure 9.1. Cumulative Enrichment Index of plant genetic resource collections held in the UK and annual number of accessions, 1960 to 2018.

Notes:

3. Data was obtained from EURISCO, which collates information across Europe from national germplasm collections, including the UK National Inventory of Plant Genetic Resources. The UK National Inventory includes food crop genetic resources such as crops, forages, wild and weedy species (including crop wild relatives), medicinal and ornamental plants, but does not include forest genetic resources.
4. The UK 2018 update of EURISCO includes information which had previously not been submitted as a result of improvements within the holding institutes to catalogue their holdings. The indicator is therefore not directly comparable with the versions previously published.

Source: EURISCO Catalogue <http://eurisco.ipk-gatersleben.de/apex/f?p=103:1>; date of data download 7 June 2018; based on UK contributions from: Genetic Resources Unit, Aberystwyth; Heritage Seed Library, Garden Organic; Commonwealth Potato Collection, The James Hutton Institute; Germplasm Resources Unit, John Innes Centre; Nottingham Arabidopsis Stock Centre; Millennium Seed Bank Partnership; Science and Advice for Scottish Agriculture, Scottish Government; Warwick Crop Centre, Genetic Resources Unit.

Defra funds a number of plant genebanks which conserve and provide access to a variety of plant genetic material, and aims to further increase the accessibility to and utilisation of these genebanks in the future, as well as making use of new genomic technologies. Supporting genebanks helps ensure the UK meets its international agreements to protect important crops and safeguard global food security.

- The National Fruit Collection <http://www.nationalfruitcollection.org.uk/> at Brogdale in Kent is curated and maintained by the University of Reading. It is one of the largest fruit collections in the world with over 3,500 varieties of named apple, pear, plum, cherry, bush fruit, vine and cob nut cultivars. Unlike other genebanks where plant genetic material is stored as seeds, the National Fruit Collection is a live collection of plants open to the public as a visitor attraction.
- The UK Vegetable Genebank <https://warwick.ac.uk/fac/sci/lifesci/wcc/gru/genebank/> is held at the University of Warwick. It manages a collection of around 14,000 samples of vegetable crops, stored as frozen seeds. The genebank supplies materials to plant breeders,

researchers and growers, as well as Genetic Improvement Networks (supported by Defra) which facilitate the transfer of genetic variations from collections of plant genetic resources into new varieties.

- The pea collection <https://www.jic.ac.uk/research-impact/germplasm-resource-unit/> at the John Innes Centre comprises over 3,500 accessions of wild and semi-cultivated material.

Plant Heritage's National Plant Collections contain, among other internationally significant socio-economically and culturally valuable resource, 2,395 taxa in seven genera across 14 locations (Plant Heritage 2018). In the past year these increased by 512 taxa at three locations newly registered within the scheme.

Unpublished data (2011-2018) held within Plant Heritage's Threatened Plants Project (Seymour, K. 2012. Conserving cultivars. *The Plantsman* n.s. p.154-159) and publicly available data (<http://rbg-web2.rbge.org.uk/multisite/multisite3.php>) additionally shows that 9,000 relevant taxa in 54 genera are held across 185 other locations throughout the UK, including significant holdings by the National Trust and National Trust for Scotland, the Royal Horticultural Society, national, university and other botanic gardens and arboreta, the Sir Harold Hillier Gardens and the Eden Project.

In 2013 RBG Kew launched the UK National Tree Seed Project which is making multi-provenance collections in order to conserve the genetic diversity of UK forest genetic resources. During its first 5 years the project focused on 60 native tree species, conserving 10 million seed from 7,623 trees. A study of the project collections of Ash (*Fraxinus excelsior*) suggests that over 90% of the UK genetic diversity of this species has been conserved by the project. Further to this project RBG Kew and others are developing a Strategy for UK Forest Genetic Resources, which seeks to both better understand genetic diversity in UK trees and to minimise genetic erosion and safeguard genetic diversity through both in situ and ex situ conservation, and sustainable use. For further details see the case study in Section II of this report.

RBGE led a project to develop a draft model report for the conservation of genetic diversity, with a particular focus on extending work from crop wild relatives, to include wild species. This has involved developing rapid and robust assessments about genetic health in the absence of direct genetic data on the species concerned.

An example of individuals engaging with practical conservation of plant genetic resources is the work of Garden Organic's Heritage Seed Library (<https://www.gardenorganic.org.uk/hsl>). It isn't a genebank, but works with individual gardeners to maintain and preserve seeds of vegetable varieties that are no longer commercially available. The seed library currently holds approximately 800 accessions of open-pollinated varieties. Each year, approximately 150 varieties within the collection are chosen for inclusion in the Heritage Seed Library Seed Catalogue. Subscribing HSL members receive the catalogue annually in December, from which they can choose six free packets of seeds.

Further details of conservation of plant genetic diversity are provided under Aichi Target 13 in Section III of this report.

Examples of the UK's contribution internationally:

The fundamental goal of the Adapting Agriculture to Climate Change Project (Crop Wild Relatives (CWR)) is to identify, collect, protect and utilise the genetic diversity of crop wild relatives of 29 of the world's most important crops. The project is managed by the Global Crop Diversity Trust with the Millennium Seed Bank (MSB) of the Royal Botanic

Gardens, Kew and implemented in partnership with national and international gene banks and plant breeding institutes around the world. To date, over 3,000 CWR collections representing over 200 taxa related to 25 crops, and comprising over 10 million individual seeds are safeguarded at the MSB. For further information, see: <http://www.cwrdiversity.org/>.

