Institute for European Environmental Policy

Study on identifying the drivers of successful implementation of the Birds and Habitats Directives

under contract
ENV.F.1/FRA/2014/0063

Final Report

1 March 2019

eco logic

ICF

Deloitte.

denkstatt
create sustainable value

PBL Netherlands Environmental Assessment Agency

BirdLife INTERNATIONAL

Authors

This main report was primarily written and prepared by Graham Tucker and Tom Stuart (IEEP), Sandra Naumann, Ulf Stein and Ruta Landgrebe-Trinkunaite (Ecologic), and Onno Knol (PBL).

It draws on information gathered during the study that was compiled as a Genuine Improvements Database and analysed by Ulf Stein and Ruta Landgrebe-Trinkunaite of Ecologic. The database and report include new information on bird population trends that was provided by Anna Staneva and Rob Martin (BirdLife International Secretariat) in conjunction with the following national BirdLife partner experts: Åke Pettersson (SOF), Ana Carricondo (SEO BirdLife), Andres Kalamees (EOY), Christina Ieronymidou (BirdLife Cyprus), Ciprian Fântâna (SOR), Claudion Celada and Marco Gustin (LIPU), Damijan Denac and Primož Kmecl (DOPPS - BirdLife Slovenia), Gwenaël Quaintenne (LPO), Halmos Gergő (MME), Harm Dotinga (VBN), Jarosław Krogulec (OTOP), Joaquim Teodósio (SPEA), Lars Lachmann (NABU), Liutauras Raudonikis (LOD), Marc Herremans (Natuurpunt), Nicholas Barbara (BirdLife Malta), Olivia Crowe (BirdWatch Ireland), Stoycho Stoychev (BSPB), Teemu Lehtiniemi (BirdLife Suomi), Viesturs Ķerus (LOB) and Zdeněk Vermouzek (CSO).

This report is also based on the case studies prepared as part of this study, which are published separately (with their summaries in Annex 10). The case study authors were: Gustavo Becerra Jurado, Erik Gerritsen, Mia Pantzar, Tom Stuart, Graham Tucker and Evelyn Underwood (IEEP), Constance von Briskorn, Pauline Cristofini and Katherine Salès (Deloitte), Denitza Pavlova (denkstatt), Katrina Abhold, Lina Röschel, Ruta Landgrebe-Trinkunaite (Ecologic Institute), Marjon Hendriks, Arjen Van Hinsberg, Onno Knol and Pim Vugteveen (PBL).

Additional contributions to this report were received from Rupert Haines and Matt Rayment of ICF on marine conservation measures, and the factors affecting long-term success of conservation measures, respectively.

Recommend citation for this report: Tucker, G, Stuart, T, Naumann, S, Stein, U, Landgrebe-Trinkunaite, R and Knol, O (2019) *Study on identifying the drivers of successful implementation of the Birds and Habitats Directives*. Report to the European Commission, DG Environment on Contract ENV.F.1/FRA/2014/0063, Institute for European Environmental Policy, Brussels.

Acknowledgements

We thank the numerous contributors to this study, including the Member State experts who responded to the consultation and especially those who provided additional data on the habitats and species that were considered to have shown measure driven improvements. We are also especially grateful to the experts and stakeholders who provided the information and took part in the interviews that were essential for the development of this contract's case studies (in which they are listed). We also thank Bent Jepsen and Darline Velghe of NEEMO GEIE, and numerous NEEMO national LIFE project monitoring officers, who facilitated the information gathering for the case studies; and Lynne Barratt, María José Aramburu, João Salgado and Sara Mora Vicente who provided information on success marine LIFE projects.

Lastly we are grateful to Frank Vassen, Angelika Rubin, Francoise Lambillotte and other members of the European Commission who provided guidance and information during the study and assisted with the Member State consultation process.

Disclaimer

The information and views set out in this report are those of the authors and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use which may be made of the information contained therein.

This study was carried out under a European Commission framework service contract on "Economic Analysis of Environmental and Resource Efficiency Policy" (ENV.F.1/FRA/2014/0063) involving the following complete consortium.

Lead contractor:

Institute for European Environmental Policy

London Office
11 Belgrave Road
IEEP Offices, Floor 3
London, SW1V 1RB
UK
Tel: +44 (0) 20 7799 2244
Fax: +44 (0) 20 7799 2600

Brussels Office
4 Rue de la Science
B- 1000
Brussels
Belgium
Tel: +32 (0) 2738 7482
Fax: +32 (0) 2732 4004

Joint tenderers:

- **Institute for European Environmental Policy (IEEP),** UK;
- **Stichting VU-VUmc - Institute for Environmental Studies (IVM),** Netherlands;
- **PBL Netherlands Environmental Assessment Agency,** Netherlands;

Sub-contractors:

- **Cambridge Econometrics Limited**, UK;
- **Deloitte Conseil**, France;
- **Denkstatt GmbH**, Austria;
- **Ecologic Institute gemeinnuetzige GmbH**, Germany;
- **ENVECO, S.A.,** Greece*;*
- **FEEM Servizi S.r.l.,** Italy;
- **ICF Consulting Services Ltd**, UK;
- **Independent expert - Francisco Greño**, Spain*);*
- **Instituut voor Toegepaste Milieu-Economie (TME),** Netherlands*;*
- **International Institute for Applied Systems Analysis (IIASA),** Austria*;*
- **Serveis de Suport a la Gestio (ENT Environment and Management),** Spain*;*
- **Sustainable Europe Research Institute (SERI),** Austria;
- **Transport & Mobility Leuven (TML),** Belgium*;*
- **University of Westminster - Policy Studies Institute (PSI),** UK; and
- **Vlaamse Instelling voor Technologisch Onderzoek NV (VITO NV),** Belgium.

In addition BirdLife International UK provided sub-contracted inputs for this particular study.

Table of Contents

GLOSSARY

BD	Birds Directive (2009/147/EC, version of 79/409/EEC)
BD birds	Bird species listed on Annexes I and II of the Birds Directive that are also trigger species for the designation of Special Protection Areas
CAP	Common Agricultural Policy
EIA	Environmental Impact Assessment
EEA	European Environment Agency
ETC-BD	European Topic Centre on Biological Diversity
EU	European Union
ERDF	European Regional Development Fund
HD	Habitats Directive (92/43/EEC)
HD species	Species listed on Annexes II, IV and V of the Habitats Directive
FCS	Favourable Conservation Status
GI	Genuine Improvement (as defined on page 16)
MDI	Measure Driven Improvement(s) (see page 16)
MPAs	Marine Protected Areas
MSFD	Marine Strategy Framework Directive (2008/56/EC)
NEC	National Emission Ceilings Directive (2001/81/EC)
NGO	Non-Governmental Organisation
PAF	Prioritised Action Framework
RDP	Rural Development Programme
SAC	Special Areas of Conservation
SEA	Strategic Environmental Assessment
SCI	Site of Community Importance
SPA	Special Protection Area
SR MDI	Sub-reporting level Measure Driven Improvement
WFD	Water Framework Directive (2000/60/EC)

EXECUTIVE SUMMARY

Study on identifying the drivers of successful implementation of the Birds and Habitats Directives

Objectives and methods

The EU Birds Directive and Habitats Directive (i.e. the Nature Directives) form the cornerstone of the EU's biodiversity conservation policy framework. The Birds Directive aims to achieve the good conservation status of all wild bird species naturally occurring in the EU territory of the Member States. This concept is further developed and defined in the overall objective of the Habitats Directive, which is to maintain or restore habitats and species of community interest to Favourable Conservation Status (FCS).

Despite the actions being taken to implement the Nature Directives, and the broader EU Biodiversity Strategy to 2020, the Member States' most recent reports under Article 12 of the Birds Directive (for 2008-2012) and Article 17 of the Habitats Directive (for 2007 to 2012), indicate that substantial proportions of species and habitats remain threatened or have an unfavourable conservation status. Although the situation has stabilised for a number of habitats and species, little progress has been made in improving the status of most habitats and species (as required under Target 1 of the EU Biodiversity Strategy). Whilst there have been many local successes that demonstrate that actions can deliver positive outcomes, these need to be scaled up to have wider impacts that can reverse negative trends and achieve overall improvements in status.

This study has been undertaken to help scale up and more widely implement successful conservation measures, thereby supporting follow up to the Nature Directives Fitness Check, including the European Commission's Action Plan on Nature, People and the Economy. In particular, it aimed to achieve this by:

1. providing a compilation of all Genuine Improvements that Member States have reported with regard to positive trends of individual habitat types or species (covered by both Nature Directives), and, furthermore, to identify the main success factors explaining these improvements (the "drivers of success").

2. on the basis of the above findings in relation to the key drivers of success, providing a series of 'lessons learnt' and recommendations for the Commission and for Member State authorities, on how the above finding should be followed up with a view to enhance and up-scale implementation, as well as to improve the accompanying reporting and monitoring processes.

For the purposes of this study **Genuine Improvements** were considered to be any improvements that are real rather than due to better data or improved knowledge, irrespective of the cause of the improvement.

The specific tasks that were carried out under this study and led to this report were:

1. The establishment of a database list of Genuine Improvements and associated main drivers explaining the successes:
   a. Establishment of a list of identified Genuine Improvements (status improvements or positive trends) in the conservation status of species and habitat types.
   b. Identification of the main drivers explaining these Genuine Improvements.

2. Carrying out an in depth assessment of the drivers of success in a representative sub-set of examples – which led to the preparation of 53 case studies.
3. Drawing strategic lessons and technical recommendations.

Tasks 1b, 2, 3 and 4 focussed on **Measure Driven Improvements (MDI)**, which are cases of Genuine Improvement that are considered to have been the result of intentional environmental measures, whether or not they were targeted at the habitat or species in question, or other habitats and species, or were more general environmental measures (e.g. to reduce pollution).

The study was carried out by firstly examining the wealth of detailed information on the implementation of the Nature Directives from the results of the Article 12 and Article 17 reporting by Member States, including on the status of species and habitats, and the trends of habitats and species with an unfavourable status (as Member States are required to report on them). The reporting data also provides standardised information on pressures and threats affecting habitats and species, and the measures taken to address them and their impacts. This provided an opportunity for an objective and quantifiable analysis of the drivers of successful implementation of the Nature Directives and their ability to lead to positive improvements in habitats and species. Secondly, drivers of success were also identified by investigating particularly effective examples of actions that have improved the status of habitats and species, through some focussed literature reviews and the preparation of the case studies, which also involved consultations with nature conservation authorities, NGOs and other stakeholders.

Identification of Genuine Improvements and Measure Driven Improvements

The first task established a Genuine Improvements Database (GID), which includes all national and sub-national cases for Habitats Directive Annex I habitats and Annex II, IV and V species (hereafter HD species), as well as species listed under Annex I or II of the Birds Directive that are also Special Protection Area (SPA) trigger species (hereafter BD birds) that were considered to show Genuine Improvements in status and/or positive trends in one or more assessment parameters (i.e. area and structure and functions for habitats, and range and population size for species).

Habitats and HD species that have shown Genuine Improvements in their conservation status were identified using Article 17 reporting data as Member States are required to indicate reasons for changes in their assessments of conservation status. The identification of Genuine Improvements in birds used Article 12 Member State reporting data, but had to use different criteria due to differences in the reporting approach and data, most importantly a lack of information on whether observed changes are genuine. To be consistent with the approach taken by the EEA in the *State of Nature Report*, BD birds were considered to have shown a Genuine Improvement if they had increasing EU populations over the short-term (2001-2012), irrespective of their long-term trend (i.e. 1980-2012); or stable and fluctuating short-term EU populations, in the face of long-term declining trends. In order to attempt to screen out unreliable changes, genuine improvements in birds were only identified if the Member State report categorised the species' long-term monitoring data quality as good or moderate; and the short-term monitoring data quality as good. In addition, to attempt to overcome the lack of information on reasons for change, BirdLife International experts were asked to carry out an initial validation. The identification of 'sub-reporting' unit improvements was carried out by national experts and via the LIFE project database.

Member State experts within the competent nature conservation authorities were asked to validate the identified Genuine Improvements and offered the opportunity to fill data gaps. Eighteen Member States responded to this request.

Overall, 91 Genuine Improvement cases for habitats (including 20 sub-reporting level), 195 cases for HD species (including 24 sub-reporting level) and 638 cases for BD birds species (including 1 sub-reporting level) were identified. It is important to note that the number of cases of Genuine Improvements in habitats and HD species was significantly limited by data gaps, with none being identified for Bulgaria and Romania (and Greece and Croatia due to the lack of Article 17 data), and less than ten Genuine Improvements were identified in each of ten other Member States. This had a significant constraint on the rest of the study. Due to the relatively limited numbers and to avoid further gaps in Member State coverage, non-validated Genuine Improvements were retained in the GID and subject to further analysis in the study.

The subsequent analysis focussed on MDI, which were initially identified using the Member State Article 12 and 17 data. Specifically species and habitats that have shown Genuine Improvements and have one or more listed conservation measures that were evaluated by the Member State as 'Maintain' or 'Enhance' are considered to be examples of MDI. However, as information on conservation measures was not supplied by the Member States for the explicit purpose of identifying MDI, Member States authorities were asked to validate these MDI, as well as provide further detailed information on the type of measures taken and their impacts, in order to help identify drivers of success. Thirteen Member States responded to this request.

Overall, 80 MDI were identified for habitats, 133 for HD species and 455 for BD birds. In part as a result of data gaps in the Art 12 and 17 reports, and incomplete responses to validation requests, the representation of MDI was very uneven across biogeographical regions, Member States, broad habitats and species groups. Most notably, a high proportion of MDI arise from the continental and Atlantic biogeographical regions, and to a lesser extent the boreal region for habitats, and the Alpine region for species. The largest group of MDI cases relate to coastal habitats, with most others from five other habitat types: freshwater, forests, grasslands, bogs and dunes. No MDI for any marine habitats were identified.

Analysis of the information in the GID on factors that may affect the success of conservation measures was carried out, e.g. the role of protected areas, action plans, site management plans, funding sources (LIFE, CAP etc.), enforcement actions, and stakeholder's engagement. The results of this and their representivity and reliability was constrained by the relatively low number of responses received from Member States to the request for information on these factors. Nevertheless, it provided some indicative evidence that was taken into account in the identification of drivers.

Case studies of Measure Driven Improvements

To supplement the analysis of the Article 12 and 17 data, and additional information provided by Member States on MDI, representative case studies were carried out to ascertain who, when and by whom the MDI had been achieved, giving particular attention to how the improvements are to be maintained in the long-term. An important aim of this was to ensure that they are as representative as possible of the range of Member States, biogeographic regions, habitat and species groups that had shown MDI, and to provide insights of wide relevance. Case study selection criteria were therefore agreed, and an initial list of possible case studies identified drawing on information in the GID, recommendations made by Member States during the MDI consultation process and consultations with DG Environment desk officers and the LIFE monitoring team.

Following the screening and consultations, 71 apparently suitable case studies were identified and contacts made with key practitioners and other experts involved in the case to check their suitable and the availability. As a result of this some case studies were dropped due to doubt over whether they were indeed a reliable or good example of MDI, or because insufficient information was available to prepare a sufficiently insightful case study report. As a result the final number of case studies that were taken forward and completed was 53. Many of the case studies relate to MDI in the Atlantic

Biogeographical region (14) and there is a relatively high proportion covering coastal habitats (4), mammals (9) or birds (17). In contrast, primarily due to their limited identification as MDI, there are no or very few case studies for Macronesian, Steppic, Marine Baltic and Marine Mediterranean biogeographical regions, inland and Mediterranean sand dunes, Mediterranean scrubland habitats, rocky habitats and marine species (other than birds).

Therefore, although every effort was made to provide a coherent and representative sample of case studies as possible, their findings should also be interpreted with their limited representivity in mind, and therefore treated as illustrative. It is also important to note that the case studies do not necessarily represent the best examples of conservation measures for the habitats and species that were covered, or of the approaches and methods that they illustrate, and they may not have resulted in the most significant improvements. Nevertheless they provide a valuable body of information that provides numerous insights on many of the drivers of the MDI.

Identification of drivers of success and key lessons

The identification of drivers of success and key lessons in this study was primarily based on a combined analysis of the collated evidence from the results of the analysis of the GID (i.e. Article 12 and 17 data and additional information from Member States on factors affecting conservation actions) and, in particular the lessons drawn from the case studies. In addition, key selected literature sources were referred to, in particular relating to the factors that influence the long-term impacts of nature conservation interventions (most of the information collated in this study was on relatively short-term interventions) and marine conservation measures (due to the lack of identified marine MDI).

The analysis of key drivers focussed on a set of key questions of particular interest identified by the European Commission in this study's terms of reference, and the most important conclusions from these in relation to their broad themes are summarised below.

The role of political support, governance, institutions and their staff

There is wide evidence that strong and coherent governance, with effective supporting institutions, (especially nature conservation authorities, but also others involved in land and sea management) is a pre-requisite for effective implementation of the Nature Directives and broader conservation actions. This requires political support, as the coherence and enforcement of environmental policies and legislation is essential, because little can be gained from implementing effective measures that support habitats and species if other actions are taking place that undermine them.

Another common driver of success is the strong motivation and commitment of particular individuals. What kind of organisation they work for is less important, though teams involving different sectors are perhaps best placed to address the multi-faceted dimensions of the work involved. Nevertheless, no matter how dedicated an individual or team, conservationists need the opportunity to operate (i.e. political/administrative permission) and the funding necessary to create the critical mass and continuity of expertise to drive and achieve large-scale impacts.

The role of land owners and other stakeholders

In most Member States many sites of high nature conservation importance consist of, or incorporate large areas of private land, and state owned land may also often be used for other purposes, such as forestry. Therefore, in almost all cases nature conservation needs to involve landowners, and other stakeholders (e.g. farming organisations, foresters, hunters, fishers, industry, local communities). Thus, adequate and effective stakeholder consultation and engagement would appear to be essential, and there is evidence to support this from the implementation of the Nature Directives. Where inadequate consultation with stakeholders occurred, this has often led to, or exacerbated, conflicts

that held up conservation actions such as those concerning the designation of Natura 2000 sites and the establishment of conservation measures for them. Moreover, the case studies provide more positive evidence that good stakeholder involvement can go beyond the avoidance of conflicts, to provide a basis for developing joint positive nature conservation goals and carrying out substantial collaborative actions.

The role of the Natura 2000 network and other protected areas

Information provided by the Member States on the MDI shows the importance of the Natura 2000 and wider protected area network in two ways. Firstly, it is clear that the protected area networks across the EU contain a large proportion of the habitat area, and populations of species for which MDI were observed, particularly for habitats and HD species. Secondly, a large proportion of the most important actions that contributed to MDI occurred within the Natura 2000 network, especially for habitats. Thus, there is evidence that protected area designation, not only gave basic protection (e.g. from habitat destruction), but also stimulated the required conservation measures for the habitats and species that are present, such as through access to funding, the development of management plans, establishment of conservation measures, enforcement actions, and stakeholder engagement etc.