The MSB is also working with other socio-economically important plants and will soon embark on a three-year project: Medicinal and Aromatic Plants of Pakistan - Well Documented, Effectively Conserved and Sustainably Used.

GSPC Target 10

Effective management plans in place to prevent new biological invasions and to manage important areas for plant diversity that are invaded.

- ☐ On track to achieve target at national level
☒ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

The UK has developed robust frameworks for the identification of invasive non-native species (INNS) and the prioritisation of their management. Comprehensive risk analysis processes are in place (including horizon scanning, risk assessment and risk management), as are new information systems and contingency plans to support rapid response. For more widespread species, long term management is being undertaken to control some, but not all, of the most problematic INNS, where feasible. In spite of this, the impact of INNS species in the UK remains significant and is continuing to increase across terrestrial, freshwater and marine environments (UK Biodiversity Indicator B6, <http://jncc.defra.gov.uk/page-4246>). For more details see Target 9 in Section III of this report.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

Investment in both staff and infrastructure has strengthened RBGE biosecurity and ensured development of robust policies and procedures for ex situ conservation and subsequent translocation (ecosystem recovery). This has leveraged external support from the EU funded EUPHRESCO-grant, allowing RBGE to increase its capacity as a data hub for conservation/horticultural pests/pathogens, aiming to isolate and tackle points of risk across the Botanic Garden sector.

The Scottish Government has funded a Scottish Centre of Expertise in Plant Health to act as a knowledge hub translating research information to practical advice and action. A particular focus of this has been to work across sectors, to encourage information flows between the Agricultural, Forestry, Horticultural and Natural Environment sectors, and to build capacity in plant health for the natural environment and biodiversity(<https://www.planthealthcentre.scot/>).

Examples of the UK's contribution internationally:

RBGE led the development of a forest health game platform – CALEDON – to enthuse and educate the next generation of plant health scientists, in collaboration with a team of games designers at Hyper Luminal Games. The game allows the player to manage their own virtual forest and is targeted primarily at teens and secondary school teachers. It communicates the importance of genetic diversity and its fundamental role in enabling tree populations to become more resilient. <http://hyperluminalgames.com/caledon/>.

RBG Kew works with various partners to identify, monitor and address the threat of invasive alien species. Examples include: RBG Kew's longstanding work in UK Overseas Territories (<http://www.kew.org/science-conservation/research-data/science-directory/projects/invasive-species-uk-overseas>), and producing field guides to help identify invasive species and instigate control measures (e.g. Upson, R., Myer, B., Floyd, K., Lee, J. & Clubbe, C. 2017. Field Guide to the Introduced Flora of South Georgia. Royal Botanic Gardens, Kew, Richmond).

Objective III: Plant diversity is used in a sustainable and equitable manner

GSPC Target 11

No species of wild flora endangered by international trade.

- ☐ On track to achieve target at national level
☒ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

Illegal wildlife trade is an urgent global issue, which not only threatens some of the world's most iconic species with extinction, but also damages sustainable economic growth and the livelihoods of vulnerable people in rural communities. In October 2018 the UK hosted the fourth in a series of global conferences on illegal wildlife trade. The conference declaration (<https://www.gov.uk/government/topical-events/london-conference-on-the-illegal-wildlife-trade-2018/about>) affirmed the participants' determination to tackle illegal wildlife trade as serious transnational organised crime, to work in partnership, and to reduce demand. More details of work undertaken by the UK are provided in the assessments of Targets 12 and 20 in Section III of this report.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is one of the key mechanisms through which the UK Government acts to protect endangered species of plants and animals. CITES uses a globally agreed system of licensing, including for import and export, or commercial use, of CITES 'specimens'. This is administered in the UK by the Animal and Plant Health Agency (APHA). Defra leads on CITES policy, with the Joint Nature Conservation Committee (JNCC) and the Royal Botanic Gardens, Kew (RBG Kew) providing scientific advice on animals and plants respectively.

The UK enforces CITES through the Control of Trade in Endangered Species (COTES) Regulations 2018. This enables the enforcement authorities, the Police, UK Border Force and the Animal and Plant Health Agency (APHA), to take action against non-compliance with CITES provisions. In addition, UK Border Force can use its powers under the Customs and Excise Management Act 1979 to enforce against CITES offences at the border.

Examples of the UK's contribution internationally:

RBGE has utilised its expertise in DNA-based identification of plants to provide tools for identification of species in trade. Standard protocols developed for DNA barcoding of plants are now used world-wide for practical plant identification. Recent applications include use of DNA based identification to support monitoring of illegal trade in cycads, and development of protocols to support monitoring of illegal trade of timber.

RBG Kew builds capacity to support local livelihoods and trade of CITES-listed plant species and ensuring the trade is sustainable and does not harm wild populations. For example, snowdrops (*Galanthus spp.*) are listed on CITES Appendix II. In 2009, a project was set up in Georgia to assess the status of wild and cultivated snowdrop populations, which concluded in an annual harvest quota of 15 million bulbs per year from the wild. Following on from the research, a monitoring system was implemented to assess the status of wild and cultivated snowdrop (*Galanthus woronowii*) populations in Georgia, and to establish opportunities for small stakeholders to participate in the trade, thereby supporting local livelihoods.

In 2016 RBG Kew initiated a three-year project looking at edible wild orchid trade in Zambia, funded by The Darwin Initiative (<http://eulophiinae.e-monocot.org/content/chikanda-zambia-wild-edible-orchids-darwin-initiative-project-2016-2019>). This project aims to understand the demand, trade and conservation of chikanda (edible orchids) in the southern African region in and around Zambia. The project is multifaceted, it works with women in local communities to develop community-led sustainable management strategies and conducting market surveys to improve knowledge of trade. Work on developing molecular barcodes aims to document chikanda orchid trade and support CITES regulation through species identifications. Specialist workshops on seed harvest and orchid cultivation for horticulture production and conservation of grassland orchids aim to build capacity within communities. Orchid conservation research, symbiotic culture and conservation assessments have also been conducted by experts at RBG Kew.

Research into the barcoding of *Aloe* DNA for identification of species from plant extract materials is currently ongoing and the Xylarium at RBG Kew is working on increasing the number georeferenced wild specimens of timber species to aid in the identification of CITES listed timber species illegally harvested and traded globally.

GSPC Target 12

All wild harvested plant-based products sourced sustainably.

- ☐ On track to achieve target at national level
☒ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

The scale of wild harvesting of plant-based products is unknown, but considered to be relatively small in scale. The legalities of foraging are governed by three main pieces of legislation in England: The Theft Act, 1968, The Wildlife and Countryside Act, 1981 and the Countryside Rights of Way Act, 2001. Equivalent legislation applies in Scotland, Wales, and Northern Ireland. Foraging for wild food stuffs has the potential to impact local populations if it is carried out in an unsustainable fashion: some landowners, such as the Woodland Trust, do not allow foraging to take place for commercial purposes, only for personal use <https://www.woodlandtrust.org.uk/visiting-woods/things-to-do/foraging/foraging-guidelines/>, and Scottish Natural Heritage have published a wild mushroom code <https://www.nature.scot/plants-animals-and-fungi/fungi>. In the absence of information about the levels of wild harvest that are occurring a conservative assessment of 'progress towards target' has been made, as if the 'on track' assessment were to be made that would have to be with a high degree of uncertainty.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

Organisations and businesses which encourage foraging of wild foods usually have guidelines on their websites – for example, Wild Food UK have a code of practice <https://www.wildfooduk.com/foraging-code/> which aims to guide those foraging in the wild to do so in a sustainable and responsible fashion.

RBGE has developed a one-health conservation platform that includes a school curriculum and Lifelong Learning programme targeted to edible urban gardening, supported by research enhancing understanding and conservation of wild crop relatives. Training has been provided to support wild sourcing, seed collection, horticultural growing and biosecurity, facilitating conservation by community groups and ensuring grassroots activism/enthusiasm is compatible with conservation best practice.

Examples of the UK's contribution internationally:

RBG Kew works in with its international partners to develop projects that address national conservation priorities. See for example:

- the Tropical Important Plant Areas project: <http://science.kew.org/strategic-output/tropical-important-plant-areas> The Itremo Massif project in Madagascar: <http://www.kew.org/science-conservation/research-data/science-directory/projects/itremo-massif-protected-area-project>
- Working with Angolan Protected Areas Expansion Strategy: <http://www.kew.org/science-conservation/research-data/science-directory/projects/assessing-plant-conservation>
- Identifying Tropical Important Plant Areas in UK Overseas Territories eg: <https://www.kew.org/science/projects/tropical-important-plant-areas-in-the-british-virgin-islands-bvi-tipas>

RBGE has utilised its expertise in DNA-based identification of plants to provide tools for identification of species in trade. Standard protocols developed for DNA barcoding of plants are now used world-wide for practical plant identification. Recent applications include use of DNA based identification to support monitoring of illegal trade in cycads, and development of protocols to support monitoring of illegal trade of timber.

GSPC Target 13

Indigenous and local knowledge innovations and practices associated with plant resources maintained or increased, as appropriate, to support customary use, sustainable livelihoods, local food security and health care.

- ☐ On track to achieve target at national level
☐ Progress towards target at national level but at an insufficient rate
☒ No significant change at national level

Please explain the selection above:

In the UK and Overseas Territories there are no indigenous peoples and local communities (IPLCs) as defined in Article 8j of the Convention. As a result GSPC Target 13 has been assessed as no significant change. The needs, knowledge and practices of IPLCs are recognised and integrated into the UK's international work.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of the UK's contribution internationally:

UK policy is to support other countries in maintaining traditional knowledge and practices. UK has strong work streams through the Darwin Initiative, International Climate Finance and others:

The Darwin Initiative

The Darwin Initiative is a competitive grant scheme focused on preserving and increasing biodiversity - animal and plant species and their habitats - in developing countries. Since its establishment in 1992 at the Rio Earth Summit, the Darwin Initiative has funded 1,123 projects in 159 countries, with £153m awarded by HMG.

Projects funded under the Darwin Initiative must support sustainable development in developing countries for the poverty reduction. Applications for funding must define the project's contribution to economic development and welfare, whether direct or indirect. All applicants must also consider whether and how their project will contribute to reducing gender inequality. Applicants are encouraged to design interventions that proactively contribute to increased equality, and to provide indicators disaggregated by gender where possible. Successful projects must refer to the actions undertaken for equality when reporting.

A complete list of Darwin Projects can be found online at:
<https://www.gov.uk/government/groups/the-darwin-initiative>. Illustrative examples of projects supporting the Aichi Targets have been provided in Section IV of this report.

International Climate Finance

In response to the global challenge posed by climate change, the Government has established International Climate Finance. This is a UK government commitment to support developing countries to respond to the challenges and opportunities of climate change. The UK is investing £5.8b between 2016 and 2021.