In conclusion, whilst it is not possible to quantify the added impact that the designation, protection and management of the Natura 2000 and wider protected area network is having, it is obvious that it is often a key driver, whether directly or indirectly, of the observed MDI in habitats, HD bird species and birds. This is especially the case for habitats and species that tend to be concentrated within Natura 2000 network, but conservation measures within the network also play an important role for more widespread species as the sites often comprise high quality habitats/species' habitats that are key core areas in wider ecological networks.

The role of broad conservation measures

Whilst this study has shown the importance of protected areas in driving many of the MDI, it is widely accepted that conservation measures are also needed in the wider environment, for two primary reasons. Firstly protected areas are not isolated from the wider environment, and therefore conservation measures are needed to address wide scale pressures and threats such as related to water and air pollution. Secondly, many habitats and species have dispersed distributions, and therefore their protection and conservation cannot be efficiently achieved just through the designation and management of protected areas for them. However, it was particularly difficult to draw reliable conclusions on the role of wide-scale conservation actions in driving MDI from the evidence collated in this study. On the face of it relatively few observed MDI appear to have involved important wide-scale actions, especially amongst habitats and HD species, but it is also likely that difficulties with achieving some wide-scale actions (in particular reducing deposition of Nitrogen on sensitive habitats), have been, and continue to be, barriers to achieving MDI. There are, however, some clear examples in the case studies of where broad-scale actions (e.g. water quality improvements, have undoubtedly been major drivers of the MDI concerned, including for some dispersed species.

The approaches to tackling pressures in agricultural and wetland ecosystems.

The Article 12/17 reports also show that a high proportion of the habitats and species associated with agricultural and wetland ecosystems are subject to high-level pressures, and have deteriorating trends and therefore, it is clearly a major challenge to achieve MDI for such habitats and species, even if it is only halting a decline. Furthermore, there are considerable obstacles to conserving and restoring agricultural habitats and species due to the large areas involved and the high per unit costs of conservation measures (especially on intensive farmland). Despite the challenges, a number of MDI have been achieved in agricultural systems and wetlands. However, most on agricultural land have

related to habitats and species that are relatively scarce and have a high proportion within Natura 2000 sites. This has enabled target interventions to be carried out, such as intensive nature conservation authority and/or NGO led engagement with farmers and the establishment of carefully designed tailored management and restoration actions supported through LIFE projects and sometimes CAP agri-environment climate measures. It appears to be difficult to achieve MDI for other more dispersed agricultural species without increased implementation of the Nature Directives (e.g. to protect grasslands from agricultural conversion), both within and outside the Natura 2000 network, strengthened environmental components of the CAP and a considerable increase in targeted funding through the Natura 2000 measure and agri-environment climate schemes. The situation for rivers, lakes and wetlands is more supportive for the achievement of MDI, but further implementation of the WFD is necessary as the poor condition of some water bodies may be a barrier to improving the conservation status of some habitats and species.

Funding and resources requirements

There is strong evidence from a number of studies, that there is a major gap between biodiversity conservation funding requirements and available funds, and the Nature Directive Fitness Check study concluded that this has been a major constraint on implementation of the Directives. It is therefore evident that access to funding is likely to be a major driver of MDI, and there is strong support for this from the Member States' information on the factors affecting the MDI and numerous case studies. However, this study was not able to objectively examine the extent to which funding constraints have limited opportunities for improving the status of habitats and species, as information was not gathered on the reasons for failure (i.e. where there have been intentions to take actions to achieve genuine improvements, but these have not materialised or been adequate due to a lack of funding). Nevertheless, it is likely that the relatively low number of identified MDI, especially for some habitats and species that would be reliant on large-scale and relatively expensive measures (e.g. on intensive farmland and in productive forests), is at least in part the result of overall funding constraints, and barriers to access as described above.

Despite its relatively small size the LIFE program appears to be the most important funding related driver of MDI, as illustrated in a large proportion of the case studies, although the projects were sometimes supported by other funding such as agri-environment schemes to deliver large-scale habitat management actions etc. However, as the LIFE projects are relatively short-term sources of funding, it is uncertain to what extent they will lead to MDI that are sustained in the long-term. Some LIFE projects were supported or followed up with larger-scale and/or longer-term funding, principally through EU agri-environment schemes. But, considering the amount of funds available, their contributions to MDI were less than expected, which may be due to insufficient targeting to implementation of the Nature Directives, and eligibility barriers for some farmers of semi-natural habitats. Other important funding sources included EU regional development funds, which were sometimes used to develop management plans or carry out one-off actions. National funds were also important for some cases, sometimes following LIFE projects. There is very little evidence that significant funding of MDI was provided by private sources or innovative funding instruments except for a couple of cases. Increasing the number and scale of MDI is therefore likely to be highly dependent on further increasing the amount and accessibility of public funding for conservation measures for habitats and species that are the focus of the Nature Directives, especially within Natura 2000 sites.

The role of research and monitoring

This study found numerous case examples supporting the widely held view that the design of appropriate, effective and efficient conservation and restoration measures are dependent on reliable, up-to-date and context relevant knowledge of the ecological requirements of the targeted habitats and species, and the pressures affecting them. Several cases also showed the value of investing in improving scientific knowledge, and the benefits of carrying out trials to test the practicality, efficacy

and efficiency of measures, before rolling them out more widely. Once measures are being implemented, then adequate, appropriately designed and targeted monitoring can facilitate adaptive management (such as refinements to the practical measures), as well as providing important assessments of trends and conservation status that can feed into Article 12 and 17 reports. However, the results of this study have shown that there are currently numerous gaps in knowledge of the status of many habitats and species, and whether or not observed improvements are genuine and the result of conservation measures, and hence the list of MDI identified under this contract is incomplete.

Factors that lead to the long-term sustainability of conservation outcomes

Whilst this study has shown that MDI can be achieved through conservation interventions, many of these are from short-term actions that often need to be maintained in the long-term, or their benefits will be undone and resources wasted. A clear lesson from the literature is that the sustainability of conservation measures needs to be carefully planned to address as necessary the following key requirements: the design of recurring practical management measures, long-term financing (e.g. through long-term funding sources such as CAP agri-environment climate measures), maintenance of partnerships and the capacity and knowledge of key actors, ongoing stakeholder engagement, monitoring, reporting and publicity.

A particularly important requirement is often to ensure long-term commitments to conservation actions. The security of these depends on at least three main factors being satisfied: ensuring the effective ongoing delivery of conservation management activities through appropriate regulatory and management systems; securing the long-term use of land for conservation purposes; and ensuring the financial sustainability of conservation management over time. The specific mechanisms that may satisfy these conditions are likely to include: a long-term management plan; a binding contractual agreement; secure rights to manage the land for conservation purposes; obligations to use the land for conservation purposes in the long-term, secure access to finance to fund conservation action, and safeguards against risk of failure.

Recommendations

The evidence examined in this study reveals that a large number of factors affect the success of conservation measures for habitats and species, and it would therefore be possible to provide a very long list of recommendations (and cover some key issues such as funding in considerable depth). However, as many topics have been previously covered in other Commission studies and guidance, to maximise the added value of this study, the recommendations below primarily draw on the evidence from the MDI information and case studies, and focus on those issues that are most likely to result in conservation successes that are of sufficient magnitude and extent to improve the status of a species or habitat at the national or at least regional scale.

In summary the main general recommendations from this study are:

- Strengthen governance at national and regional level to provide the foundations on which targeted actions to improve the status of habitats and species is dependent.

- Improve inter-regional cooperation where necessary to ensure that joint and co-ordinated actions are taken to achieve improvements across multiple regions.

- Deepen stakeholder involvement where necessary e.g. through participatory processes rather than a limited consultation.

- Ensure the Natura 2000 and wider protected area network is sufficient and coherent, to increase protection of habitats and species from ongoing pressures, and trigger the development of conservation objectives and plans for the sites, which in turn increases access to targeted funding and other forms of support.

- Ensure that all public bodies comply fully with the requirements of the Nature Directives, such as through integrating species' or habitat's requirements into land use regulations and plans.

- Fully implement other supporting broad environmental measures, in particular the Water Framework Directive and National Emission Ceilings Directive.

- Enforce Nature Directives protection measures on agricultural land, and elsewhere where necessary, in particular, within the Natura 2000 network (e.g. in relation to prohibiting the ploughing of grasslands).

- Strengthen biodiversity measures in the CAP and improve the implementation of other environmental regulations on agricultural land.

- Provide an adequate and accessible EU budget allocation for the implementation of the Nature Directives.

- Increase the capacity of environmental authorities and NGO organisations involved in nature conservation to access funds.

- Bolster the LIFE programme and increase its funding for nature projects, whilst also increasing complementary and longer-term funding sources.

- Increase targeted EAFRD funding for implementation of the Nature Directives, especially through tailored agri-environment climate schemes, particularly to the habitats and species that are the focus of the Nature Directives, and especially within Natura 2000 sites.

- Ensure CAP payment eligibility rules do not encourage damage to habitats and species covered by the Directives, or preclude farmers from obtaining CAP funds for their required conservation measures.

- Develop and use habitat and species action plans to identify and coordinate coherent measures.

- Ensure that knowledge of a habitat's or species' ecology, effects of pressures and the impacts of planned conservation actions are adequate before implementing them at a large-scale.

- Strategically plan restoration measures based on research into the specific requirements of the habitats and species concerned and the spatial distribution of suitable areas.

- Carry out adequate monitoring of conservation interactions and their impacts, adjust actions if necessary, learn lessons and disseminate them.

In addition, the following recommendations are made with respect to achieving sustainable long-term improvements:

- Design and plan for the long-term.
- Provide long-term finance and incentives.
- Maintain diverse partnerships and engagement.
- Demonstrate the socio-economic benefits of species and habitats as this can motivate communities and businesses to value them and take responsibility for their protection.
- Ensure that appropriate land uses and management are maintained, eg through long-term management agreements (underpinned by legal and contractual arrangements), or land purchase where this is cost-effective or otherwise necessary.

INTRODUCTION

1.1 Background

The EU has developed a relatively comprehensive biodiversity policy framework, at the heart of which are the Birds Directive[1] and Habitats Directive[2] (hereafter referred to as the Nature Directives). The Birds Directive aims to achieve the good conservation status of all wild bird species naturally occurring in the EU territory of the Member States. This concept is further developed and defined in the overall objective of the Habitats Directive, which is to maintain or restore habitats and species of community interest[3] to Favourable Conservation Status (FCS). In simple terms, FCS can be described as "a situation where a habitat type or species is prospering (in both quality and extent/population) and with good prospects to do so in the future as well" (ETC/BD, 2011). Importantly FCS is assessed across the whole national territory, or across biogeographical regions if there is more than one such region within the country.

The Nature Directives are similarly designed and structured, with a similar set of specific and operational objectives requiring not only the conservation of species but also their habitats, through a combination of site and species protection and management measures, supported by monitoring and research measures. One of the key ways to achieve their objectives has been the establishment of Natura 2000, which aims to be a coherent network of protected areas that is sufficient to achieve the aims of the Nature Directives. Natura 2000 comprises Special Protection Areas (SPAs) designated under the Birds Directive and Special Areas of Conservation (SACs) designated under the Habitats Directive.

The Nature Directives are also complemented by the EU Biodiversity Strategy to 2020[4], which includes six targets and 20 wide ranging supporting actions that aim to contribute to the EU's headline target of halting the loss of biodiversity and ecosystem services in the EU and helping to stop global biodiversity loss by 2020. Of particular relevance to this study is Target 1, which is 'To halt the deterioration in the status of all species and habitats covered by EU nature legislation and achieve a significant and measurable improvement in their status so that, by 2020, compared to current assessments: (i) 100% more habitat assessments and 50% more species assessments under the Habitats Directive show an improved conservation status; and (ii) 50% more species assessments under the Birds Directive show a secure or improved status.'

Despite the actions being taken to implement the Nature Directives and EU Biodiversity Strategy, the Member States' most recent reports under Article 12 of the Birds Directive (for 2008-2012) and Article 17 of the Habitats Directive (for 2007 to 2012), as analysed in the EEA's State of Nature report, indicate that substantial proportions of species and habitats remain threatened or have an unfavourable conservation status (EEA, 2015). Although the situation has stabilised for a number of habitats and species, little progress was being made towards achieving Target 1. Furthermore, the mid-term review of the EU Biodiversity Strategy in 2015 also concluded that biodiversity more generally was continuing to decline as confirmed by the 2015 European Environment — State and Outlook report[5]. It also noted that 'While many local successes demonstrate that action on the ground delivers positive outcomes, these examples need to be scaled up to have a measurable impact on the overall negative trends'.

[1] Directive on the conservation of wild birds (2009/147/EC, which is a codified version of the original Directive 79/409/EEC)
[2] Directive on the conservation of natural habitats and of wild fauna and flora (92/43/EEC)
[3] I.e. habitats listed under Annex 1 of the Habitats Directive and species listed in Annexes 2, 4 and 5
[4] COM/2011/0244 final https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52011DC0244
[5] https://www.eea.europa.eu/soer

In 2015-16, the European Commission carried out a "Fitness Check"[6], of the Birds and Habitats Directives. The Commission's report on the Fitness Check[7], informed by a supporting evaluation study (Milieu, IEEP and ICF, 2016), hereafter referred to as the Fitness Check Study, found that good progress has been made towards the achievements of some of the specific objectives of the Nature Directives. In particular, the terrestrial component of the Natura 2000 network is virtually complete[8] and covers around 18% of the EU land. Progress with the establishment of the marine component of the network has been slower and more marine sites needed to be designated, particularly for the offshore environment, but there is now growing momentum to complete the marine network. Reasonable progress has also been made with the protection of Natura 2000 sites from development impacts (but less so regarding their management), the protection of species from illegal hunting, although some problems remain, especially in the Mediterranean region and the directives have stimulated a great deal of scientific research and monitoring, although significant knowledge gaps remain.

Furthermore, there is strong scientific evidence that the Birds Directive has had a beneficial impact over time on its target species, particularly in countries with high proportions of SPA coverage (Donald et al, 2007; Sanderson et al, 2015). However, despite this and implementation of many of the components of the Nature Directives it is evident that the measures taken to-date are not yet sufficient to meet the overall aims of the Nature Directives.

Moreover, this limited progress needs to be considered in the context of the substantial declines in many habitats and species that was evident before the Nature Directives came into force, the current relatively early stage of implementation and the time needed for ecosystems and species populations to respond to conservation measures. Recent assessments suggest that many declines have been arrested, even if species and habitats are not recovering.

In accordance with Article 17 of the Habitats Directive, the assessment of FCS is dependent on an assessment of each of the following components: range, population (species only), area (habitats only), habitat of the species (species only), structure and function (habitats only) and future prospects; all of which must be favourable to achieve overall FCS (ETC/BD, 2011). As a result of this multi-criterion assessment, and the slow response of some of these components to conservation measures, overall conservation status as assessed under the Directive is a relatively insensitive indicator of progress. However, when a habitat or species is considered to have an unfavourable conservation status in their Article 17 reporting, Member States are also required to provide a qualifier that indicates if its status is improving, stable, declining or unknown. These qualifiers therefore can provide indications of improvements, albeit for habitats and species that may have some way to go before they achieve FCS. Unfortunately this opportunity to identify improvements is limited by data gaps, as the trends are unknown for a large proportion of habitats and species, or not reported in many assessments.

The reporting units for conservation status assessments are large, being national components of biogeographical areas (and often the entire Member State or a large portion of it). There are many areas that are smaller than the reporting units that are subject to targeted conservations measures (e.g. LIFE nature projects or agri-environment schemes) that are leading to local or regional scale improvements in the status of habitats and species, with numerous examples provided during consultations with stakeholders during the Fitness Check Study. Consequently, the study also

[6] http://ec.europa.eu/environment/nature/legislation/fitness_check/index_en.htm
[7] SWD(2016) 472 final
http://ec.europa.eu/environment/nature/legislation/fitness_check/docs/nature_fitness_check.pdf
[8] http://ec.europa.eu/environment/nature/info/pubs/docs/nat2000newsl/nat39_en.pdf

concluded that in many cases the Nature Directives measures are to a large degree effective when implemented.

The results of the Fitness Check Study, and the large volume of written evidence submitted to it, identify many of the general and relatively high-level factors that affect the Nature Directives' implementation, and in their ability to create impacts that result in positive trends in species and habitats and overall improvements in their conservation status. Such positive factors (such as funding, knowledge, stakeholder engagement) can be considered to be drivers of improvements in conservation status. However, only a condensed and selective account of the analysis of influencing factors could be provided in the report. The timetable for the Fitness Check Study also meant that the analysis had to focus on selected issues, and therefore the evidence base was not fully examined.

Furthermore, there is a wealth of detailed information on the implementation of the Nature Directives from the results of the Article 12 and Article 17 reporting that can be further analysed, including the status of species and habitats, and their trends, pressures and threats, and the measures taken to address them and their impacts. This provides an opportunity for a more objective, detailed and potentially quantifiable analysis of the drivers of successful implementation of the Nature Directives and their ability to lead to positive improvements in habitats and species. There is also the potential to identify and further investigate particularly effective examples of actions that have improved the status of habitats and species, through wider literature reviews and consultations with nature conservation authorities, NGOs and other stakeholders. Such an analysis can complement and add depth to the assessment of Fitness Check Study evidence, and the Article 12 and 17 databases.

In summary, this study provides a valuable opportunity to:

- Build on the results of the Fitness Check Study, and further investigate its extensive evidence base.

- Objectively analyse existing data in the Article 12 and 17 databases (and to some extent fill gaps).

- Obtain in-depth insights from practical examples of measures that have been shown to result in genuine improvements in the status or trends of habitats and species that are the focus of the Nature Directives.

There is also now the opportunity for the findings of this study to support the implementation of the Action Plan on Nature, People and the Economy, which was produced in 2017 in response to the Fitness Check (European Commission, 2017). This includes 15 actions, grouped under the following four priority themes, many of which could be informed by the results of this study:

- Priority A: Improving guidance and knowledge and ensuring better coherence with broader socioeconomic objectives.
- Priority B: Building political ownership and strengthening compliance.
- Priority C: Strengthening investment in Natura 2000 and improving synergies with EU funding instruments.
- Priority D: Better communication and outreach, engaging citizens, stakeholders and communities.

1.2 The general aims of the contract

According to the Specific Terms of Reference, this study had two principle objectives.

1. '*provide a compilation of all Genuine Improvements that Member States have reported with regard to positive trends of individual habitat types or species (covered by both directives), and, furthermore, to identify the main success factors explaining these improvements (the "drivers of success").*'

2. '*on the basis of the above findings in relation to the key drivers of success, the contractor shall provide a series of "lessons learnt" and recommendations for the Commission and for Member State authorities, on how the above finding should be followed up with a view to enhance and up-scale implementation, as well as to improve the accompanying reporting and monitoring processes*.'

For the purposes of this study **Genuine Improvements** were considered to be any improvements that are real rather than due to better data or improved knowledge, irrespective of the cause of the improvement (see section 2.2.1 for more detailed definition).

The specific tasks that were carried out under this study were:

- Task 1: The establishment of a list of Genuine Improvements and associated main drivers explaining the successes:
    - Sub-task la: Establishment of a list of identified Genuine Improvements (status improvements or positive trends) in the conservation status of species and habitat types.
    - Sub-task lb: Identification of the main drivers explaining these Genuine Improvements.