Projects run by the Royal Botanic Gardens, Kew

RBG Kew works with partners to ensure that traditional knowledge, innovations and practices of IPLCs are respected. Specific projects include:

1. Medicinal Knowledge in the Amazon <http://www.kew.org/discover/blogs/kew-science/medicinal-knowledge-amazon>.
2. Useful plants of Chimanimani mountains.
<https://www.kew.org/sites/default/files/Chimanimani%20Darwin%20report%2C%20FINAL.pdf>.

Objective IV: Education and awareness about plant diversity, its role in sustainable livelihoods and importance to all life on earth is promoted

GSPC Target 14

The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.

- ☒ On track to achieve target at national level
☐ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

A wide variety of communication, education and public awareness programmes are carried out across the UK, ranging from those at substantial visitor attractions such as the the Royal Botanic Gardens, Kew and Royal Botanic Garden Edinburgh, to activities of NGOs such as Plantlife and the Botanical Society of Britain and Ireland, and displays at many local attractions which often put plants in to a local and historical context. Traditional and social media outreach is also carried out, including gardening television programmes with elements on plant conservation.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

UK biodiversity Indicator A2: Taking action for nature: volunteer time spent in conservation (<http://jncc.defra.gov.uk/page-4253>) presents an index of the number of hours worked by volunteers for 13 UK conservation charities and public bodies. Extracting the information relating to the two charities focussed exclusively on plant conservation activities shows a long term-increase over the whole length of the dataset. The figure for 2017 is slightly lower than the peak in 2014, but is broadly stable for the last three years. The jump between 2013 and 2014 is a result of an increase in hours reported by the Botanical Society of Britain and Ireland for survey data input and analysis.

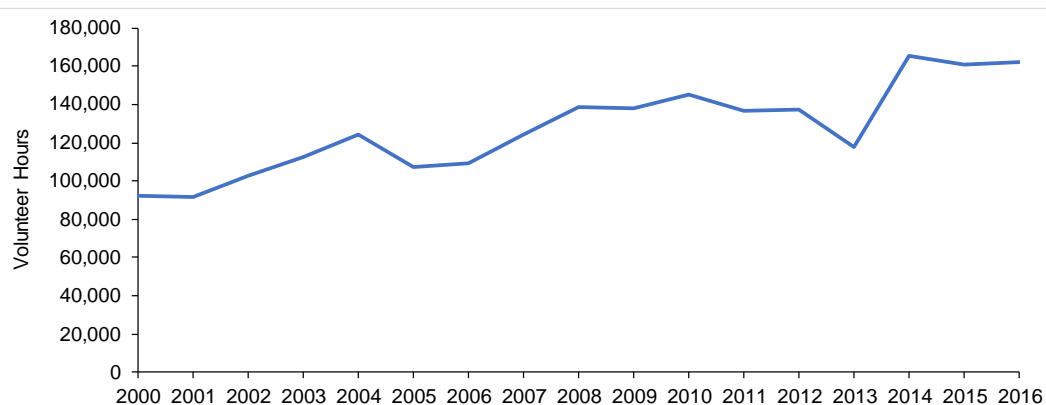


Figure 14.1. Total volunteer hours recorded by the Botanical Society of Britain and Ireland, and Plantlife from 2000 to 2017. Data for 2000 to 2006 for Plantlife are interpolated.

Since 2014 RBGE has taught an average of 10,000 adults and school children each year through its on-site and online education services (including on average 120,000 hours of direct contact with a tutor every year). RBGE's public engagement facilities are visited by almost one million visitors per year and are used to communicate information about plant biodiversity and conservation. RBGE is a major partner in the Edinburgh Living Landscapes project. This aims to build a network for nature in the city, provide benefits to local people and communicate the importance of biodiversity for health and well-being and the local economy. <https://edinburghlivinglandscape.org.uk/>.

RBG Kew has over 1.5 million visitors a year and 85,200 school visits (<https://www.kew.org/sites/default/files/20160425%20Kew%20valuation%20vFINAL.pdf>). RBG Kew staff provide 157 days of education to UK Master of Science students. This coincides with RBG Kew's science strategy (2015-2020) which has 'Science in the Gardens' and 'Training the next generation' as part of the outputs. In addition to the interpretation and science signs across the garden RBG Kew engages with the public through the science festival, a 3-day festival where the scientists have interactive stands relating to the work they do. RBG Kew staff run various tours such as 'meet the experts' and 'plant of the month' as well as joining city-wide initiatives such as 'Open House', a weekend of herbarium and nursery tours open to the public. The visitor numbers for 2016 were 828 visitors to the herbarium and 1,605 visits to the tropical nursery. These outreach events use the gardens to highlight the scientific research and conservation RBG Kew undertakes nationally and internationally. In the gardens there are also art galleries and installations which connect to the research undertaken in the gardens, the latest addition being The Hive: an artistic sculpture highlighting the importance of bees and pollination.

RBG Kew disseminates its science through social media reaching out to members of the public through numerous twitter profiles set-up from different science teams and the RBG Kew science blog. In 2016 RBG Kew launched the State of the World's Plants report and website which will be updated annually (<https://stateoftheworldsplants.org/>).

Outreach and biodiversity awareness is also raised out with the gardens such as the community driven initiative called Grow Wild. Through Grow Wild millions of people are doing something positive where they live; connecting with wild flowers, plants and places around them, taking notice of nature, getting active, learning new things and sharing their knowledge and enthusiasm (<https://www.growwilduk.com/>).