- Task 2: Carrying out an in depth assessment of the drivers of success in a representative sub-set of examples.

- Task 3: Drawing strategic lessons and technical recommendations.

- Task 4: Elaboration of this Final Study Report.

Tasks 1b, 2, 3 and 4 focussed on **Measure Driven Improvements (MDI)**, which are cases of Genuine Improvement that are considered to have been the result of intentional environmental measures, whether or not they were targeted at the habitat or species in question, or other habitats and species, or were more general environmental measures (e.g. to reduce pollution).

The main output from this study has been this report describing the work undertaken and its findings, including the identified drivers of success, in-depth descriptions of 53 case studies of MDI, and a set of evidence-based lessons learnt and associated recommendations. A database of Genuine Improvements (GID) (created under task 1) has also been provided as an additional deliverable for the Commission to use as a tool for further investigation and management of information on cases of Genuine Improvement (e.g. through sorting, filtering and links to further information).

1.3 Structure of this Final Report

This report describes the work that has been undertaken and its results as follows:

Chapter 2 describes the methods that have been used to identify the Genuine Improvements that Member States have reported for habitat types and species and those that are considered to be MDI; and then presents a summary of the number of cases of Genuine Improvements and MDI, for each Member State, biogeographical region and broad habitat and species groups. It also includes an analysis of information provided by Member States on the measures taken for MDI from their Article 12 and 17 reports, and in response to a questionnaire circulated as part of this study. This information and analysis provides a first broad indication of some of the key drivers of improvements (which is further discussed in chapter 4)

Chapter 3 sets out the methodology used to select and develop the MDI case studies and provides a summary of their representation in relation to Member State, biogeographical region and broad habitat and species groups.

Chapter 4 draws on the results of the analysis of the MDI cases in the GID (Chapter 2), the case studies and some selected wider literature on the factors that influence the effectiveness of nature conservation measures, to provide a qualitative analysis of the drivers of MDI and identify the main lessons that can be learnt from the study. The chapter concludes with recommendations on ways of increasing the effectiveness of conservation measures that aim to achieve wide-scale improvements in the conservation status of habitats and species that are the focus of the Nature Directives.

Identification of Genuine Improvements and associated main drivers explaining their success

2.1 Overall task objectives

The aim of this task was two-fold:

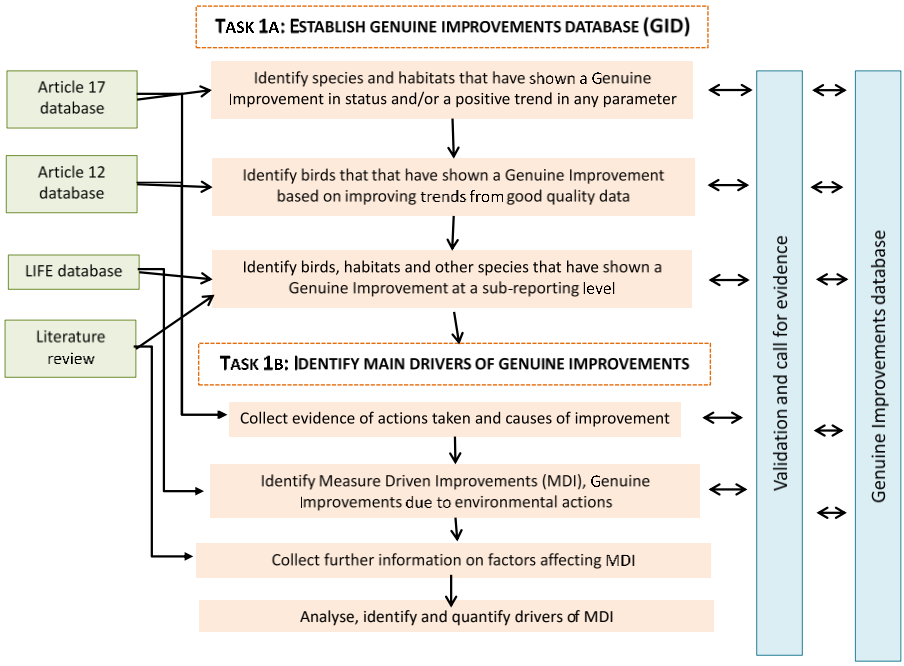
Firstly, Task 1a was to develop a **Genuine Improvements Database** (GID), listing all national and sub-national cases for Habitats Directive Annex I habitats and Annex II, IV and V species (hereafter referred to as HD species), and species listed on Annex I or II of the Birds Directive that are also SPA trigger species)[9], for which Member States are required to designate Special Protection Areas (SPAs)(hereafter referred to as BD birds), that have shown status improvements, or positive trends in one or more assessment parameters (i.e. area and structure and functions for habitats, and range and population size for species). These cases were primarily identified using the most recent Member State reports on these habitats and species submitted in accordance with Article 12 and Article 17 of the Birds and Habitats Directives respectively, as well as further relevant data sources and consultations with national experts (subtask 1a). In addition this step identified and included examples of significant Genuine Improvements in the GID which, for reasons of their insufficient geographical scale, did not lead to Genuine Improvements at the scale of units reported on by Member States, and are therefore not indicated in the Article 12 and 17 reports. We refer hereafter to these as **sub-reporting unit Genuine Improvements.**

Secondly, Task 1b aimed to identify the main drivers of the identified Genuine Improvements. This exercise focused on Genuine Improvements that have mainly occurred as a result of intentional environmental measures, whether or not they were targeted at the habitat or species in question, or other habitats and species, or were more general environmental measures (e.g. to reduce pollution); which we refer to as **Measure Driven Improvements (MDI)**. Further data were collected on each of these MDI to identify the conservation measures that have been taken and their impacts.

An overview of Task 1 and its subcomponents, key inputs (i.e. data sources) and expected outputs is presented in Figure 2-1.

[9] These are a subset of species listed in Annex I of the Birds Directive, plus a selection of migratory species (some of which are listed on Annex II) as identified in the 'Checklist of SPA trigger species' in the Reference Portal
http://biodiversity.eionet.europa.eu/activities/Article_12_Birds_Directive/reference_portal

Figure 2-1 Schema of the information flows and analytical steps in task 1



2.2 Subtask 1a – Establish a list of Genuine Improvements

2.2.1 Methodological approach

Definition of 'Genuine Improvements'
As noted in Chapter 1, Genuine Improvements are considered to be any improvements that are real, rather than being due to improved data or knowledge, taxonomic change or the use of different monitoring methods between subsequent reporting periods.

Genuine Improvements were primarily identified in subtask 1a, using Member State Article 12 and Article 17 reporting data, which were then added to the GID. As the data for the last reporting period were not available for Greece at the time of this study, and Croatia has not been required to report so far, these two Member States are not included in this analysis.

The Article 17 reporting data were reviewed to identify habitats and bird species reported as having experienced Genuine Improvements in their conservation status between the 2001-2006 reporting period and the 2007-2012 reporting period. For these habitats and species, this assessment was relatively straightforward as Member States were asked to indicate reasons for changes in the assessments of conservation status since the 2001 to 2006 reports. This information was provided by the Member States for each habitat and species assessment, using a coding system (see Table 2-1). A change in conservation status could be recorded as genuine (a), non-genuine (b1, b2, c1, c2, e), or due to unknown reasons (d). Such information is not available for birds.

Table 2-1: Codes used for reporting the nature of change in conservation status between two reporting periods under Article 17

Code	Description	Aggregation
a	There is a genuine change: the overall conservation status improved (or deteriorated) due to natural or non-natural reasons (management, intervention, etc.)	**genuine**
b1	The change observed is due to more accurate data (e.g. better mapping of distribution) or improved knowledge (e.g. on ecology of species or habitat)	non-genuine
b2	The change observed is due to a taxonomic review: one taxon becoming several taxa, or vice versa	non-genuine
c1	The change observed is due to use of different methods to measure or evaluate individual parameters or the overall conservation status	non-genuine
c2	The change observed is mainly due to the use of different thresholds e.g. to fix favourable reference values	non-genuine
d	No information about the nature of change	no information
nc	No change (e.g. overall trend in conservation status only evaluated in 2013 but assumed to be the same in 2007 or not known)	no change
na	Not applicable (used by Spain, no official code)	other non-genuine changes
e	The change observed is due to less accurate data than those used in the previous reporting period or due to absence of data	non-genuine

Data validation

A review of the quality and completeness of the data in the Article 17 reports was performed in order to provide context to the data being assessed. Table 2-2 below provides an overview of the information provided by each Member States on the reasons for changes in conservation status for habitats and species. The detailed results from the data validation are given in Annex 1

The analysis revealed that for both habitats and species only 8% of assessments were considered to show a Genuine Improvement (code 'a'). This was largely due to a high proportion of assessments showing no change. However, for those that did show a change, the majority were considered to be due to methodological factors or data limitations etc (especially in Cyprus and Spain) rather than changes that could be reliably considered to be genuine. Furthermore, two Member States (Bulgaria and Romania) provided no information at all on the reasons for change, and for several others there were substantial gaps in information.

It is therefore important to note that due to these data limitations, the number of cases of Genuine Improvements in habitats and species that can be identified from the Article 17 data are relatively few and they do not provide complete coverage of the EU. As discussed later, this has had a significant constraint on this study.

Table 2-2: Overview of the reasons for changes in conservation status for HD species and habitats per Member State (Special cases are highlighted)

Note: Greece and Croatia are not included as reporting data were not available for them.

Habitats

	a	b1	b2	c1	c2	d	e	na	nc	no entry
FR	7%	26%	0%	8%	0%	1%	0%	0%	53%	5%
AT	7%	14%	0%	28%	0%	1%	0%	0%	48%	2%
BE	23%	10%	2%	1%	0%	0%	0%	0%	13%	51%
BG	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
CY	4%	58%	0%	0%	0%	0%	0%	0%	0%	38%
CZ	26%	17%	0%	6%	1%	0%	0%	0%	34%	16%
DE	27%	14%	1%	2%	1%	3%	4%	0%	48%	1%
DK	4%	17%	0%	0%	0%	0%	7%	0%	6%	65%
EE	6%	37%	0%	3%	0%	0%	0%	0%	13%	40%
ES	1%	0%	1%	68%	0%	0%	0%	7%	1%	21%
FI	10%	13%	1%	6%	1%	0%	0%	0%	19%	50%
HU	9%	27%	1%	9%	0%	0%	0%	0%	52%	1%
IE	15%	10%	0%	7%	2%	0%	0%	0%	10%	57%
IT	7%	33%	0%	14%	0%	11%	0%	0%	1%	33%
LT	7%	33%	0%	1%	4%	9%	0%	0%	45%	1%
LU	17%	3%	0%	20%	0%	8%	0%	0%	51%	0%
LV	13%	28%	1%	9%	0%	4%	0%	0%	12%	34%
MT	4%	25%	0%	0%	6%	0%	0%	0%	31%	35%
NL	27%	4%	0%	5%	18%	0%	3%	0%	44%	0%
PL	12%	21%	0%	10%	0%	1%	0%	0%	17%	39%
PT	4%	10%	1%	19%	1%	1%	9%	0%	22%	33%
RO	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
SE	7%	15%	0%	3%	0%	1%	0%	0%	16%	58%
SI	12%	18%	0%	5%	0%	0%	5%	0%	59%	2%
SK	4%	20%	0%	0%	0%	0%	0%	0%	0%	75%
UK	11%	8%	0%	15%	4%	0%	0%	0%	7%	56%
Grand Tot	**8%**	**15%**	**0%**	**13%**	**1%**	**2%**	**1%**	**1%**	**21%**	**39%**

Species

	a	b1	b2	c1	c2	d	e	na	nc	no entry
FR	2%	17%	0%	7%	2%	3%	0%	0%	69%	0%
AT	8%	3%	0%	1%	6%	14%	0%	0%	68%	1%
BE	29%	14%	0%	13%	0%	6%	0%	0%	33%	4%
BG	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
CY	0%	79%	0%	0%	0%	0%	0%	0%	0%	21%
CZ	3%	41%	5%	42%	0%	0%	0%	0%	0%	9%
DE	26%	10%	0%	10%	0%	1%	3%	0%	51%	0%
DK	5%	23%	0%	10%	15%	0%	0%	0%	27%	20%
EE	10%	22%	0%	7%	0%	0%	0%	0%	20%	42%
ES	0%	0%	0%	74%	0%	0%	0%	2%	2%	23%
FI	2%	4%	0%	3%	0%	0%	0%	0%	32%	59%
HU	7%	11%	0%	41%	0%	0%	0%	0%	41%	0%
IE	40%	10%	0%	2%	0%	0%	0%	0%	43%	5%
IT	0%	21%	0%	46%	0%	8%	0%	0%	0%	25%
LT	44%	0%	0%	0%	0%	2%	0%	0%	54%	0%
LU	18%	0%	0%	18%	4%	0%	0%	0%	61%	0%
LV	21%	19%	0%	28%	0%	0%	0%	0%	14%	18%
MT	3%	10%	0%	0%	40%	0%	0%	0%	40%	7%
NL	8%	0%	0%	13%	4%	0%	0%	0%	75%	0%
PL	1%	26%	1%	11%	0%	0%	0%	0%	59%	2%
PT	4%	7%	0%	7%	0%	0%	1%	0%	53%	28%
RO	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
SE	0%	28%	0%	0%	0%	1%	0%	0%	11%	60%
SI	26%	8%	0%	2%	10%	0%	1%	0%	53%	0%
SK	3%	18%	0%	0%	0%	0%	2%	0%	1%	76%
UK	37%	5%	0%	22%	1%	0%	0%	0%	5%	31%
Grand Tot	**8%**	**13%**	**0%**	**16%**	**2%**	**2%**	**0%**	**0%**	**28%**	**31%**

Identification of Genuine Improvements in habitats and species using Article 17 reporting data

In a first step, an analysis of the reports was made for cases in which **the conservation status improved between the two reporting periods *and* in which this change was reported as being genuine by the Member State.** Only Member State data (as opposed to EU aggregated data) were used for this assessment. The review of Article 17 reporting data revealed that a total of 77 habitat and 196 species reports[10] met these criteria. The following two tables illustrate the underlying approach to extracting the number of Genuine Improvements for Article 17 habitat and species reports.

Table 2-3 shows the assessment matrix that guided the assessment of the Article 17 habitats. All reports that showed an improvement from the previous to the most recent assessment (e.g. U1+ -> FV) were treated as Genuine Improvements.

[10] This number refers to the count for species reported as being 'present'

Table 2-3: Assessment criteria matrix used to identify Genuine Improvements in habitats

Genuine improvements are those with assessment combinations shaded in green AND where the MS has classified the 2007-2012 change as being a Genuine Improvement.

Conservation Status: FV = favourable; U1 = unfavourable – inadequate; U2 = unfavourable – bad; XX = unknown, Trend: '+' improvement, '=' = no change; '-' = deterioration.

		Previous assessment (2000-2006)							
		FV	U1+	U1	U1-	U2+	U2	U2-	XX
Assessment (2007-2012)	FV								
	U1+								
	U1 =								
	U1 -								
	U2+								
	U2=								
	U2-								
	XX								

Table 2-4 presents the results from the assessment of potential habitat reports indicating a Genuine Improvement between the two reporting periods.

Table 2-4: Number of potential habitat reports indicating a Genuine Improvement

Conservation Status: FV = favourable; U1 = unfavourable – inadequate; U2 = unfavourable – bad; XX = unknown, Trend: '+' improvement, '=' = no change; '-' = deterioration. Incomplete datasets with missing information on 'conservation status' are excluded. Selection fields are highlighted in green.

		Previous assessment (2000-2006)								**Total**	**Genuine improvement**
		FV	U1+	U1	U1-	U2+	U2	U2-	XX		
Assessment (2007-2012)	FV	3	2	4	1					10	**7**
	U1+	2		11		1	3	1		18	**16**
	U1 =	3	1	19	6	1	1		1	32	**8**
	U1 -	7	1	28			3		1	40	**3**
	U2+	2		3	1	1	26	4		37	**30**
	U2=			5		3		13		21	**13**
	U2-	1	1	19	1	5	58		2	87	**-**
	XX	1								1	**-**
	Total	19	5	89	9	11	91	18	4	246	**77**

The assessment for the Article 17 species was set up in the same way as that of habitats. The following table shows the assessment matrix that guided the assessment of the Article 17 species. All reports that showed an improvement from the previous to the most recent assessment (e.g. U1+ -> FV) and are categorised as showing a Genuine Improvement by the Member State were selected as Genuine Improvements.

Table 2-5: Assessment criteria matrix to identify Genuine Improvements in species

Genuine improvements are those with assessment combinations shaded in green AND where the MS has classified the 2007-2012 change as being a Genuine Improvement.

Conservation Status: FV = favourable; U1 = unfavourable – inadequate; U2 = unfavourable – bad; XX = unknown, Trend: '+' improvement, '=' = no change; '-' = deterioration; 'x' = unknown. Selection fields are highlighted in green.

		Previous assessment (2000-2006)							
		FV	U1+	U1	U1-	U2+	U2	U2-	XX
Assessment (2007-2012)	FV								
	U1+								
	U1=								
	U1-								
	U1x								
	U2+								
	U2=								
	U2-								
	U2x								
	XX								

Table 2-6 presents the results on the number of potential species reports indicating a Genuine Improvement between the two reporting periods.

Table 2-6: Number of potential species reports indicating a Genuine Improvement

Conservation Status: FV = favourable; U1 = unfavourable – inadequate; U2 = unfavourable – bad; XX = unknown, Trend: '+' improvement, '=' = no change; '-' = deterioration; 'x' = unknown. Incomplete datasets with missing information on "conservation status" are excluded. Selection fields are highlighted in green.

		Previous assessment (2000-2006)								Total	**Genuine improvements**
		FV	U1+	U1	U1-	U2+	U2	U2-	XX		
Assessment (2007-2012)	FV	7	17	35	3	1	7	1	6	77	**64**
	U1+	3		25		5	17		1	51	**47**
	U1=	21	5	6	3	2	17			54	**22**
	U1-	23	1	57			5		6	92	**5**
	U1x	2	1	6	1	1	1		1	13	**0**
	U2+	1	2	1			42	6		52	**48**
	U2=	4	1	7	1	3	11	3	2	32	**3**
	U2-	8	2	41	12		74		5	142	**0**
	U2x	4		5	1		2		4	16	**0**
	XX	9								9	**0**
	Total	82	29	183	21	12	176	10	25	538	**189**

Identification of Genuine Improvements in birds using Article 12 reporting data

In the second step, birds were identified that appear to have undergone Genuine Improvements according to Article 12 reporting.

Selection of species

The Birds Directive applies to all naturally occurring birds, and Member States must report on all these species. Therefore there is the potential to identify Genuine Improvements that have occurred in all birds. However, to do so would have resulted in the GID being dominated by bird records (as the HD species are focused on threatened species). Furthermore, monitoring experts within BirdLife International considered that the quality of monitoring data on many species not listed on Annex I and II (including migratory species that trigger SPA designations) would be too poor and variable to reliably identify Genuine Improvements. Therefore only birds listed on Annex I and II that are also SPA trigger species (referred to as BD birds) were assessed and included in the GID.