Progress towards this target is discussed further under Target 1 of Section III of the report.

Objective V: The capacities and public engagement necessary to implement the Strategy have been developed

GSPC Target 15

The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy.

- ☐ On track to achieve target at national level
☒ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

Training courses, both for professionals and amateurs, are widely available, and there is a multitude of UK expertise which can be drawn upon to teach local and international students in UK Universities. The UK has world leading institutions, but it is difficult to assess what would constitute an ‘appropriate’ number of people and facilities. Having noted that, it is likely that the number of taxonomic specialists in UK institutions has decreased in the last twenty years. Conversely, the development of the internet and online identification resources has made taxonomic resources and identification guides much more easily accessible.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

RBG Kew runs a portfolio of specialist training courses (www.kew.org/science/training-and-education) ranging from a 1-year MSc in Plant and Fungal Taxonomy, Diversity and Conservation to many short courses for plant conservation practitioners e.g. a 3-week Seed Conservation Techniques course at RBG Kew’s Millennium Seed Bank at Wakehurst (www.kew.org/science/training-and-education/short-courses/seed-conservation-techniques)

RBGE runs highly successful online learning courses via its ProPaGate Learning platform (<https://onlinecourses.rbge.ac.uk/>). This provides access to a wide range of botanical, horticultural and conservation courses.

RBGE also runs its internationally renowned flagship *Taxonomy and Biodiversity of Plants MSc*, which has been running for 25 years, and trained students from more than 50 countries.

The Field Studies Council <https://www.field-studies-council.org/> runs a wide variety of courses to enhance environmental understanding by all ages. Courses can be targeted at schools, universities, individuals, and for professional development – including a Masters of Science in Biological Recording in association with Manchester Metropolitan university.

The discipline of Taxonomy and Systematics in the UK has been the subject of a number of inquiries, including three reports by the House of Lords (1992, 2002, 2008). Following the report published in 2008 on the status of taxonomy and systematics in the UK by the House of Lords, the Natural Environment Research Council undertook a UK Taxonomy & Systematics Review. The report is available at:

<https://nerc.ukri.org/research/funded/programmes/taxonomy/>. It has informed subsequent work to provide taxonomic training at a variety of levels: for example the one day conference held by the Linnean Society of London in September 2018 on communicating the importance of taxonomy (<https://www.linnean.org/meetings-and-events/events/taxsyst-plenary-2018>).

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.

- ☒ On track to achieve target at national level
☐ Progress towards target at national level but at an insufficient rate
☐ No significant change at national level

Please explain the selection above:

At various scales the UK has networks and partnerships for plant conservation in place. The forums Plant Link and PlantNetwork have been established to further plant conservation and the delivery of the Global Strategy for Plant Conservation regional and nationally. Internationally, the UK is a world leader. RBG Kew and RBGE are members of a number of global partnerships including the Global Partnership for Plant Conservation. Moreover, in RBG Kew and RBGE the UK has world renowned institutions for plant conservation.

Please describe how and to what extent your country has contributed to the achievement of this GSPC Target and summarize the evidence used to support this description:

Examples of implementation actions in the UK:

Plant Link (PLINK, <http://www.plantlife.org.uk/uk/our-work/working-partners/plantlink>) is a forum for organisations to share information and work together to advance the conservation of wild plants. The network of PLINK organisations aims to take forward action to deliver the Global Strategy for Plant Conservation. Working towards the GSPC requires action at both the UK and country level therefore, there is a Plant Link UK (PLINK UK) group as well as country specific groups called Plant Link Scotland (PLINKS), Plant Link Cymru (PLINC) and Plant Link England (PLINK England).

PlantNetwork (<https://plantnetwork.org/>) is the national network of botanic gardens, arboreta and other documented plant collections. PlantNetwork promotes botanical collections in Britain and Ireland as a national resource for research, conservation and education and facilitates networking and training among holders of plant collections through a programme of conferences and workshops and a regular newsletter and a well referenced website.

The Chartered Institute of Horticulture (<https://www.horticulture.org.uk/>) is the authoritative organisation representing those professionally engaged in Horticulture in the UK & Ireland. Its membership comprises, and represents, those that are involved in amenity horticulture, parks, landscaping, botanic/heritage gardens, and the full range of horticulture within leisure industries as well as those producing, managing, growing and marketing all edible and decorative horticultural crops, allied research, education and consultancy.

In Scotland, key partnerships include RBGE's founder membership of the Edinburgh Living Landscape project (<https://edinburghlivinglandscape.org.uk/> biodiversity provision in urban environments and population centres), and the Atlantic Woodland Alliance, aiming to achieve collaborative conservation of Britain's internationally-important Atlantic wet woodlands. This conservation work has become widely consultative, reflecting delivery of Targets outside the protected site system and requiring new partnerships. Businesses and local communities have been actively drawn into the discussion of biodiversity linked to individual and societal needs, with RBGE developing bespoke natural capital projects (e.g. Square Metre for Butterflies) and specific training to affect delivery, e.g. local community co-designed projects drawing on EU Green Infrastructure and HLF funding.

Examples of the UK's contribution internationally:

RBGE and RBG Kew are members of the Global Partnership for Plant Conservation (<http://www.plants2020.net/gppc/>), working with other botanic gardens to develop future thinking for the Global Strategy for Plant Conservation, and is involved in several IUCN plant specialist groups. At a global scale, input to the World Flora online project (GSPC Target 1) and the International Barcode of Life Project, represent major inputs to GSPC goal of understanding plant diversity. This is paralleled by regional partnerships and networks for mega-diverse areas, for example by RBGE's leadership role in DRYFLOR (neotropical dry forest network), and its collaborative horticultural training with the China Union of Botanic Gardens to expand horticultural expertise in China.

Section VI. Additional information on the contribution of indigenous peoples and local communities

Using the template below, please provide any additional information on the contribution of indigenous peoples and local communities to the achievement of the Aichi Biodiversity Targets if not captured in the sections above

VI. Additional information on the contribution of indigenous peoples and local communities to the achievement of the Aichi Biodiversity Targets if not captured in the sections above

Please provide any additional information on the contribution of indigenous peoples and local communities to the achievement of the Aichi Biodiversity Targets if not captured in the sections above.

In the UK and Overseas Territories there are no indigenous peoples and local communities (IPLCs) as defined in Article 8j of the Convention and Target 18 has therefore not been assessed. The needs, knowledge and practices of IPLCs are recognised and integrated into the UK's international work.

Section VII. Updated biodiversity country profile

Please review and update your country's biodiversity profile currently displayed on the clearing-house mechanism. Biodiversity country profiles provide an overview of information relevant to your country's implementation of the Convention.

VII. Updated biodiversity country profile (Please review and update the text currently displayed at <https://www.cbd.int/countries>⁴)

Biodiversity facts

Status and trends of biodiversity, including benefits from biodiversity and ecosystem services and functions:

The United Kingdom is made up of four countries: England, Scotland, Wales and Northern Ireland, as well as [14 Overseas Territories and 3 Crown Dependencies](#) (see below). The development and implementation of biodiversity policy in the UK is largely devolved and delivered through country plans and strategies. Action is coordinated through the UK post-2010 Biodiversity Framework which sets out how the countries work together to meet the CBD Aichi targets and those of the EU Biodiversity Strategy and through the UK Marine Strategy which provides a framework country implementation in the marine environment. Within the UK Government, the Department for Environment, Food and Rural Affairs ([DEFRA](#)) is the lead government department for the implementation of the CBD. Given the scope of the CBD, a number of government departments support its implementation. Defra and other government departments work closely with stakeholders through advisory groups, consultations and other partnerships. This includes voluntary organisations, local authorities, land owners and managers, research institutions and the private sector.

The 'metropolitan' UK (England, Scotland, Wales and Northern Ireland) has a diverse mix of habitats and species for its small size (approximately 240,000km²); with a marine area approximately 3.5 times the size of the land area. The main factors that lead to this range of biodiversity are the diversity of geology, landforms and sea floors, the long history of land management, the warming effect of the Gulf Stream, and a large tidal range. These factors create:

- productive and varied seas which harbour globally significant numbers of fish, seabirds and sea mammals;
- abundant and diverse wildlife along a great length of coastline that comprise high cliffs, expanses of productive estuarine habitats on which wintering waterbirds can be found in densities as high as anywhere else in the world; the UK's estuaries are a crucial link in the migratory chain for waders and wildfowl;
- a patchwork mix of traditional land uses, semi natural habitats and settlements in the South and East that include important areas for biodiversity such as heathlands, bluebell woods, chalk downland, broads, and fens; the UK has 20% of Europe's lowland heathland;
- wet oakwoods along the western seaboard, supporting important assemblages of mosses, ferns, lichens and liverworts;
- large tracts of sparsely populated upland and mountain areas of the North and West that support many relict populations of species surviving from the last Ice Age and provide a wealth of 'ecosystem services' in the form of water provision,

⁴ Note: If the online reporting tool is being used, the text of the current biodiversity profile will be displayed. A time stamp will be added to indicate the date when the update was published.

carbon capture in the continually forming peat and traditional practices such as grouse shooting and the distillation of whisky;

- an intricate web of freshwater habitats including rivers, lochs, freshwater lakes, waterfalls, coastal lagoons, reedbeds etc, for instance the UK has approximately 13% of the world's blanket bog.

The UK's ground breaking [National Ecosystem Assessment](#) (NEA, published in 2011, follow-on phase published in 2014) presents a thorough account of the ecosystem services provided by biodiversity that are essential for national social and economic wellbeing. The NEA shows the enormous value of biodiversity to the UK; for example the value that inland wetlands give to water quality and the value of pollination to agriculture. Much of the evidence on status and trends of biodiversity is provided by the [UK Biodiversity Indicators](#), which are published annually. The UK Biodiversity Indicator information used to inform this profile, and the UK's 6th National report to the CBD, is based on the 2018 update of the indicators (more recent updates of the indicators are available on [JNCC's website](#)). The [UK Biodiversity Indicator for protected areas](#) demonstrates that the area of terrestrial and freshwater habitats with [protected status](#) has increased to 28% in 2018 and the protected areas at sea has increased to c24% in 2018. Additionally, the condition of many of these protected sites, particularly Sites of Special Scientific Interest (SSSIs), has been improving because of management interventions.

In the marine environment, [Charting Progress 2](#) (published in 2010) is a comprehensive report on the state of the UK seas, outlining the progress being made towards the UK's vision for healthy and biologically diverse seas. This work evolved and was further updated by the publication in 2017 of the [OSPAR Intermediate Assessment](#). Charting Progress 2 was used to formulate the [UK Marine Strategy in 2012](#). The UK is updating the UK Marine Strategy to implement the European Union Marine Strategy Framework Directive (MSFD) and national environmental targets, it is due to be published in 2019. The UK's seas are important for their variety of benthic habitats and high overall biodiversity. The improvements in the sustainability of UK fishing is demonstrated by the indicator on fish-size classes that shows the proportion of large fish in the North Sea rose from a low of 4.4% in 2001 to 16.4% in 2016.