Identification of Genuine Improvements

The identification of Genuine Improvements in BD birds using Article 12 data was not entirely straightforward, as there are differences compared to Article 17 data that had considerable significance for this study. In particular:

- The Birds Directive does not refer to Favourable Conservation Status (although it has a similar concept) and therefore the status of birds is not reported in terms of Favourable / Unfavourable Conservation Status and according to their sub-types, but in terms of whether they are secure /non-secure based on IUCN threat assessment criteria (Birdlife International, 2013; EEA, 2015).
- The legislative requirements for reporting by Member States under the Birds Directive are different from those of the Habitats Directive in that they are less standardised and more focused on legal and technical implementation issues, rather than the status of birds. Reporting under the Birds Directive was brought more into line with those of the Habitats Directive through agreement between the Commission and Member States in time for the 2007-2013 reporting period. Although there is no official EU-adopted status assessment against which the current status could be compared, *Birds in Europe* (BirdLife International, 2004) did perform a review at EU25 scale using data collated by BirdLife. This report was also used as the basis of the 2020 EU target for birds.
- The biogeographical regions applied to habitats and species under the Habitats Directive do not apply to birds, with reporting normally carried out at a national level, or for other specific reporting units for some species.
- Whilst it is assumed that trend data in the Member State reports are more robust and indicate real increases if they are positive, there is currently no direct way of being sure from the reports that this is the case and they are Genuine Improvements and not changes in methods or data quality etc. As indicated in Annex 2, Member States are required to indicate long and short-term trends in populations and breeding ranges, but until now there have been no requirements in the forms to indicate if changes in population size and range area are genuine or not; this change will only apply from the next reporting period onwards.

To address these issues, criteria were developed to select cases of apparent Genuine Improvement from the recent assessments in the Article 12 database.

The selection of Genuine Improvements in BD birds is based on the approach used to identify improving species in the *State of Nature Report* (EEA, 2015) as part of the measurement of progress towards Target 1 of the Biodiversity Strategy. In the report, non-secure but improving bird species are those that showed:

- increasing EU populations over the short-term (2001-2012), irrespective of their long-term trend (i.e. 1980-2012)

  OR

- stable and fluctuating short-term EU populations, in the face of long-term declining trends.

These *State of Nature Report* criteria applied to EU level population trends were applied to national or other recording units, using the data available in the Article 12 database (Table 2-7). They are appropriate because they primarily relate to short-term trends, which are most likely to reflect targeted improvements taken by Member States in recent years. In contrast, long-term trends are more likely to also reflect external influences, such as climate change and trends in land use and cover (e.g. land use driven increases in forest cover in many countries). However, we recognise that focusing on short-term trends risks missing some genuine changes that have occurred over long-periods, particularly from actions carried out by the older EU Member States that initially increased populations up to a new stable population level, hence showing more recent stable population trends.

Table 2-7: Assessment criteria matrix to identify genuine improvements in Annex I and II bird species triggering SPAs according to Article 12 reports

Trend: 0 = stable / F = Fluctuating / + = Increase / - = Decrease / x = Unknown. Selection fields are highlighted in green.

		Short-term trends			
		+	0/F	-	x
Long-term trends	+				
	0/F				
	-				
	x				

This approach assumes that Member States have implicitly considered the possibility that apparent changes in population size or range are not the result of changes in methods, increased coverage of surveys or better data etc. It is also relevant to note that it often takes a long time for conservation action to have a noticeable impact and for the populations or ranges of declining species to stabilise and eventually increase again. Efforts to slow, halt and reverse such declines need to be identified, as they are essential steps on the road to the recovery from an insecure to a secure status. This assumption was therefore checked during the data validation stage.

In order to obtain robust results from the assessment, it was considered whether bird species assessments that were reported by the Member states as being based on ‘poor‘ data should be excluded or not, as these cases cannot be deemed to be reliably genuine. On the other hand, considering only cases based on good quality data would limit the analysis to the cases of areas with the best monitoring (e.g. NW EU). It was decided to adopt a pragmatic approach and focus primarily on bird species assessments in which the **long term monitoring data quality is good *or* moderate AND the short-term monitoring data quality is good**. The underlying assumption here is that Member States have improved their monitoring activities over the years.

Results

According to the above criteria, 407 assessments of BD Birds (i.e. Annex I or II species triggering SPAs) can be considered to have shown a Genuine Improvement (see Table 2-1).

Table 2-8 The number of assessments of Annex I and II bird species triggering SPAs that showed a Genuine Improvement based on assessments of short and long-term bird population trends

Trend: 0 = stable / F = Fluctuating / + = Increase / - = Decrease / x = Unknown. The number of assessments that are considered to show improving population trends are shown in green shaded cells with bold types. Assessments with unknown or poor quality data for trends in short-term and long-term population trends are excluded.

	Short-term trends				
Long-term trends	+	0/F	-	x	**Total**
+	**292**	100	52	3	447
0/F	**32**	107	31	3	173
-	**21**	**56**	135	2	214
x	**6**	8	10	5	29
Grand Total	**351**	**271**	**228**	**13**	**863**
Total with improving trend					**407**

In order to support the validation process with the Member States, BirdLife experts flagged all records in the GID that they consider (based on expert judgement) to have or likely to have shown Genuine Improvements. Furthermore, in order to not omit important cases, BirdLife experts were asked to nominate Genuine Improvement cases out of a set of 314 records of Annex I & II species triggering SPAs, with poor OR moderate quality for short-term trend regardless of the data quality of the long term trend. In total, BirdLife experts from 15 Member States (that had reported in 2013) responded to the call and verified the country specific extraction from the GID, and in some cases further bird species were added. The results of this verification process by BirdLife are shown Annex 3.

Finally, 585 BD bird species reports were selected for the Member States consultation in Task 1b, from which 301 cases were verified by BirdLife experts from the Member State beforehand. The other 284 cases were a direct result of selection process, without verification by BirdLife.

Identification of sub-reporting unit improvements

In a third step, examples of habitats, birds and other species that have shown Genuine Improvements (or what are likely to qualify as Genuine Improvements) at scales below that of the reporting units have been identified. This is important because in some countries nature conservation governance and planning is devolved to the sub-national levels (e.g. Austria, Belgium, Germany, Spain and the UK), and many actions as well as the monitoring of the status of species and habitats are carried out at this devolved level. Therefore, it is likely that there are cases where improvements have occurred as a result of targeted actions taken at the sub-national level, but have not been sufficient to affect the overall national reports. Cases are also likely in which targeted projects, such as those funded by the EU LIFE instrument, have had significant impacts in certain areas of a country.

This step included an initial assessment of existing sources of information (in particular the LIFE project database) that might indicate actions that have led to genuine regional changes. The LIFE project

database[11] contains approximately 4,500 projects, which have been implemented between 1992 and 2016, and as such served as a valuable tool for the identification of evidence to support the analysis of the identified positive genuine changes for habitats, birds and HD bird species. Detailed search functions under the 'Nature', 'Nature co-op' or 'Nature starter' strands enabled targeted searches for habitats, (bird) species or Red List (bird) species. The search for habitat/ species (which can be selected as categories under 'themes') was conducted independently as well as in combination using the following parameters:

- Member State (benefiting country) and its regions
- Year (range) (starting from 2000)
- Keywords (e.g. 'nature conservation', 'nature reserve')
- Free text (e.g. "improvement of conservation status")

There is a dedicated webpage for each project, which provides details on the

- Project description: background, objectives and results
- Environmental issues: targeted species, habitat types, and Natura 2000 sites etc.

Where information on "improved conservation status" was reported, this information was found in most cases under 'Objectives' and/or 'Results' for the targeted species/habitat in the LIFE project description. All species and habitats and species for which an "improved conservation status" was mentioned were included in the list of sub-reporting cases of Genuine Improvements for the respective Member States.

In addition to the LIFE project consultation, a few Member States (such as Estonia and Finland) listed further sub-reporting cases during the 1st phase of the consultation (1a questionnaire) in response to a request from the study team.

Genuine Improvements Database (GID)

Information from each of the above steps was used to create the new Excel based GID. This database served as a working tool for the project and was extended and populated with new data over its lifetime. Table 2-9 and Table 2-10 provide an overview of the structure and contents of the database fields used for the potential cases of Genuine Improvement in relation to Task 1a. For each group (habitats, HD species and BD birds), one sheet was created.

[11] URL: http://ec.europa.eu/environment/life/project/Projects/index.cfm

Table 2-9: Structure and contents of the GID relating to Task 1a – 1st Member State consultation phase (using the Art.12./Art.17 database)

Parameter	Description	Relevant parameter		
		Habitats	Species	Birds
General information[12]				
Member State	2-letters country code	x	x	x
Biogeographical region	EU biogeographical and marine regions[13]	x	x	
Region (hash)	General report auto generated primary key	x	x	x
Code	Habitat code /Species code	x	x	x
Euringcode	Code for bird species according to EURING			x
Group	Habitat group /taxonomic species group	x	x	
Name	Habitat/species name	x	x	x
Migratory status in EU	migratory, non-migratory			x
Season	breeding, wintering			x
Genuine change				
Conservation status (2001-2006)	Article 17 reporting codes: FV-Favourable U1-Unfavourable-inadequate U2-Unfavourable-bad XX-Unknown	x	x	
Conservation status (2007-2012)	See above	x	x	
Conservation status trend (2007-2012)	Article 17 reporting codes: + (improvement) = (stable, no change) - (decline/deterioration)	x	x	
BirdLife_Expert Judgement	yes, no			x
BirdLife_Comments	Text			x
Verified by BirdLife	x (yes)			x
Validated genuine change_MS	yes, no	x	x	x
Reasons for (non) GI	Text (What are the reasons for the Genuine Improvement? Or why it is not a Genuine Improvement?)	x	x	x

[12] Definition of the fields are based on the Art12/17 database descriptions https://www.eea.europa.eu/data-and-maps/data/article-17-database-habitats-directive-92-43-eec-1; https://www.eea.europa.eu/data-and-maps/data/article-12-database-birds-directive-2009-147-ec

[13] Alpine (ALP), Atlantic (ATL), Black Sea (BLS), Boreal (BOR), Continental (CON), Macaronesian (MAC), Mediterranean (MED), Pannonian (PAN), Steppic (STE), Marine Atlantic (MATL), Marine Baltic (MBAL), Marine Black Sea (MBLS), Marine Mediterranean (MMED), Marine Macaronesian (MMAC)

Table 2-10 Structure and contents of the GID relating to Task 1a – 1st Member State consultation phase (using the Art.12./Art.17 database) - sub-reporting cases

Parameter	Description	Relevant parameter	
		Habitats	Species (incl. birds)
General information[14]			
Member State	2-letters country code	x	x
Biogeographical region/ region	EU biogeographical and marine regions	x	x
Name [popular]	Popular habitat/species name	x	x
Name [Latin]	Latin habitat/species name	x	x
Code	Habitat code /Species code	x	x
Genuine change			
Comment (info on CS if no details available)	Text	x	x
Validated genuine change_MS	Yes, No (Has the Genuine Improvement been validated by the MS?)	x	x
Reasons for (non) GI	Text (What are the reasons for the Genuine Improvement? Or why it is not a Genuine Improvement?)	x	x
Conservation measures & more (referring to LIFE projects)			
Type of measures implemented	Text	x	x
Project duration (start)	Respective year	x	x
Project duration (end)	Respective year	x	x
Project title	Text	x	x
Project link	Internet website (URL)	x	x
(Other) source of information	Text, internet website (URL)	x	x

1st phase consultation with Member States

The completion of Task 1 and development of the GID involved two phases of consultation with Member State nature authorities (through members of the reporting group) designed in close consultation with the Commission. The first phase focussed on the validation of the proposed list of Genuine Improvements, and the identification of additional cases that are not visible from the Article 12 and 17 databases, and filling related data gaps. The second phase focussed on the validation of proposed MDI and evidence gathering on the factors affecting them (described in section 2.3.1). Annex 4 provides more details on the consultation procedures.

[14] Definition of the fields are based on the Art12/17 database descriptions https://www.eea.europa.eu/data-and-maps/data/article-17-database-habitats-directive-92-43-eec-1; https://www.eea.europa.eu/data-and-maps/data/article-12-database-birds-directive-2009-147-ec

2.3 Subtask 1b – Identify the main drivers explaining these Genuine Improvements

2.3.1 Methodology

This sub-task involved the following three main steps (as further described below):

- Identification of measure driven improvements (MDI)
- Collation of detailed information on factors affecting MDI
- Identification and analysis of drivers of MDI

Measure Driven Improvements
MDI are defined as Genuine Improvements that are the result of intentional environmental measures, whether or not they were targeted at the habitat or species in question, or other habitats and species, or were more general environmental measures (e.g. to reduce pollution).

Identification of measure driven improvements (MDI)

The identification of MDI principally draws on the information that Member States provided in the Article 12 and 17 databases on conservation measures taken for each habitat and species according to the questions and coding set out in (Annex 5). Of particular relevance is the listing of conservation measures and the broad evaluation of each measure, which is supposed to assess their effectiveness. On the basis of this information, as a minimum, **species and habitats that have undergone Genuine Improvements and have one or more listed measures that were evaluated by the Member State as 'Maintain' or 'Enhance' are considered to be examples of MDI**.

However, as information on conservation measures was not supplied by the Member States for the explicit purpose of identifying MDI, it was considered necessary to carry out a second consultation phase to verify the data and confirm the identified MDI. Furthermore, some Member States did not provide full information in their Article 12 and 17 reports on conservation measures and their effectiveness, and therefore the second phase consultation was also carried out to give Member States the opportunity to fill in any such data gaps for habitats and species that had been identified as showing Genuine Improvements, and thereby identify further MDI. Member States were also asked to indicate if they considered that the Genuine Improvements might be primarily caused by other factors, such as broad land use changes, climate change or natural factors (e.g. natural succession), and are not therefore MDI.

As for the first phase consultation, the process was carried out through the use of an MS Excel based questionnaire, incorporating the relevant data from the GID. Table 2-11 shows the contents of Part A (i.e. worksheet A) of the GID and questionnaire which includes the Member States' Article 12/17 information on conservation measures each Genuine Improvement.

Table 2-11: Structure and contents of part A of the GID as related to Task 1b – 2nd Member State consultation phase

Parameter	Description	Relevant parameter		
		Habitats	Species	Birds
Country, [species/habitat], biogeographic region				
Member State	2-letters country code	x	x	x
Biogeographical region	EU biogeographical and marine regions	x	x	
Region (hash)	General report auto generated primary key	x	x	x
Code	Habitat code /Species code	x	x	x
Name	Habitat/species name	x	x	x
Data validated by BirdLife	yes, no			x
Data validated by MS	yes, no	x	x	x
Comments	Text	x	x	x
A1. Conservation measures taken by the Member State – for all Genuine Improvements				
Select Measure code and type of measure	List of conservation measures (multiple selection possible)	x	x	x
Ranking	High, Medium, Low	x	x	x
Location	Inside the Natura 2000 network, Outside the Natura 2000 network, Both within and outside the network	x	x	x
Broad evaluation of the measure	Enhance, Maintain, Long-term, No-effect, Unknown, Not-evaluated (multiple selection possible)	x	x	x
Measure information verified	Verified prefilled data (i.e. from the previous Art. 12/17 reports), Updated/completed the prefilled data, Added entirely new data	x	x	x
Comments	Text	x	x	x
A2. Other factors for the Genuine Improvement				
Main drivers of Genuine Improvements	Natural factors (e.g. succession) (NF), Climate change (CC), Broad changes in land use (e.g. agricultural abandonment) (LU), Other human induced changes other than conservation measures (OT) (multiple selection possible)	x	x	x
Selected main drivers of Genuine Improvements	See above	x	x	x
Other contributing factors	See above	x	x	x
Selected other contributing factors	See above	x	x	x
Comments	Text	x	x	x
Measure driven improvement	**true, false**	**x**	**x**	**x**

With the information that was available on each Genuine Improvement in the GID, it was evident that it is not possible to define MDI in a simple binary way, or to reliably identify them with the available data. Therefore each Genuine Improvement and MDI was categorised as follows:

- **MDI-A:** Article 12 or 17 evidence that at least one conservation measure has been taken that has maintained or enhanced the habitats or species, which has been validated by the Member State. Or, for sub-reporting level Genuine Improvements, the Member States identified at least one conservation measure, which has maintained or enhanced the habitats or species.

- **MDI-B:** Article 12 or 17 evidence that at least one conservation measure has been taken that has maintained or enhanced the habitats or species, but not validated by the Member State. This category does not apply to sub-reporting levels as Genuine Improvements and conservation measures are not identified through Art.12 or 17.

- **MDI-C:** Article 12 or 17 evidence that at least one action has been taken, but its effects are unknown or not evaluated; OR for Member States with no Article 12/17 data on conservation measures, there is evidence from other sources, that conservation measures were taken that are expected to have at least contributed to the Genuine Improvement; AND there is no evidence that the Genuine Improvement is due to other factors (e.g. climate change or unplanned landuse changes). Or, for sub-reporting level Genuine Improvements, there is no information on specific conservation measures and their effects, but there is evidence from other sources (e.g. LIFE project database).

- **Uncertain**: no evidence of any measures being taken or other factors being the cause of the Genuine Improvement.

- **Not MDI**: Balance of evidence suggest that other factors were probably the cause of the Genuine Improvement (e.g. from Member State response to the consultation questions in part A2).

Collation of detailed information on MDI

For Genuine Improvements that meet the criteria for MDI-categories A-C, additional information was gathered and added to the GID on key factors that may affect the efficacy of conservation measures for habitats and species, such as biological / ecological factors, key pressures / threats affecting them, and the types of conservation measures taken, from strategic to specific. This was primarily carried out by asking Member States, in the 2nd phase consultation, to provide their views (and supporting evidence if available) on the key factors that may be drivers of each MDI. Table 2-12 sets out the questions and the potential responses given to Member States. Responses to these questions were incorporated into the GID, and coded to allow systematic searching and filtering of the database entries thereby facilitating its analysis in this study and its wider use by the Commission in future.

It had been envisaged that additional key contextual information and data on some key factors that may influence the effectiveness of conservation measures (such as aspects of a species ecology, population and population dynamics) would be collated, through literature searches, and added to the GID to support a statistical analysis of the MDI. However, as further discussed in section 2.4.4, due to the gaps in Member States coverage and relatively low number of identified MDI, especially for HD species, statistical analysis of the results would not be appropriate. The collation of such data was therefore not required.