Main pressures on and drivers of change to biodiversity (direct and indirect):

The key drivers of change across terrestrial biodiversity in the UK, as identified in the NEA, are habitat change (land-use/condition) and pollution. Other threats to UK biodiversity are over-exploitation, invasive species, and climate change. As identified in [Charting Progress 2](#), the main threats to the marine environment are fishing pressure, climate change, acidification, hazardous substances, and eutrophication.

Measures to enhance implementation of the Convention

Implementation of the NBSAP:

The UK has overall responsibility for the environment and biodiversity but biodiversity policy is devolved in the UK; each country has developed national biodiversity strategies which underpin the '[UK Post-2010 Biodiversity Framework](#)':

- England: [Natural Environment White Paper](#), [Biodiversity 2020: A strategy for England's wildlife and ecosystem services](#), [Soils Strategy](#), [UK Marine Strategy](#) and the [25 Year Environment Plan](#).

- Northern Ireland: [Valuing Nature: A Biodiversity Strategy for Northern Ireland to 2020](#) and the [State of the Environment Report for Northern Ireland](#).
- Scotland: [2020 Challenge for Scotland's Biodiversity](#), [Scotland's Biodiversity - A Route Map to 2020](#), [Aichi targets report](#).
- Wales: [Nature Recovery Action Plan for Wales \(setting the course for 2020 and beyond\)](#).

The [UK high-level marine objectives](#) set out how the UK can achieve its vision to have 'clean, healthy, safe, productive and biologically diverse oceans and seas'

Overall actions taken to contribute to the implementation of the Strategic Plan for Biodiversity 2011-2020:

A suite of actions have been undertaken by the UK to achieve the Aichi Biodiversity Targets. The priority actions are set out in the UK Biodiversity Framework and the country strategies listed above. Progress and outcomes are being assessed using UK and country-level indicators, and reports on the UK Biodiversity Framework's implementation plan. Further details on actions taken to achieve the Aichi targets are outlined in the UK's 6th National Report.

Support mechanisms for national implementation (legislation, funding, capacity-building, coordination, mainstreaming, etc.):

The UK has a number of mechanisms to support national implementation; one important driver for mainstreaming biodiversity into other sectors, for instance through legislation which places a 'statutory duty' on all public bodies to account for biodiversity when conducting their function. Each country has listed priority habitats and species which are the subject of the duty. Additionally, spatial planning legislation and policies include safeguards for biodiversity and ecosystems, as well as requirements for Environmental Impact Assessments (EIAs) on some developments.

Particular success has been achieved in [mainstreaming biodiversity within agriculture policy](#), with 2.8 million hectares of farmland under higher-level agri-environment schemes in 2017, as well as with forestry and planning policy. However, mainstreaming is a continuing challenge and further work is needed to integrate concern for biodiversity in other sectors. Key to this is the growing understanding of the value of biodiversity and ecosystem services, particularly as a result of the work of TEEB ([The Economics of Ecosystems and Biodiversity](#)).

Monetary support for national implementation is increasing in the long term as demonstrated by the [2018 update of the UK Biodiversity Indicator](#) measuring expenditure on biodiversity in the UK and internationally. Between 2000-01 and 2016-17, public sector spending on UK biodiversity increased in real terms (to £445 million in 2016-17). UK public sector funding for international biodiversity in 2016-17 totaled £76 million; a real-term increase of 24% over the last 5 years.

The UK funded the [Ecosystem Services for Poverty Alleviation](#) (ESPA) research programme between 2009 and 2018; a nine year global interdisciplinary research programme that aimed to give decision-makers and natural resource users the evidence they need to address the challenges of sustainable ecosystem management and poverty reduction. The programme was developed by the UK government in response to the findings of the 2005 Millennium Ecosystem Assessment that substantial gains in human

well-being in recent decades have been achieved at the expense of high and often irreversible levels of ecosystem degradation. The UK is also supporting the implementation of '[Wealth Accounting and the Valuation of Ecosystem Services](#) (WAVES)' to establish environmental accounts in six to ten countries, develop guidelines for ecosystem accounting, and promote environmental accounting.

The UK is aiming to protect habitats and species in our seas by contributing to an ecologically coherent network of marine protected areas. The Marine and Coastal Access Act 2009 provides the legal mechanism to [protect and sustainably use the marine environment](#), included within the act is the designation of Marine Conservation Zones (MCZs), a type of marine protected area. MCZs protect areas that are important to conserve the diversity of nationally rare, threatened and representative habitats and species. Designation of these zones takes social and economic factors into account, alongside the best available scientific evidence. An [interactive map](#) of the Marine Protected Areas in the UK allows exploration of the sites designated to date.

Mechanisms for monitoring and reviewing implementation:

The UK recognises the importance of having an evidence-based approach and as such has collected a great deal of information about its biodiversity. One key source based on this information is the [UK set of Biodiversity Indicators](#); these provide an effective means of assessing and communicating progress on implementation.

The UK Biodiversity Indicators were reviewed in 2011, to ensure that they were based on robust data and to fit them to the Strategic Plan for Biodiversity 2011-2020 and its 20 Aichi Biodiversity targets.