Table 2-12 Structure and contents of part B of the GID related to Task 1b - 2nd Member State consultation phase

Parameter	Description	Relevant parameter		
		Habitats	Species	Birds
Country, [species/habitat], biogeographic region				
Member State	2-letters country code	x	x	x
Biogeographical region	EU biogeographical and marine regions	x	x	
Region (hash)	General report auto generated primary key	x	x	x
Code	Habitat code /Species code	x	x	x
Name	Habitat/species name	x	x	x
Comments	Text	x	x	x
Measure Driven Improvement	**true, maybe**	**x**	**x**	**x**
B1 Information on ecological factors and conservation measures taken - Conservation actions taken and their context				
% coverage in the complete protected area network, whether public or private	0 – 20% / 21 – 40% / 41 – 60% / 61 – 80% / 81 – 100%	x	x	x
% of habitat area/ species range on land in private ownership	see above	x	x	x
What pressures and threats were mainly addressed by the conservation actions taken over the last reporting period?	Pressure and threats (Art12/17 data, multiple selection possible)	x	x	x
List of selected pressures and threats	List of pressure and threats	x	x	x
Comments	Text	x	x	x
B2 To what extent have conservation measures taken over the last reporting period addressed the following:				
Site based actions in the Natura 2000 network	Major, Moderate, Minor, Insignificant/none, Unknown	x	x	x
Actions in the wider environment (ie. outside the Natura 2000 network)	See above	x	x	x
Increasing habitat extent / area	See above	x	x	x
Maintaining, improving / restoring habitat condition	See above	x	x	x
Species-specific issues	See above		x	x
Comments	Text	x	x	x
B3 What contribution have the following types of measures made to the improvement?				
Species or Habitat Action Plan	Essential, Major, Moderate, Minor, No plan exists, Unknown, Insignificant/none	x	x	x
Site management plans	Essential, Major, Moderate, Minor, Unknown, Insignificant/none	x	x	x
LIFE projects	See above	x	x	x
Agri-environment measures, Natura 2000 measures and other Rural Development Measures	See above	x	x	x
Regional / Cohesion funds	See above	x	x	x
Common Fisheries Policy funds	See above	x	x	x
National public funds (other than co-financing)	See above	x	x	x
Private funds	See above	x	x	x
Innovative funding (e.g. payments for ecosystem services, other market based instruments etc)?	See above	x	x	x
Business support (e.g. sponsorship or partnerships for PR purposes etc)	See above	x	x	x
Public awareness and support	See above	x	x	x
Political awareness and support	See above	x	x	x

Parameter	Description	Relevant parameter		
		Habitats	Species	Birds
Landowners and other stakeholders awareness and support	See above	x	x	x
Actions for other EU environmental objectives - Which (WFD, ELD, MSFD, ND, NECD, Forest AP etc)?	WFD, MSFD, ELD, ND, FAP, NECD[15] (multiple selection possible)	x	x	x
Selected other EU environmental objectives	Text	x	x	x
Enforcement of legislation	Essential, Major, Moderate, Minor, Unknown, Insignificant/none	x	x	x
Actions outside EU	See above	x	x	x
Other, please specify	Text	x	x	x
Other, please specify Significance	Essential, Major, Moderate, Minor, Unknown, Insignificant/none	x	x	x
Comments	Text	x	x	x
B4. What has been the combined impact of the conservation measures on:				
Habitat extent	Major, Moderate, Minor, Insignificant/none, Unknown	x	x	x
Habitat quality – physical-chemical (e.g. hydrology)	See above	x	x	x
Habitat quality – biological structure / species composition	See above	x	x	x
Species survival rates	See above		x	x
Reproduction / breeding success	See above		x	x
Comments	Text	x	x	x
B5. Projects and references				
Provide the code numbers of any LIFE projects that have played a key role in the improvement	Text	x	x	x
List any other plans, projects or other initiatives that have played a key role in the improvement	Text	x	x	x
List key sources of further information on the main measures that have been taken; list reference codes here and provide full details in the reference sheet	Text	x	x	x
Comments	Text	x	x	x

2.4 Results from Task 1

2.4.1 Overview of feedback from Member States on the call for evidence

The responses received from the Member States during the call for evidence (1a and 1b questionnaire) addressing birds and habitats/species are indicated in Annex 6. With regards to the 1st phase of the Member State consultation 18 Member States participated in the process and validated to some extent the previously identified cases of Genuine Improvements for birds. In the 2nd phase of the consultation 13 Member States provided some data on the factors driving the MDI for birds and 14 for other species and habitats. However, in many cases the information provided in the 2nd phase consultation on the drivers of MDI only covered a selection of habitats and species, and/or factors affecting the MDI.

[15] WFD – the Water Framework Directive, MSFD – the Marine Strategy Framework Directive, ELD- the Environmental Liability Directive, ND – the Nitrates Directive, FAP – the EU Forest Action Plan, NECD – the National Emission Ceilings Directive.

2.4.2 Genuine Improvements in the Member States

Member States who had provided Article 17 responses that indicated a Genuine Improvement were asked to validate the improvements in the 1st phase of the consultation. Some Member States, which did not participate in the first consultation process, validated these Genuine Improvements as part of the 2nd phase of the consultation (including Portugal, Slovakia, Spain, Luxembourg and Lithuania). Those Member States that had not provided Article 17 information to identify Genuine Improvements (i.e. had not indicated the causes of change) were given the opportunity to provide this in the consultation process. Most Members States provided incomplete responses to the 1st consultation, and therefore a relatively large proportion of Genuine Improvements have not been validated and significant gaps in information on the reasons for change remain in the GID. Some of the Member States that did not respond to the consultation, or provide information that could enable the identification of Genuine Improvements and MDI, included some of the countries for which information on the causes of change were lacking in the Article 17 database (see Table 2-2), namely Bulgaria, Romania and Spain. As a result, no Genuine Improvements or MDI were identified from the Article 17 data for these countries', although a few were identified from other information sources.

The results of the validation process are shown in Table 2-13. It is important to note that, for the purposes of this study, reporting level improvements that are not-validated are nevertheless considered to be Genuine Improvements and were taken forward for consideration as MDI. This is because they are based on Article 12 and 17 reporting information provided by the Member States. In contrast, potential sub-reporting level Genuine Improvements are based on other information (such as from LIFE projects), and were therefore only considered to be actual Genuine Improvements if they had been validated by the Member State in which they occurred. For habitats 58% of the reporting level Genuine Improvements were validated, for HD species 88% and for BD birds 42%.

Table 2-13 Number of reporting level and sub-reporting level Genuine Improvements validated and not validated by each Member State

GI = Genuine Improvement at a reporting level. SR GI = Genuine Improvement at a sub-reporting level. Greece and Croatia are not included as reporting data were not available for them.

	HD Annex I habitats			HD Annex II, IV & V species			BD Annex I & II SPA trigger birds		
	GI - validated	GI - not validated	SR GI- validated	GI - validated	GI - not validated	SR GI - validated	GI - validated	GI - not validated	SR GI - validated
AT	0	0	0	12	0	0	14	0	0
BE	13	6	0	6	9	0	0	11	0
BG	0	0	0	0	0	0	0	43	0
CY	0	0	0	2	0	0	0	5	0
CZ	1	0	0	17	0	0	21	0	0
DE	2	0	0	28	0	0	24	7	0
DK	0	6	0	3	2	2	5	8	0
EE	5	0	3	2	0	2	12	5	0
ES	0	0	0	4	0	0	6	65	0
FI	1	0	0	2	0	1	18	0	0
FR	0	0	0	18	0	0	65	0	0
HU	0	0	0	8	0	0	17	0	0
IE	9	0	0	4	0	0	0	19	0
IT	0	0	0	15	0	1	0	32	0
LT	2	0	0	0	0	2	20	0	1
LU	0	0	0	4	0	0	11	0	0
LV	1	0	0	0	0	0	10	3	0
MT	0	0	0	2	0	0	2	0	0
NL	3	0	0	24	0	0	0	38	0
PL	1	0	0	16	0	0	18	0	0
PT	0	0	9	1	0	0	3	25	0
RO	0	0	0	0	0	0	0	13	0
SE	0	0	0	0	8	0	0	32	0
SI	2	0	7	1	0	14	15	1	0
SK	1	0	1	4	0	0	4	21	0
UK	0	18	0	0	5	0	0	43	0
Total	**41**	**30**	**20**	**173**	**24**	**22**	**265**	**371**	**1**
	71		**-**	**197**		**-**	**636**		**-**
	91			**219**			**637**		

2.4.3 Measure Driven Improvements in the Member States

In the 2nd phase of the consultation process, Member States identified and/or validated MDI and provided information on the drivers for these MDI. A breakdown of the results in terms of reporting and sub-reporting level types of MDI (as defined in section 2.3.1.) for each Member State is presented in Table 2-14 below (and all are listed Annex 7). **MDI-A, MDI-B and SR MDI-A were considered to be reliable MDI and therefore were the focus of the further analysis in the study** (see section 2.3.1 for definitions).

Table 2-14 Breakdown of MDI types by each Member State

MDI-A, MDI-B and SR MDI-A are considered to be reliable MDI and therefore the focus of the further analysis in the study. These are in green shaded cells below. Note: Greece and Croatia are not included as reporting data were not available for them.

	HD Annex I habitats						HD Annex II, IV & V species						BD Annex I & II SPA trigger birds					
	MDI-A	MDI-B	MDI-C	Uncertain	SR_MDI-A	SR_MDI-C	MDI-A	MDI-B	MDI-C	Uncertain	SR_MDI-A	SR_MDI-C	MDI-A	MDI-B	MDI-C	Uncertain	SR_MDI-A	SR_MDI-C
AT								8	4					11		3		
BE	10	6	3			14	3	6	4	3				7	1	2		
BG														30	10	1		
CZ	1							2						5				
CY							12		4	1			21					
DE		2				1		26	2			6		29		2		
DK		6				3	1	1	1			2	7			6		
EE	5				3						2		3		13			
ES						1	4						6	61	3	1		
FI		1				1		1		1		1		13		5		
FR								5	15					35	30			
HU						1	6						16					
IE		9				8			4						19			
IT								4	1	9		2		4	28			9
LT	2										2		20				1	
LU							4						11					
LV	1					22						1	7		2	1		4
MT													2					
NL	3					4	13		8	3			13	8	8	9		
PL		1				6		15		1				15	2	1		
PT					6		1						2	26				1
RO						12						11		6	4	3		1
SE						48		2	1	5		1		27		5		1

	HD Annex I habitats						HD Annex II, IV & V species						BD Annex I & II SPA trigger birds					
	MDI-A	MDI-B	MDI-C	Uncertain	SR_MDI-A	SR_MDI-C	MDI-A	MDI-B	MDI-C	Uncertain	SR_MDI-A	SR_MDI-C	MDI-A	MDI-B	MDI-C	Uncertain	SR_MDI-A	SR_MDI-C
SI	2				5	2	1				7		2		8	6		7
SK	1					7	4					3	4	21				37
UK		16		2		4		3	2					42	1			
Total	**25**	**41**	**3**	**2**	**14**	**134**	**49**	**73**	**46**	**23**	**11**	**27**	**114**	**340**	**129**	**45**	**1**	**60**
	66		**-**	**-**	**14**	**-**	**122**		**-**	**-**	**11**	**-**	**454**		**-**	**-**	**1**	**-**
	80					**-**	**133**					**-**	**455**					**-**
	668																	

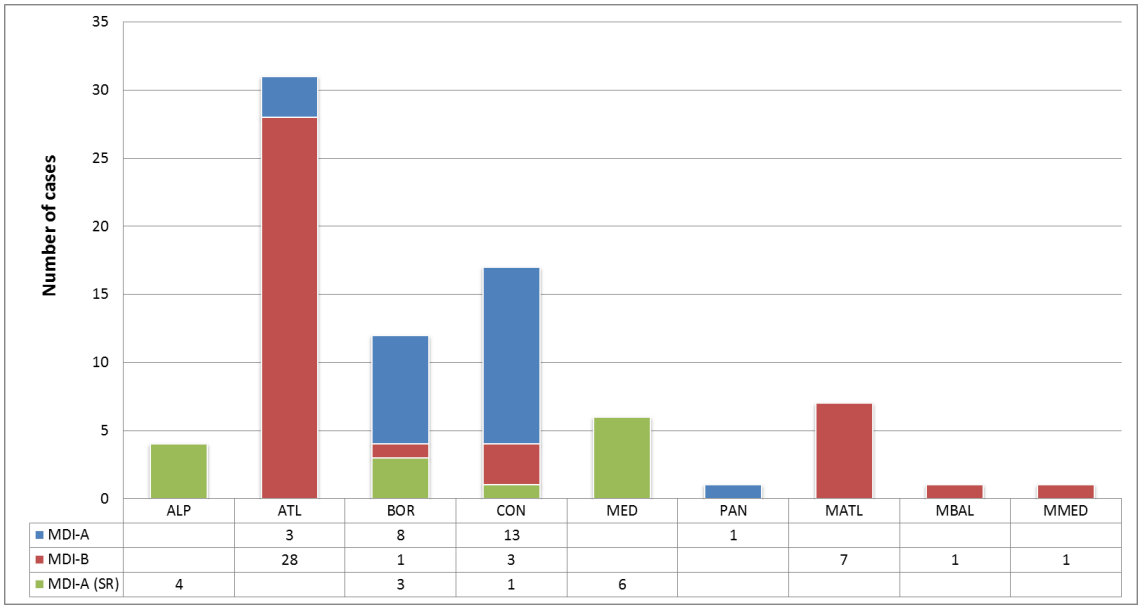
In total, this study identified 188 MDI-A, 454 MDI-B, 178 MDI-C and 26 sub-reporting level validated MDI-A (MDI-C are not considered further). However, as MDI-C would require further analysis to confirm, these were not further considered in the study. Therefore the total of MDI-A & B and sub-reporting MDI-A that were further analysed below and considered for case studies were 668. As the focus of the further analysis of the MDI was MDI-A and MDI-B and validated sub-reporting MDI-A Figures 2.2 to 2.5 below give an overview of these types of MDI.

The representation of each biogeographical region is shown in Figure 2-2. This clearly shows the high proportion of MDI that arise from the continental and Atlantic biogeographical regions, and to a lesser extent the boreal region for habitats, and the Alpine region for species. In contrast, there are very few MDI cases from marine biogeographical regions. The reasons for the large differences in the numbers of MDI from the various biogeographical regions are uncertain as gaps in the dataset make it difficult to ascertain whether the limited numbers are due to a real lack of MDI, or are the result of the missing information itself.

Figure 2-2 MDI A & B in relation to their biogeographical region

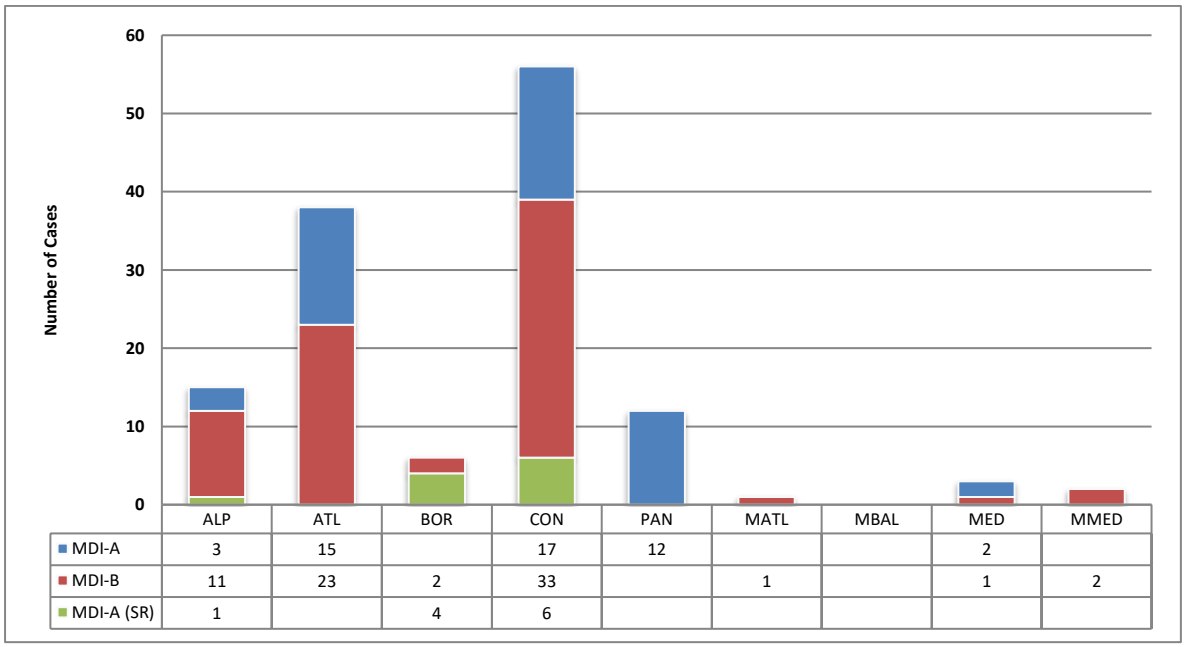
No MDI were identified for the Steppic, Black Sea, Pontic, Macaronesian, Marine Black Sea and Marine Macaronesian regions

a. Annex I habitats



	ALP	ATL	BOR	CON	MED	PAN	MATL	MBAL	MMED
MDI-A		3	8	13		1			
MDI-B		28	1	3			7	1	1
MDI-A (SR)	4		3	1	6				

b. Annex II, IV & V species

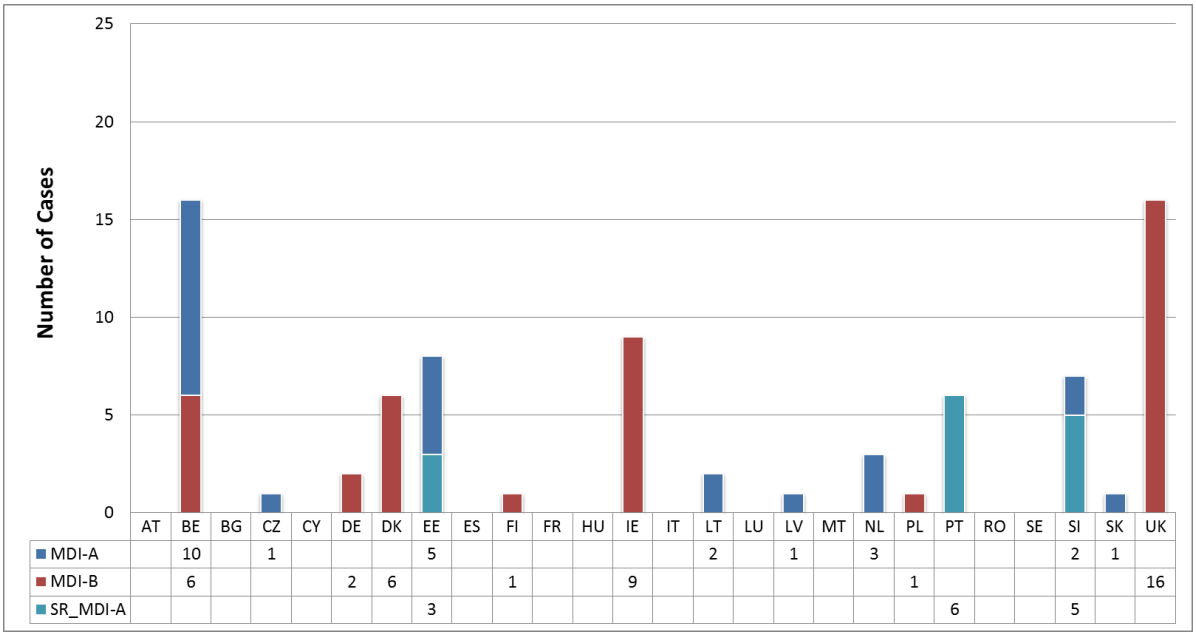


	ALP	ATL	BOR	CON	PAN	MATL	MBAL	MED	MMED
MDI-A	3	15		17	12			2	
MDI-B	11	23	2	33		1		1	2
MDI-A (SR)	1		4	6					

For habitats, in total 25 MDI were identified and validated (MDI-A), 41 cases were not validated by the Member State (MDI-B). In addition, 14 sub-reporting cases were validated as MDI-A. Of these 80 MDI, nearly half come from just two countries, Belgium and the UK (Figure 2-3). There are more than five habitat MDI cases for five other Members States, but for all others there are very few or no cases. This therefore provides a very patchy and rather unrepresentative sample of habitat MDI.

Similarly, the breakdown of the habitat MDI in Table 2-15 indicates that most of the cases relate to coastal habitats, with most others from five other habitat types: freshwater habitats, forests, grasslands, bogs etc, dunes. There are no MDI for any marine habitats.

Figure 2-3 MDI A & B for habitats listed on Annex I of the Habitats Directive



	AT	BE	BG	CZ	CY	DE	DK	EE	ES	FI	FR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
MDI-A		10		1				5							2		1		3					2	1	
MDI-B		6				2	6			1			9							1						16
SR_MDI-A								3													6			5		

Table 2-15 A breakdown of MDI A & B against broad habitat type and Member State

	Bogs etc	Coastal	Dunes	Forests	Freshwater	Grasslands	Heath & scrub	Rocky	Sclerophyllous scrubs	Tot
BE	3		2	4	1	3	2		1	**16**
CZ					1					**1**
DE					1	1				**2**
DK	2	4								**6**
EE	1	1			2	4				**8**
FI		1								**1**
IE		4		3			1	1		**9**
LT			2							**2**
LV			1							**1**
NL			1		2					**3**
PL						1				**1**
PT	1			3		2				**6**
SI	3	2		1	1					**7**
SK		1								**1**
UK		7	2	1	5		1			**16**
Tot	**10**	**20**	**8**	**12**	**13**	**11**	**4**	**1**	**1**	**80**
%	13%	25%	10%	15%	16%	14%	5%	1%	1%	

For HD species in total 49 MDI were identified and validated (MDI-A) and 73 cases were not validated by the Member State (MDI-B). Eleven sub-reporting cases were validated as MDI-A. Figure 2-4 indicates that there is considerable variation in the number of MDI identified across the Member States, with particularly high numbers in Germany, the Netherlands and Poland.

Figure 2-4 MDI A & B for species listed on Annex II, IV & V of the Habitats Directive

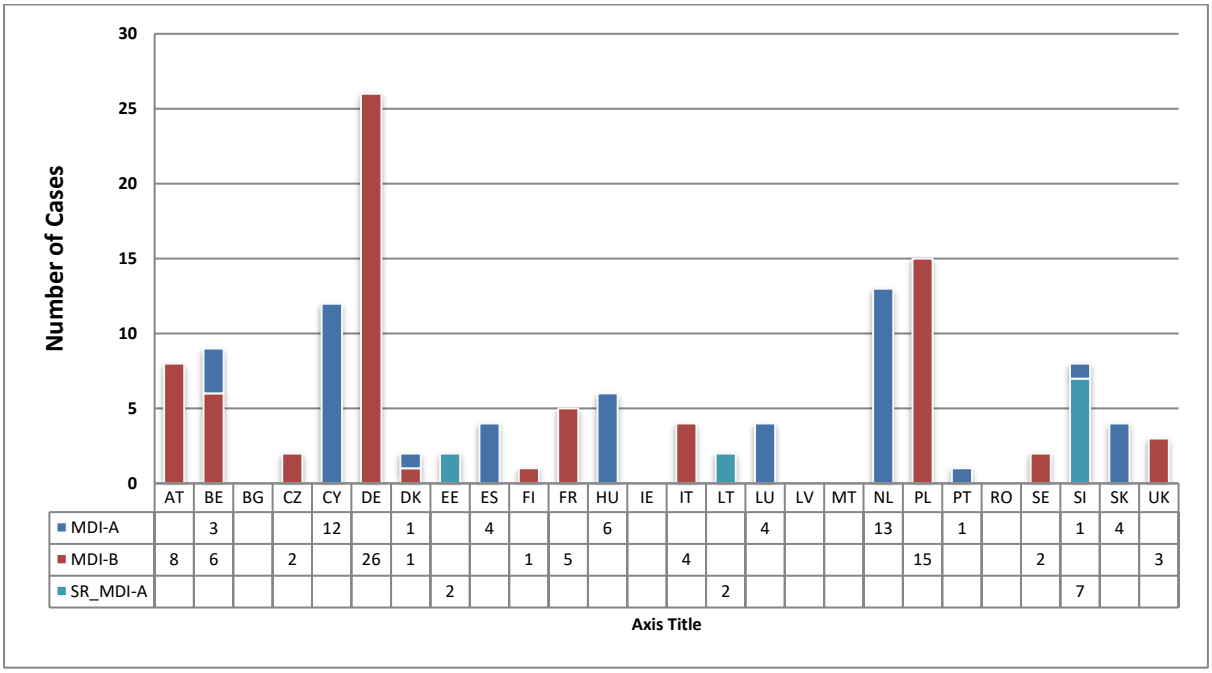


Table 2-16 below provides a breakdown of the HD species MDI in relation to their broad groups. Mammals are the group with the largest proportional share of the MDI (32%), but higher plants (i.e. vascular plants) and arthropods (mainly butterflies and dragonflies) also make up a significant share.

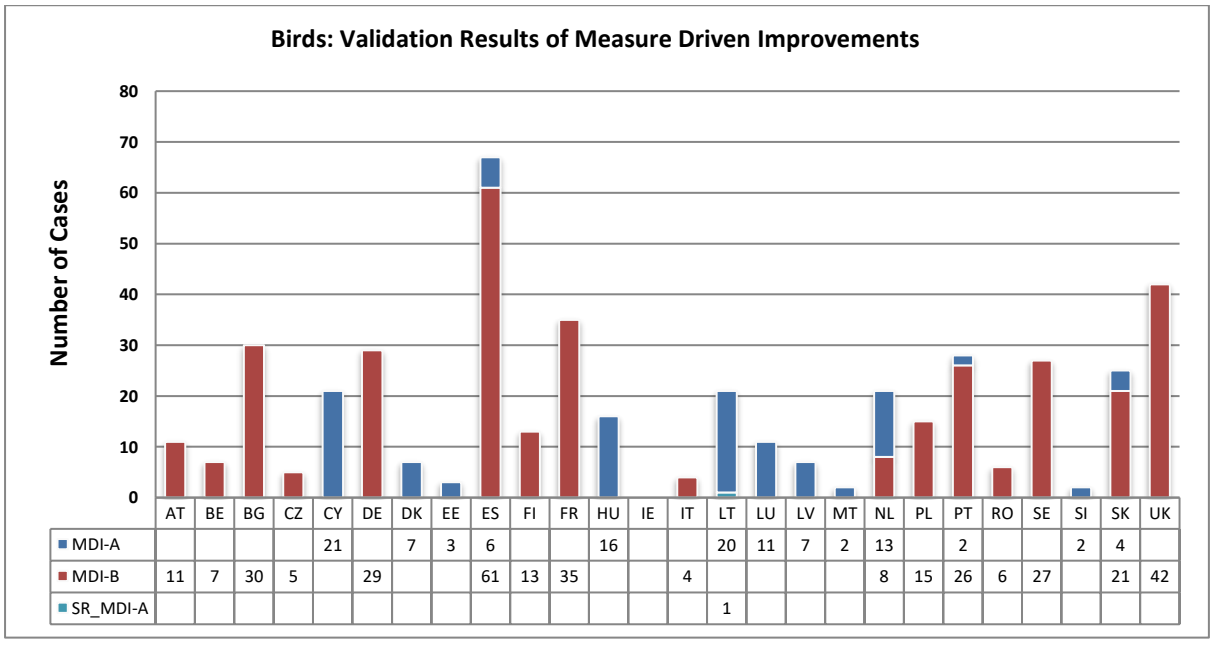
Table 2-16 A breakdown of MDI A & B against HD species group and Member State

	Lower plants	Higher plants	Arthropods	Molluscs	Fish	Amphibians	Reptiles	Mammals	Total
AT		3	1					4	**8**
BE		1	3	1	2			2	**9**
CZ							2		**2**
CY		3	2					7	**12**
DE	2	2	2	1	9		1	9	**26**
DK			1		1				**2**
EE						1		1	**2**
ES			2					2	**4**
FI								1	**1**
FR		1	4						**5**
HU		4	1				1		**6**
IT		1						3	**4**
LT						1	1		**2**
LU			1		1	1		1	**4**
NL	1		4		1	3	1	3	**13**
PL	1	8	1					5	**15**
PT								1	**1**
SE		1			1				**2**

	Lower plants	Higher plants	Arthropods	Molluscs	Fish	Amphibians	Reptiles	Mammals	Total
SI		1	1		2	3	1		**8**
SK		1	1					2	**4**
UK			1		1			1	**3**
Tot	**4**	**26**	**25**	**2**	**18**	**9**	**7**	**42**	**133**
%	3%	20%	19%	2%	13%	7%	5%	32%	

The highest number of MDI were amongst the bird species, with a total of 114 MDI confirmed by the Member States (MDI-A), 340 non-validated cases (MDI-B), and one sub-reporting case was validated as MDI-A, giving a total of 455. This is probably mainly due to the relatively complete Article 12 reporting data, and the additional identification of potential Genuine Improvements by Birdlife experts as part of this study. From Figure 2-5, it is clear that a large proportion of the MDI for birds comes from Spain, and this may in part reflect the large number of species listed on Annex I of the Birds Directive that occur there and some conservation efforts that have been targeted towards some of them in recent decades (e.g. for cereal steppe species, raptors and vultures). With the exception of Spain, the distribution of MDI is relatively even for most other countries, although there are several countries with very low numbers, and none have been identified from Ireland. The MDI dataset for birds is therefore relatively large and representative, however it should be noted that the majority of MDI for birds have not been validated by the Member State concerned.

Figure 2-5 MDI A & B for SPA trigger species listed on Annexes I and II of the Birds Directive



This initial analysis of the MDI indicates that a large majority of the MDI-A/B cases relate to birds, and there are particularly few cases involving habitats. This therefore needs to be borne in mind when interpreting the later further analysis of the MDI data and when drawing conclusions from the results of the study, as the factors affecting birds may not be representative of habitats and other species. As this could distort the results, the analysis carried out in this study treats each of these groups separately where appropriate and sample sizes allow.

2.4.4 Quantitative analysis of the drivers of the MDI

Member State Article 12 and Article 17 reporting data on implemented conservation measures

As discussed above, as a result of gaps in the Article 17 database and the limited response by Member States to the 2nd consultation on factors driving the identified MDI, the overall number of validated and non-validated Genuine Improvements and MDI are low for habitats and HD species, and GID information on the factors driving the MDI is missing for most habitats, HD species and birds. This has constrained the quantitative analysis that was envisaged under this study, and in particular precluded detailed statistical analysis of the results as the identified Genuine Improvements and MDI cannot be considered to be complete or a representative sample.

In response, the identification of drivers of MDI in this study has drawn more on the information collected from the detailed case studies, and wider related literature affecting the effectiveness of conservation measures (as discussed in chapter 4), than the data contained in the GID. Nevertheless, although a statistical examination is not appropriate, the Article 12 and 17 information on measures that were taken for the MDI, and the partial responses received on drivers of the MDI provide some valuable insights from the analysis set out below.

Of most obvious potential value, is the information supplied by each Member State on the measures that have been taken to maintain or enhance the species in question, according to the standard measure typology and reporting guidance (see Annex 5). As Member States are also required to indicate the impact of these measures, it is possible to analyse these data and identify those measures that appear to be most important in driving each MDI.

To analyse this information, the measures listed by each Member State were compiled into three tables for habitats, HD species and BD birds, and the percentage use of each conservation measure that was considered to have a high impact calculated in relation to the total list of high impact measures for each Member State. These tables are provided in Annex 8 and visual inspection of the variation in the use of the different measures suggests that there are no substantial or systematic variations in the use of the measures by the different Member States, and this seems to hold true for habitats, HD species and birds. Therefore, it appears to be justified to consider the average percentage use of each conservation measure as an indicator of its importance, and this information is therefore presented in
Table 2-17 below.

Interpretation of these results need to take into account the biases created by the variation in the numbers of different types of MDI that have been identified for the different types of habitats and taxa. Nevertheless, the frequent listing of the establishment of protected areas for MDI that have occurred for habitats, HD species and especially birds, gives a strong indication that these measures are of considerable and widespread importance. This may be as a result of the protection of the habitat and species itself, such as from developments, but also because it enables and encourages other measures to be taken, such as habitat management measures. It is also noteworthy, that the legal protection of habitats and species is frequently listed as a high-impact measure, and again especially so for birds. Given that a relatively high proportion of birds are subject to illegal hunting and other forms of persecution, compared to other species, this result is to some extent to be expected.

The results also indicate that many MDI relating to HD species especially, and to a lesser extent birds, are in part driven by specific species measures. This seems to indicate that there is often a need to go beyond general habitat protection and management requirements and to provide the specific ecological requirements of species, especially for those listed on Annex II of the Habitats Directive, as a high proportion of these are habitat specialists.

The relatively frequent listing of measures concerning the maintenance and restoration of grasslands, freshwater habitats, coastal habitats and forests, indicates the importance of these as general conservation measures. However, the percentage differences between these, and other habitat types, probably mainly reflects the relatively large number of MDI that were identified for these particular habitat types (see Table 2-15).

Table 2-17 Mean % listing across Member States of measures for MDI A & B that were considered to have had a high impact and maintained or enhanced the habitat and species

	Mean use across MS			
Measure listed in the Article 12 / 17 report	**Hab**	**HD Spp**	**Birds**	**Mean**
6.1 Establish protected areas/sites	14.3%	16.5%	26.1%	19.0%
8.0 Other measures		1.1%	30.0%	15.6%
6.3 Legal protection of habitats and species	5.6%	12.1%	20.9%	12.9%
2.1 Maintaining grasslands and other open habitats	17.7%	8.1%	5.4%	10.4%
7.4 Specific single species or species group management measures	0.9%	17.6%	8.7%	9.1%
4.2 Restoring/improving the hydrological regime	6.6%	7.3%	5.9%	6.6%
3.1 Restoring/improving forest habitats	11.8%	1.8%	5.7%	6.4%
4 Measures related to wetland, freshwater and coastal habitats	3.6%	4.9%		4.2%
4.1 Restoring/improving water quality	6.0%	3.2%	2.1%	3.8%
4.4 Restoring coastal areas	8.1%	1.7%	0.3%	3.4%
7.1 Regulation/ Management of hunting and taking	0.4%	3.8%	4.3%	2.8%
6.0 Other spatial measures	5.0%	1.8%	1.3%	2.7%
6.4 Manage landscape features	2.6%	3.3%	1.9%	2.6%
3.2 Adapt forest management	2.7%	2.3%	2.6%	2.5%
4.0 Other wetland-related measures	0.4%	3.2%	3.4%	2.3%
2.0 Other agriculture-related measures	1.9%	2.1%	1.6%	1.9%
4.3 Managing water abstraction	2.6%	0.9%	1.4%	1.6%
8.2 Specific management of traffic and energy transport systems		1.2%	1.8%	1.5%
2.2 Adapting crop production	2.2%	0.2%	1.6%	1.3%
7 Measures related to hunting, taking and fishing and species management	1.0%	2.4%	0.2%	1.2%
2 Measures related to agriculture and open habitats	2.0%	0.1%		1.0%
9.2 Regulating/Managing exploitation of natural resources on sea	1.7%		0.3%	1.0%
7.2 Regulation/ Management of fishery in limnic systems	0.7%	1.9%	0.1%	0.9%
1.2 Measures needed, but not implemented	0.2%	1.1%	1.3%	0.9%
6.5 Adaptation/ abolition of military land use	0.8%			0.8%
3.0 Other forestry-related measures		0.6%	0.9%	0.8%
6.2 Establishing wilderness areas/ allowing succession	0.8%	0.6%	0.5%	0.6%
9.1 Regulating/Management exploitation of natural resources on land			0.5%	0.5%
7.3 Regulation/ Management of fishery	0.2%		0.6%	0.4%
8.1 Urban and industrial waste management	0.2%			0.2%
1.1 No measures needed		0.1%	0.1%	0.1%
5.0 Other marine-related measures			0.1%	0.1%
Total	100%	100%	100%	100%

Source: Article 12 and 17 data for 2007-2012 reporting period, as contained in the GID

Additional new Member State information on drivers of MDI

As described above, additional information was gathered from the Member States during the 2nd phase questionnaire and added to the GID on key factors that may affect the efficacy of conservation measures for MDI A-C habitats and species, including more information on the types of conservation measures taken for each of them and their context (as shown in Table 2-12). Such information was received from 13 Member States as indicated in Table 2-18.

Table 2-18 The number of MDI for which Member States provided information in the 2nd phase of the consultation (questionnaire 1b) on factors affecting the improvements

See Table 2-12 for the list of questions.

	Habitats Directive Annex I listed habitats	Habitats Directive Annex II, IV or V listed species	Birds Directive Annex I and II listed SPA trigger species
AT			
BE	10	3	
BG			
CZ	1	12	
CY			
DE			
DK			
EE	7		3
ES		4	5
FI			
FR			
HU		8	15
IE			
IT			
LT	1		3
LU		4	11
LV	1		6
MT			2
NL	3	15	
PL			
PT	6	1	2
RO			
SE			
SI	8	7	2
SK	1	4	2
UK			
TOTAL	**38**	**58**	**51**

As only half of the Member States responded to the 2nd questionnaire and most answered a relatively small proportion of questions, there are many gaps in the information available on these drivers. The

results of the analysis of the information provided on drivers of the MDI, as presented in Table 2-19 to Table 2-25 below, should therefore be treated as only being indicative. They should also be interpreted carefully, taking into account the distribution of the Member States that responded and the overall limited representivity of the MDI. Particular care should be taken where the percentages are based on low numbers of responses to specific questions (as indicated in the tables). The implications of these results are further discussed, together with the findings of this study's case studies, and some other key studies, in Chapter 4.

The Member State responses summarised in Table 2-19 clearly show the importance of Natura 2000 sites, and other protected areas, as the majority of MDI occurred where a large proportion of the habitat or species concerned occurred within such networks. This was especially the case for habitats and species listed on the Habitats Directive. However, high coverage within protected area networks does not appear to have been a pre-requisite for achieving MDI as a sizeable proportion also occur where there is no or little protected area coverage, and this was particularly the case for birds.