UK Overseas Territories (OTs) & Crown Dependencies (CDs)

In addition to numbers of globally threatened species, the Overseas Territories also hold regionally or globally important concentrations or assemblages of species. For example, Ascension Island supports the second largest green turtle rookery in the Atlantic; Gough Island (Tristan da Cunha) has been described as, arguably, the most important seabird island in the world; and the reefs of the Chagos Archipelago (British Indian Ocean Territory) are some of the most pristine and best protected in the Indian Ocean (and account for some 1.3% of the world resource). The importance to nature conservation of parts of the Territories is recognised through the designation of Gough Island & Inaccessible Islands (Tristan) and Henderson Island (Pitcairn) as World Heritage Sites for their insular natural heritage interests.

There is an increasing awareness in the OTs & CDs of the importance of biodiversity and the vital ecosystem services it provides. Biodiversity Strategies and/or National Biodiversity Action Plans have been developed for some of the OTs & CDs. These, combined with other policies, strategies and initiatives, and UK funded work such as the [Darwin Plus programme](#) underpin work to conserve the wildlife and habitats. These are outlined below.

The Convention on Biological Diversity (CBD) has been extended to 6 OTs and 2 CDs (British Virgin Islands, Cayman Islands, Gibraltar, South Georgia & South Sandwich Islands and St Helena, Ascension & Tristan da Cunha, Falkland Islands; and Isle of Man and Jersey).

- **British Virgin Islands**

BVI are in the process of introducing an Environmental Management, Biodiversity Conservation and Climate Change Adaptation Bill in building BVI Greener. A Biodiversity Action Plan for Anegada was developed in 2006 through Darwin Plus.

- **Cayman Islands**

The Cayman Islands [Biodiversity Action Plan](#) was produced in 2009.

- **Gibraltar**

Biodiversity forms part of Gibraltar's [Environmental Action & Management Plan](#). Terrestrial aspects are elaborated further in the [Gibraltar Nature Reserve Management Plan](#) published in 2016. Gibraltar has also produced specific plans for its Marine Protected Areas such as the [Southern Waters of Gibraltar Management Scheme in 2012](#). A revised version of the plan, incorporating the MPAs designated in 2014 in British Gibraltar Territorial Waters, is being published in 2018.

- **South Georgia & South Sandwich Islands**

South Georgia and the South Sandwich Islands recently released their [National Biodiversity Action Plan](#) which runs from 2016-2020

- **St Helena, Ascension & Tristan da Cunha**

St Helena

St Helena's Environmental Protection Ordinance was published in 2016; Part 6 focuses on the conservation of biodiversity.

The recent Darwin Plus project has mapped [St Helena's Biodiversity and Natural Environment](#)

Laying the foundations for invertebrate conservation in St Helena: DPlus029
<http://www.darwininitiative.org.uk/project/19029/>

Ascension

In 2013 the [Wildlife protection Ordinance](#) was published, followed by the [Fisheries \(Conservation and Management\) Ordinance](#) in 2015. Information on [conservation](#) activities undertaken on the island is available on the Ascension Island Government website.

Tristan da Cunha

In 2006 the [Conservation of Native Organisms and natural habitats \(Tristan da Cunha\) Ordinance](#) was published. The 2014 [Biodiversity Action Plan for the Tristan da Cunha Islands](#) replaces the 2012 publication.

- **Falkland Islands**

The Falkland Islands vision for the environment is set out in the [Falkland Islands Biodiversity Framework \(2015-30\)](#).

- **Isle of Man**

The Isle of Man recently published its [Biodiversity Strategy: Managing our Natural Wealth, The Isle of Man's First Biodiversity Strategy](#), which runs from 2015-2025.

- **Jersey**

Jersey released its first [Biodiversity: a Strategy for Jersey](#) in 2000 and [Biodiversity Action Plans for Jersey](#) have followed.

Additional sources of information include:

UK – blue belt programme <https://www.gov.uk/government/publications/the-blue-belt-programme> UK government's commitment to provide long term protection for the marine environment.

JNCC's ongoing [Natural Capital in the Caribbean and South Atlantic Overseas Territories](#) project will provide an assessment of natural capital in the UK's Caribbean and South Atlantic Overseas Territories

EU Biodiversity and Ecosystem Services in Territories of European overseas (BEST) [Ecosystem Profiles for the OTs](#) and [projects](#).

APHA – UK Government funded work on Invasive non-native species in the UKs Overseas Territories <http://apha.defra.gov.uk/apha-scientific/services/wildlife-management/invasive-non-native-species.htm>.

CEFAS data hub <https://www.cefasc.co.uk/cefasc-data-hub/>.

Kew - Tropical Important Plant Areas in the British Virgin Islands <https://www.kew.org/blogs/kew-science/tropical-important-plant-areas-british-virgin-islands-0>.

RSPB ongoing project; The UK Overseas Territories - The UK's hidden natural treasures <https://www.rspb.org.uk/our-work/conservation/projects/uk-overseas-territories-hidden-natural-treasures/>.

Conserving Species and sites of international importance by the eradication of invasive alien species in the Caribbean UK OTs. http://ec.europa.eu/environment/nature/biodiversity/best/pdf/fs_rspb_final.pdf.

UK Overseas Territories Conservation Forum's Review of performance by 2016 of UK Overseas Territories and Crown Dependencies in implementing the 2001 Environment Charters or their equivalents and moving towards the Aichi Targets and Sustainable Development Targets <https://www.ukotcf.org.uk/implementation>.