There was also a tendency for most MDI to occur on public land, especially for habitats. This may be because in some countries a high proportion of Natura 2000 sites comprise public land, and it may in any case be generally easier to undertake conservation measures on public land. Nevertheless, a sizeable proportion of MDI were for species that are concentrated on private land, with examples in the GID being the Iberian Lynx (*Lynx pardinus*) in Portugal and European Pond Turtle (*Emys orbicularis*) in Slovenia.

Table 2-19 MDI A & B in relation to protected area coverage and land ownership

Habitats = Habitats Directive Annex I listed habitats; HD Species = Habitats Directive Annex II, IV or V listed species; Birds = Birds Directive Annex I and II listed SPA trigger species

	% coverage in the complete protected area network, whether public or private			% of range on land in private ownership		
	Habitats	HD Species	Birds	Habitats	HD Species	Birds
0 – 20%	20%	15%	17%	70%	27%	46%
21 – 40%	0%	10%	21%	9%	15%	23%
41 – 60%	10%	12%	12%	4%	23%	23%
61 – 80%	10%	10%	12%	13%	8%	3%
81 – 100%	60%	54%	38%	4%	27%	6%
Responses	30	41	42	23	26	35

Further evidence of the importance of the Natura 2000 network is provided in Table 2-20, which indicates that most MDI for habitats, HD species and birds involved site-based actions of moderate or major importance within the network. In contrast a much smaller proportion of MDI involved important measures in the wider environment. However, there were also some MDI for species, and a large proportion of birds, that were also dependent on measures outside the network, presumably as they are dispersed species at some point in the life-cycle. Examples of such MDI amongst birds include the White-tailed Eagle (*Haliaeetus albicilla*) in Estonia, and the Roller (*Coracias garrulus*) in Hungary.

Table 2-20 The extent to which measures were taken for MDI A & B within the Natura 2000 network and the wider environment

Habitats = Habitats Directive Annex I listed habitats; HD Species = Habitats Directive Annex II, IV or V listed species; Birds = Birds Directive Annex I and II listed SPA trigger species

	Site based actions in the Natura 2000 network			Actions in the wider environment		
	Habitats	HD Species	Birds	Habitats	HD Species	Birds
Insignificant/none	3%	0%	0%	37%	28%	0%
Minor	11%	10%	9%	60%	52%	26%
Moderate	21%	34%	40%	3%	20%	64%
Major	66%	55%	51%	0%	0%	10%
Responses	38	29	45	30	25	39

According to the Member State responses, the conservation measures that were taken for habitats, HD species and birds consistently tended to focus more on improving or restoring the quality of habitats / species' habitats than extending their area (Table 2-21). This is probably because it is normally easier, and therefore more cost-effective, to improve the condition of a habitat than to extend its area which would normally require more challenging habitat recreation or creation measures. It may also reflect limitations in the opportunities for increasing the area of habitats in some countries, such as where landuse changes have occurred that make it impractical or too expensive.

Table 2-21 The extent to which measures for MDI A & B were taken to increase habitat extent, improve habitat condition or address species specific issues

Habitats = Habitats Directive Annex I listed habitats; HD Species = Habitats Directive Annex II, IV or V listed species; Birds = Birds Directive Annex I and II listed SPA trigger species

	Increasing habitat extent / area			Maintaining, improving / restoring habitat condition			Species specific measures	
	Habitats	HD Species	Birds	Habitats	HD Species	Birds	HD Species	Birds
Insignificant/none	19%	39%	15%	8%	4%	3%	3%	2%
Minor	35%	21%	26%	8%	11%	18%	31%	21%
Moderate	30%	21%	50%	29%	39%	54%	28%	38%
Major	16%	18%	9%	55%	46%	26%	38%	38%
Responses	37	28	34	38	28	39	29	42

The results in Table 2-21 also clearly indicate that species specific measures played an important role in the MDI, probably in addition to habitat measures, as they were a moderate or major competent of more than two-thirds of MDI for species and birds. The need for, prioritisation and coordination of species specific measures is often carried out through the development of species action plans, and their importance in many MDI is shown in Table 2-22. The evidence is particularly strong for birds, as action plans were considered to be essential for 51% of the 39 MDI where Members States ranked their importance. As discussed in Chapter 4 this is consistent with a review of the impacts of species action plans (Barov and Derhé, 2011), and the finding from an EEA analysis of Article 12 reporting data that a high proportion of Annex I breeding birds with a species action plan have increasing population trends, and a low proportion have a declining trend (EEA, 2015). However, it is also noteworthy that a significant proportion of MDI were achieved where no habitat or species plan exists.

Site management plans are also widely considered to be a key tool for identifying and agreeing on conservation measures, especially as a vehicle for facilitating stakeholder dialogue, and obtaining funding (De Blust et al, 2010; European Commission, 2013, 2014b; Eurosite, 1999, 2010; Kruk et al, 2010). Furthermore, the Fitness Check study (Milieu, IEEP and ICF, 2016) found that the lack of management plans in some countries / regions was a major constraint on the implementation of the Nature Directives. Consequently, it is not surprising that for those MDI where the role of management plans were assessed they were considered to have played a major or essential role for 90% of habitats and 77% of birds (Table 2-22). Their role for HD species was lower, but they were judged to have made a moderate or greater contribution to most MDI.

Table 2-22 The contribution of plans to MDI A & B

Habitats = Habitats Directive Annex I listed habitats; HD Species = Habitats Directive Annex II, IV or V listed species; Birds = Birds Directive Annex I and II listed SPA trigger species

	Species or Habitat Action Plan			Site management plans		
	Habitats	HD Species	Birds	Habitats	HD Species	Birds
No plan exists	29%	33%	37%	3%	0%	0%
Insignificant/none	32%	2%	0%	0%	20%	0%
Minor	0%	10%	0%	0%	34%	23%
Moderate	0%	19%	10%	7%	15%	0%
Major	29%	17%	2%	37%	12%	26%
Essential	11%	17%	51%	53%	15%	51%
Unknown	0%	2%	0%	0%	5%	0%
Responses	28	42	41	30	41	39

The Nature Directives Fitness Check study also found that the level of enforcement of the Directives and other environmental regulations was an important factor affecting the degree to which their objectives are being obtained. This is also reflected in the findings from this study, especially for birds, where enforcement was considered to play an essential role in 71% of the MDI where responses were received on its role (Table 2-23). This is probably due to illegal hunting and persecution being a contributory factor to declines in a large proportion of birds, especially amongst birds of prey and disturbance sensitive species. This is illustrated by the following MDI examples for birds where enforcement actions were considered to be essential measures: White-tailed Eagle (*Haliaeetus albicilla*) in Estonia and Hungary, Eagle Owl (*Bubo bubo*), Black Stork (*Ciconia nigra*) and Common Raven (*Corvus corax*) in Hungary, and Great Bustard (*Otis tarda*) in Hungary and Portugal. Enforcement measures also played at least a moderate role for most habitat and HD species MDI for which responses on its contribution were received, and were considered to be essential for Brown Bear (*Ursus arctos*), Iberian Lynx (*Lynx pardina*) and White-clawed Crayfish (*Austropotamobius pallipes*) in Spain.

Table 2-23 The role of enforcement of regulations in MDI A & B

Habitats = Habitats Directive Annex I listed habitats; HD Species = Habitats Directive Annex II, IV or V listed species; Birds = Birds Directive Annex I and II listed SPA trigger species

	Habitats	HD Species	Birds
Insignificant/none	31%	7%	0%
Minor	0%	11%	0%
Moderate	26%	46%	7%
Major	37%	25%	11%
Essential	0%	11%	78%
Unknown	6%	0%	4%
Responses	35	28	27

The availability of funding is a key factor affecting the implementation of required conservation measures, and as a result it is unlikely that any MDI will have occurred without it to a significant degree (e.g. relying solely on other measures such as enforcement regulation). Therefore, the results indicated in Table 2-24, are of particular relevance to this study and provide several important insights concerning the sources of funds that have driven MDI.

Most obviously, from the MDI for which responses were received, the vast majority of MDI were dependent on public funds, of which LIFE funding (under the LIFE+ 2007-2013 programme) was the most important, especially for habitats and HD species. However, it is also apparent that a sizeable proportion of the MDI were achieved without significant contributions from LIFE funds, presumably as a result of the use of other sources such as EU agri-environment, regional development and/or national funds (although it is not possible to ascertain from the available GID data which funds were most important when LIFE funding was not used). The Member State responses do indicate that agri-environment measures played a major or essential role for a significant proportion of MDI for habitats and birds, although they did not play more than a moderately important role for other species. Regional and cohesion funds appear to have been more important for habitat MDI, but care needs to be taken in interpreting this finding, as all the MDI cases where this source of funding made a major or essential contribution were from one Member State, Estonia; where presumably particular efforts were made to utilise this funding source. It is perhaps surprising that agri-environment measures did not play a greater role in the MDI, and therefore this is explored in more depth in Chapter 4.

It is not surprising that Common Fisheries Policy (CFP) funding had an insignificant or minor role for habitats, and for most HD species, given that no MDI were identified for marine habitats (except some intertidal habitats) and very few marine species. In contrast, even though few MDI for birds involved marine species, CFP funding was of moderate importance for 25% of the bird MDI for which responses were received on its importance, and was essential for the Yelkouan Shearwater (*Puffinus yelkouan*) and the Mediterranean Storm Petrel (*Hydrobates pelagicus melitensis*) in Malta (case study MT-1).

The results shown in Table 2-24 also clearly show that private funds, innovative funding instruments and direct support from business played an insignificant or minor role in nearly all the MDI for habitats, birds and other species. There was, however, one known case where business support played a major role, and this involved the two seabirds in Malta (as mentioned above). There was also one HD species case where it was reported that private funding and business support made a moderate contribution to the MDI: the White-faced Darter dragonfly (*Leucorrhinia pectoralis*) in Slovakia. It therefore seems that such cases are rare, and there is some way to go before the funding of biodiversity conservation

measures from private / innovative sources becomes sufficient to commonly carry out measures at the scale necessary to achieve population or biogeographical level impacts.

Table 2-24 The contribution of funding sources to MDI A & B

Habitats Directive Annex I Habitats

Impact	LIFE projects	Agri-environment & N2k measures & other RDP measures	Regional / Cohesion funds	Common Fisheries Policy funds	National public funds (other than co-financing)	National private funds	Innovative funding	Business support
Insignificant / none	16%	33%	55%	97%	38%	100%	76%	93%
Minor	11%	15%	0%	3%	14%	0%	0%	3%
Moderate	27%	18%	17%	0%	7%	0%	0%	0%
Major	11%	0%	3%	0%	21%	0%	0%	3%
Essential	30%	15%	21%	0%	3%	0%	0%	0%
Unknown	5%	18%	3%	0%	17%	0%	24%	0%
Responses	37	33	29	29	29	29	29	29

Habitats Directive Annex II, IV and V species

Impact	LIFE projects	Agri-environment & N2k measures & other RDP measures	Regional / Cohesion funds	Common Fisheries Policy funds	National public funds (other than co-financing)	National private funds	Innovative funding	Business support
Insignificant / none	48%	50%	77%	96%	14%	69%	79%	71%
Minor	2%	15%	4%	0%	39%	19%	0%	17%
Moderate	7%	35%	8%	0%	21%	4%	0%	4%
Major	12%	0%	4%	4%	21%	0%	0%	0%
Essential	31%	0%	0%	0%	4%	0%	0%	0%
Unknown	0%	0%	8%	0%	0%	8%	21%	8%
Responses	42	26	26	26	28	26	24	24

Birds Directive D Annex I & II SPA trigger birds

Impact	LIFE projects	Agri-environment & N2k measures & other RDP measures	Regional / Cohesion funds	Common Fisheries Policy funds	National public funds (other than co-financing)	National private funds	Innovative funding	Business support
Insignificant / none	38%	50%	43%	57%	23%	21%	21%	11%
Minor	11%	11%	0%	0%	33%	12%	7%	0%
Moderate	18%	18%	43%	25%	13%	17%	0%	4%
Major	11%	5%	0%	0%	13%	0%	0%	4%
Essential	22%	11%	5%	7%	5%	5%	0%	7%
Unknown	0%	5%	8%	11%	13%	45%	71%	74%
Responses	45	44	37	28	39	42	28	27

Table 2-25 presents the Member States' assessments of the extent to which the MDI depended on the support of the public, politicians and affected landowners and other stakeholders. As might be expected, the support of all these groups is at least of moderate importance for most habitats, birds and other species. However, there are some indications of variations in their importance amongst various groups. Support, especially from politicians and stakeholders, was considered to be essential for driving a large proportion of MDIs. There was, however, a tendency for HD species MDI to be less dependent on the support of the public and politicians. Overall, the MDI were judged to be most dependent on the support of landowners and other stakeholders, with this being of at least moderate importance for more than 70% of MDI for habitats, HD species and birds. However, most of these differences are fairly slight, and as with all the other results presented above, due to the relatively small sample sizes and limited representativeness of the MDI, all these results should be only treated as indicative.

Table 2-25 The extent to which measures for MDI A & B have depended on public, political and other stakeholder support

Habitats = Habitats Directive Annex I listed habitats; HD Species = Habitats Directive Annex II, IV or V listed species; Birds = Birds Directive Annex I and II listed SPA trigger species

	Public awareness and support			Political awareness and support			Landowners and other stakeholders awareness and support		
	Habitats	HD Species	Birds	Habitats	HD Species	Birds	Habitats	HD Species	Birds
Insignificant /none	14%	24%	0%	17%	38%	3%	14%	18%	0%
Minor	14%	24%	24%	14%	7%	34%	0%	11%	23%
Moderate	31%	31%	27%	38%	41%	18%	38%	32%	26%
Major	10%	17%	44%	21%	7%	0%	24%	32%	7%
Essential	24%	3%	5%	3%	3%	45%	14%	7%	44%
Unknown	7%	0%	0%	7%	3%	0%	10%	0%	0%
Responses	29	29	41	29	29	38	21	28	43

The Ib questionnaire also asked Member States to indicate the importance of actions outside the EU (e.g. for migratory species or with respect to long-distance pollution). These results are not indicated in a table, as there were no cases where such actions were reliably known to have contributed to MDI amongst habitats or HD species. Furthermore, for birds the actions were of insignificant, minor or unknown importance for all MDI, except for two (Yelkouan Shearwater and the Mediterranean Storm Petrel). These results are discussed further in relation to a specific question on the importance of external actions in section 4.2.8.

Case studies of measure driven improvements

3.1 Task objectives

This task aimed to examine in detail a number of representative case studies of measure driven improvements (MDI), as identified in Task 1, in order to ascertain who, when and by whom the MDI had been achieved, giving particular attention to how the improvements are to be maintained in the long-term. Each case study covered one or more species and habitats and Member States. A further important aim was to ensure that they are as representative as possible of the range of Member States, biogeographic regions, habitat and species groups that had shown MDI. Furthermore, they also aim to cover examples that are likely to be widely relevant and replicable so that the lessons learnt from them are of generic value, and to reflect priority issues, such as addressing the particular challenge of achieving FCS in agricultural habitats. According to the study specification it was envisaged that 75 case studies would be carried out.

To meet the aims of the study and task, the following case study selection criteria were developed and applied. To ensure representatively and reflect conservation priorities, **each** case study had to:

- Be a verified MDI (A or B, or sub-reporting level) with reliable evidence that the actions featured in the case study at least contributed to the observed genuine improvement (as ascertained in task 1).
- Result from actions that were primarily taken for habitats and species that are the focus of the Nature Directives.
- Have sufficient information available to complete the majority of the sections in the case study pro forma.
- Provide generic lessons that are likely to be applicable to other situations and habitats and species.
- Be based on actions that followed general principles of good practice and did not lead to unforeseen negative impacts such as on the environment or socio economic impacts on local communities.
- Be based on actions that were efficient as well as effective (i.e. good value for money) and did not lead to disproportionate costs or burdens on administrations or other stakeholders.

As a **set**, the case studies were also selected as much as was feasible to:

- Be representative of the main groups of species and habitats that are the focus of the Nature Directives (e.g. birds, other vertebrates, plants, invertebrates, forests, grasslands, wetlands, coastal and marine habitats).
- Be representative of all EU Member States and biogeographical regions.
- Give priority to cases that involve the most influential drivers, taking particular account of the results from task 1b.
- Give priority to improvements that are likely to be replicable elsewhere and able to provide quick improvements reliably.

- Give priority to cases that address habitat and species groups that are most threatened.

- Where feasible the case studies also aimed to include examples of cases that illustrate the full range of approaches that have been shown to drive MDI, including good practice examples of:
  - Strategic conservation planning.
  - Terrestrial and marine spatial planning.
  - Trans-boundary measures.
  - Approaches to delivering appropriate management on private land.
  - The use of site management plans.
  - The development of species action plans for threatened species.
  - Actions for species affected by hunting and fishing (e.g. management plans).
  - Public and stakeholder awareness raising measures.
  - Stakeholder participatory projects.
  - Improved governance and enforcement.
  - Specific research into the causes of a species or habitat unfavourable conservation status and the measures that need to be taken to improve it.
  - Use of agri-environment and other Rural Development measures.
  - Measures tackling pollution, e.g. airborne nitrogen eutrophication.
  - Measures that addressed site isolation and fragmentation, such as improving ecological connectivity in the Natura network (e.g. through additional site designation, corridors and stepping stones and other green infrastructure).
  - Synergistic measures linked to other EU directives and environmental objectives e.g. Good Ecological Status and the Water Framework Directive.
  - The use of novel funding sources such as payments for ecosystem services.
  - Measures outside the EU, such as for migratory species in their breeding or wintering areas.

3.2 Selected case studies

An initial list of 72 case studies was compiled from the MDI identified in Task based on the criteria above. In interpreting the selection criteria, cases were selected where the Member State had:

- Confirmed that it was an MDI over the last reporting period, unless there are very good alternative sources of information (e.g. clear indications from the Article 12/17 responses) that measures have been taken that had a high impact and enhanced the habitat or species.

- NOT indicated that it would be an unsuitable case study (except for Portugal, where it appears that a mistake was made in filling out the questionnaire, as all MDI were indicated as being unsuitable case studies). Preference was given to cases that had been recommended by the Member State but this was not a prerequisite and was balanced against other selection criteria.

- Indicated in Part A of the GID that one or more measures had been taken that had a high impact and led to the enhancement of the status of the habitat or species (i.e. contributed to the MDI), and that such measures went beyond just the protection of the species and/or site.

- Given clear indications in Part B of the GID that concerted measures had been taken during the last reporting period, and suitable sources of information on them are available (e.g. LIFE projects listed by the Member State). However, as most fields of part B of the GID were not

completed by Member States, this assessment was supplemented by checks of the LIFE project database.

The number of initially selected case studies (72) was a little lower than the envisaged 75 because it was difficult to meet many of the required criteria, in particular due to gaps in the information provided by Member States in the Article 12 and 17 reports on conservation measures and in the 2nd questionnaire / Part B of the GID during the 2nd consultation phase. Thus, although the collated information in the GID was able to identify many more than 75 cases of MDI, it was difficult to assess many of them reliably in terms of their suitability as case studies. The requirement to ensure representivity and avoid duplications also limited the number of case studies that could be selected for the most well documented taxa (e.g. birds) and some Member States.

After agreement with the Commission, the initially selected case studies were investigated by the appointed study team author, in consultation with the NEEMO LIFE external monitoring team for those cases where one or more LIFE projects had played a significant role. Contact was also made with the respective LIFE project managers, and other project managers, nature authority staff and other experts as necessary. As a result some case studies were dropped, due to new information casting significant doubt on the reliability of the Genuine Improvement, or on it being the result of conservation measures, i.e. whether it was an MDI. Some case studies were also dropped because it was considered that they did not meet other criteria, such as in relation to the availability of information.

As a result of the initial investigations, 53 cases were taken forward for completion, as listed in Table 3-1 according to Member State, and summarised in Table 3-2 below in relation to the coverage of biogeographic regions, Member States, habitats and taxa. Annex 8 lists the case studies grouped according to habitat type and species group. The summary sections of each case study are included in Annex 10 (see contents list for section and page numbers), and the full case studies can be found on the DG Environment website.

Table 3-1 The case studies prepared under Task 2

MS & no.	Habitat / species included	Habitat type / taxa	BGR
AT-1	*Myosotis rehsteineri*	Higher plant	ALP
BE-1	N Atlantic wet heaths (4010) + other habitats and associated species	Habitat - heath & scrub	CON
BE-2	Freshwater Pearl Mussel (*Margaritifera margaritifera*)	Invertebrate - mollusc	CON
BG-1	Pygmy Cormorant (*Phalacrocorax pygmeus*) & Ferruginous Duck (*Aythya nyroca*)	Bird	-
CY-1	Loggerhead Turtle (*Caretta caretta*) & Green Turtle (*Chelonia mydas*)	Reptiles	MMED
DE-1	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260], European bitterling (*Rhodeus amarus),* Barbel (*Barbus barbus*), Eurasian Otter (*Lutra lutra*), European River Lamprey (*Lampetra fluviatilis*), Atlantic Salmon (*Salmo salar*)	Habitat - river, fish & mammal	ATL
DE-2	Eurasian Beaver (*Castor fiber*)	Mammal	ATL
DK-1	Green Gomphid (*Ophiogomphus cecilia*)	Invertebrate - dragonfly	CON
DK-2	North Sea Houting (*Coregonus oxyrhynchus*) NB. Due to taxonomic issues this species is not included in the GID	Fish	ATL
EE-1	Active raised bogs* [7110]	Habitat - bog	BOR
EE-2	Nordic alvar and precambrian calcareous flatrocks * [6280]	Habitat - grassland	BOR
EE-3	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]	Habitat - river	BOR
EE-4	Common Spadefoot Toad (*Pelobates fuscus*)	Amphibian	BOR
EE-5	European Mink (*Mustela lutreola*)	Mammal	BOR

MS & no.	Habitat / species included	Habitat type / taxa	BGR
ES-1	White-clawed Crayfish (*Austropotamobius pallipes*)	Invertebrate - crustacean	ATL & ALP
ES-2	Spanish Imperial Eagle (*Aquila adalberti*)	Bird	-
ES-3	Lesser Kestrel (*Falco naumanni*)	Bird	-
ES-4	Iberian Lynx (*Lynx pardinus*)	Mammal	MED
FI-1	Boreal Baltic coastal meadows [1630]	Habitat – coastal & halophytic	BOR
FR-1	*Biscutella neustriaca*	Higher plant	ATL
FR-2	Egyptian Vulture (*Neophron percnopterus*), Cinerous Vulture (*Aegypius monachus*), Bearded Vulture (*Gypaetus barbatus*) & Griffon Vulture (*Gyps fulvus*)	Birds	-
FR-3	Eurasian Spoonbill (*Platalea leucorodia*)	Bird	-
HU-1	Long-lasting Pink (*Dianthus diutinus*)	Higher plant	PAN
HU-2	Hungarian Meadow Viper / Orsini's Viper *(Vipera ursinii rakosiensis)*	Reptile	PAN
HU-3	Black Stork (*Ciconia nigra*)	Bird	-
IE-1	Sandbanks which are slightly covered by sea water all the time [1110], Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Large shallow inlets and bays [1160]	Habitat – coastal & halophytic	MATL
IE-2	*Taxus baccata* woods (91J0)	Habitat - forest	ATL
IT-1	Brown Bear (*Ursus arctos*)	Mammal	ALP
LT-1	European Pond Turtle (*Emys orbicularis*)	Reptile	BOR
LU-1	Violet Copper (*Lycaena helle*)	Invertebrate - butterfly	CON
LV-1	Dry sand heaths (2320)	Habitat - dunes	BOR
LV-2	Corncrake (*Crex crex*)	Bird	-
MT-1	Yelkouan Shearwater (*Puffinus yelkouan*) & Mediterranean Storm Petrel (*Hydrobates pelagicus melitensis*)	Bird	-
NL-1	Humid dune slacks (2190)	Habitat - dunes	ATL
NL-2	European Tree Frog (*Hyla arborea*)	Amphibian	ATL
NL-3	Varnished Hook-moss / Slender Green Feather-moss *(Drepanocladus vernicosus)*	Lower plant	ATL
NL-4	Little Tern (*Sterna albifrons*)	Bird	-
NL-5	Eurasian Otter (*Lutra lutra*)	Mammal	ATL
PL-1	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]	Habitat - grassland	CON
PT-1	Great Bustard (*Otis tarda*)	Bird	-
SI-1	Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation [3150], Raised bogs [7110], Transition mires [7140], Alkaline fens [7230], Bog forest - Sphagnum spruce woods [91D0].	Habitat - bogs, freshwater wetlands & forest	CON / ALP
SI-2	Mediterranean Killifish (*Aphanius fasciatus*)	Fish	CON
SK-1	Inland salt meadows [1340]	Habitat – coastal & halophytic	PAN
SK-2	Saker Falcon (*Falco cherrug*)	Bird	-
SK-3	Eastern Imperial Eagle (*Aquila heliaca*)	Bird	-
SK-4	Northern Chamois (*Rupicapra rupicapra tatrica*)	Mammal	ALP
SK-5	European Bison (*Bison bonasus*)	Mammal	ALP
UK-1	Mudflats and sandflats not covered by seawater at low tide [1140], Salicornia and other annuals colonizing mud and sand [1310], *Spartina* swards (Spartinion maritimae) [1320], Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	Habitat – coastal & halophytic	MATL & ATL
UK-2	Fisher's Estuarine Moth (*Gortyna borelii lunata*)	Invertebrate - moth	ATL
UK-3	Twaite Shad (*Alosa fallax*)	Fish	ATL
UK-4	Eurasian Bittern (*Botaurus stellaris*)	Bird	-
UK-5	Eurasian Stone Curlew / Eurasian Thick-knee (*Burhinus oedicnemus*)	Bird	-
UK-6	Greater Horseshoe Bat (*Rhinolophus ferrumequinum*)	Mammal	ATL

Although every effort was made to provide a coherent and representative sample of case studies as possible, it is clear that there is under representation of some broad habitat types, taxa and regions (Table 3-2). This primarily reflects the patterns of MDI that were identified by the Member States and gaps in the information provided on them. In particular, few or any MDI were identified for:

- Macaronesian, Steppic, Marine Baltic and Marine Mediterranean biogeographical regions.
- Inland and Mediterranean sand dunes.
- Mediterranean scrubland habitats.
- Rocky habitats.
- Marine species, e.g. no MDI for cetaceans.
- Invertebrates.

Table 3-2 The number of case studies in each Member State, biogeographical region, broad habitat type and species group

a. Biogeographical coverage of habitats and species case studies

No MDI and therefore case studies were identified for the Steppic, Black Sea, Macaronesian, Marine Black Sea and Marine Macaronesian regions.

Biogeographical Region	Habitats Directive Annex I listed habitats		Habitats Directive Annex II, IV or V listed species		Total	
	MDI A & B	Case studies	MDI A & B	Case studies	MDI A & B	Case studies
Alpine	4	1 with CON	15	4 + 1 with ATL	**19**	**4 + 2 mixed**
Atlantic	31	4	37	9 + 1 with ALP	**68**	**13 + 1 mixed**
Boreal	12	5	6	3	**18**	**8**
Continental	17	3 + 1 with ALP	56	3	**73**	**6 + 1 mixed**
Mediterranean	6		3	1	**9**	**1**
Pannonian	1	1	12	2	**13**	**3**
Marine Atlantic	7	1	1		**8**	**1**
Marine Baltic	1				**1**	
Marine Mediterranean	1		2	1	**3**	**1**
Total	**80**	**13 + 1 mixed**	**132**	**25**	**212**	**37 + 4 mixed**

NB. Birds are not included because their populations are not allocated to biogeographical regions.

b. Country coverage

No MDI or case studies were identified for Greece (due to unavailable reporting data) and Croatia as it was not a Member State over the period covered by this study.

Member State	Habitats Directive Annex I listed habitats		Habitats Directive Annex II, IV or V listed species		Birds Directive Annex I and II listed SPA trigger species		Total	
	MDI A & B	Case studies	MDI A & B	Case studies	MDI A & B	Case studies	MDI	Case studies
AT			8	1	11		19	**1**
BE	16	1	9	1	7		32	**2**
BG					30	1	30	**1**
CZ	1		2		5		8	
CY			12	1	21		33	**1**
DE	2	1 mixed	26	1 mixed + 1	29		57	**2**
DK	6		1	2	7		14	**2**
EE	8	3	2	2	3		13	**5**
ES			4	2	67	2	71	**4**
FI	1	1	1		13		15	**1**
FR			5	1	35	2	40	**3**
HU			6	2	16	1	22	**3**
IE	9	2					9	**2**
IT			4	1	4		8	**1**
LT	2		2	1	21		25	**1**
LU			4	1	11		15	**1**
LV	1	1			7	1	8	**2**
MT					2	1	2	**1**
NL	3	1	13	3	21	1	37	**5**
PL	1	1	15		15		31	**1**
PT	6		1		28	1	35	**1**
RO					6		6	
SE			2		27		29	
SI	7	1	8	1	2		17	**2**
SK	1	1	4	2	25	2	30	**5**
UK	16	1	3	3	42	2	61	**6**
Total	**80**	**13 + 1 mixed**	**132**	**25 + 1 mixed**	**455**	**14**	**667**	**53**

c. Habitat type coverage

According to habitats Directive Annex I typology.

Code	Habitat types	Number of MDI A & B	Number of case studies
1	Coastal	20	4
2	Dunes	8	2
3	Freshwater	13	3
4	Heath and scrub	4	1
5	Sclerophyllous scrubs	1	
6	Grasslands	11	2
7	Raised bogs, mires & fens	10	2
8	Rocky habitats	1	
9	Forests	12	2

d. Species coverage

Taxa groups	Number of MDI A & B	Number of case studies
Lower plant	4	1
Higher plants	26	3
Arthropods	25	5
Molluscs	2	
Fish	17	3 + 1 mixed
Amphibians	9	2
Reptiles	7	3
Birds	455	14
Mammals	42	8 + 1 mixed

It is important to note that the case studies do not necessarily represent the best examples of conservation measures for the habitats and species that were covered, or of the approaches and methods that they illustrate, and they may not have resulted in the most significant improvements. Instead they were selected to meet the range of selection criteria listed above (such as geographical balance). Furthermore, as it was not possible to meet all the criteria, their findings should also be interpreted with their limited representivity in mind, and therefore treated as illustrative, rather than providing a set of information that can then be further analysed. Nevertheless they provide an important and detailed body of information that provides numerous insights on many of the drivers of the MDI. These findings are therefore discussed in detail and lessons drawn from them in the following chapter.

Conclusions and recommendations on drivers of success

4.1 Introduction

This concluding chapter primarily draws on the Article 12 and 17 reporting information submitted by Member States, as contained in the GID and analysed in section 2.4, and the findings from the MDI case studies, as listed in Table 3-1 (and available as separate documents on the DG Environment website). In addition, it also takes into account evidence from the Nature Directives Fitness Check Study (Box 4.1) (Milieu, IEEP and ICF, 2016) and some other key studies (Deinet et al, 2013; Hochkirch et al, 2013; Kati et al, 2015; McKenna et al, 2014).

Box 4.1. The key factors that have contributed to or stood in the way of achieving the objectives of the Birds and Habitats Directives

Source: Edited concise version of the key findings from Chapter 5 of the evaluation study supporting the Fitness Check of the Birds and Habitats Directives (Milieu, IEEP and ICF, 2016)

- First and foremost, the availability of public funding. While the Nature Directives have undoubtedly increased the availability of EU funding, there is strong evidence to suggest that this is insufficient and/or difficult to access, both with regard to maintenance measures needed to avoid deterioration, and for restoration or other measures aimed at improving the status of species or habitats.
- The degree of political support for the Directives through its effects on funding and key implementation decisions, such as the ambitions of the Natura 2000 network.
- Uncertainty regarding the implications of some legislative provisions has led to numerous delays in implementation and conflicts with stakeholders (although such legal problems have become much less common).
- Awareness of the implications of the Directives for, and among, landowners and local communities.
- Levels of stakeholder cooperation, e.g. partnerships between nature authorities and nature conservation organisations and engagement with businesses.
- The level of ecological knowledge, such as the distribution of EU protected species and habitats and their ecological requirements.
- The use of management plans and whether they are developed according to best practice principles.
- The degree to which national and regional conservation objectives have been developed, as their absence frequently constrained strategic and site-level management planning.
- The existence of payments that encourage damaging agricultural, forestry and fishery practices, making it difficult to secure appropriate management agreements with landowners.
- The degree of integration with spatial planning and impact assessment procedures.
- Levels of expertise, capacity and standards in environmental authorities.
- Levels of enforcement of protection measures (and penalties), e.g. in relation to hunting and pollution incidents.

However, it was not within the scope of this study to carry out a thorough literature review on all of these factors and the others that affect the success of conservation actions. The use of other evidence, has therefore been mainly targeted to where there are clear information gaps and/or on issues that have been identified from this study as being of particular importance (e.g. the role of funding and agri-environment schemes).

Of particular importance are the factors that influence the long-term impacts of nature conservation interventions. However, this is difficult to examine from the information available in this study because the Article 12 and 17 reporting data, Member State consultation on MDI and the case studies primarily relates to relatively recent conservation measures. The MDI analysis was therefore

complemented by a review of the literature on the key factors that influence the long-term sustainability of conservation outcomes. Another information gap concerns the drivers of improvements in the marine environment, as very few marine MDI and case study examples were identified (largely due to a lack of information on status changes in marine habitats and species). To address this information gap a review of the factors affecting conservation success in the marine sector was also carried out. This drew on key literature on marine nature conservation issues and consultations with experts involved in monitoring marine LIFE nature projects. Most of the supplementary evidence found on marine conservation issues is presented in separate boxes and cross referred to in the main text.

The remains of this chapter are divided into three sections. The next section provides conclusions in relation to a number of key broad drivers of improvements of the status of habitats and species. In particular, each section focusses on the specific questions listed under each heading, which were included in the technical specification for this study. All of the questions included in the specification are included, although some have been split, or combined, with minor amendments. Other specific issues that have been subsequently identified as being of importance during the course of this study are also discussed where of relevance.

Section 4.3 then presents the findings of the complementary review of the literature on the key factors that influence the long-term sustainability of conservation outcomes.

The final section of the chapter draws on all of the evidence compiled and reviewed in the study, and related conclusions, to provide a concise set of priority recommendations relating to each of the key drivers of success. These aim to increase the success of conservation measures directed towards habitats and species that are the focus of the Nature Directives, and ultimately to increase the proportion of them that show genuine improvements in their conservation status.

4.2 Conclusions on key factors driving improvements in the conservation status of habitats and species

4.2.1 The role of political support, governance, institutions and their staff

- *To what extent can the targeted improvements be explained by the socioeconomic context, including societal and political support in the Member State/ region concerned?*

- *To what extent can targeted improvements be explained by strategic, politically endorsed decisions, as opposed to individual initiatives by dedicated individuals or NGOs?*

There is wide evidence from the literature that strong and coherent governance, effective supporting institutions (especially nature conservation authorities, but also others involved in land and sea management) and the meaningful involvement of stakeholders are pre-requisites for effective implementation of the Nature Directives and broader conservation actions (e.g. Milieu et al, 2014). This requires political support, as the coherence and enforcement of environmental policies and legislation is essential, because little can be gained from implementing effective measures that support habitats and species (e.g. relating to their protection from hunting) if other actions are taking place that undermine them (e.g. conflicting policies or prohibited actions that degrade or destroy the habitat). However, such problems can often be avoided by appropriate consideration of the potential impacts of policies and their implementation choices (e.g. use of EU funds), which needs good governance and institutions, and in turn adequate funding (see 4.2.6). Whilst the more positive proactive involvement of politicians in instigating environmental strategies is likely to be helpful in most situations, there is little evidence of it being a key driver of MDI from this study as there are no obvious examples in any of the case studies.

The fundamental importance of strong governance and institutions is illustrated in a number of case studies. Most notably, strong governance combined with effective enforcement when environmental regulations are contravened has underpinned the improvement in the conservation status of several species that had been subject to persecution, most obviously including the large carnivores, such as Iberian Lynx (ES-4) and Brown Bear (IT-1) and to some extent some birds of prey, for example Spanish Imperial Eagle (ES-2), and Eastern Imperial Eagle (SK-3). Similar conclusions are drawn for large carnivores and birds of prey in a study of selected mammal and bird species that have recovered their populations in Europe (Deinet, et al, 2013). In contrast, there is widespread evidence, such as from the Fitness Check study, that where enforcement is weak and illegal hunting or persecution continues such species remain restricted to a small part of their former range. This is, for example, still the case with the Hen Harrier (*Circus cyaneus*), which remains under intense pressure from illegal persecution in England (Potts, 1998; Avery 2015). But effective governance is not just important for protecting species from persecution. For example, in Estonia it is considered that the national level governance of nature conservation is well established and generally works well. This provides the essential foundations for developing further more specific and targeted actions that build on the existing nature protection and management measures in place, such as those relating to the Common Spadefoot Toad (EE-4).

In many countries, responsibilities for nature conservation and related issues are devolved to regional or other subnational bodies. Thus, strong governance and effective institutions are also a necessity at these levels too, but their resources are often more limited. Such regionalisation can enable conservation measures to be more tailored to needs, and can help with the engagement of stakeholders. But it can also make it more difficult to develop and coordinate the multiple regional actions that are often required to scale up nature conservation measures to a level that results in a change in conservation status. This was, for example, found in Spain where interregional cooperation on conservation actions for the Iberian Lynx (ES-4) was not easy to achieve and/or maintain in some cases.

Experience from marine environmental governance also indicates that it is necessary to involve a combination of people, state and market incentives, which need to be adapted to the local context in which the conservation activity takes place. However, while community engagement often contributes to the success of the measures (see below), a clear legal mandate in the form of a relevant public authority/agency is often a cornerstone for successful conservation projects, as was demonstrated by Osmond et al (2010). Legislation can clarify responsibilities, provide the mandate for implementation, surveillance and enforcement, and reduce opportunities for individual stakeholder interests to override the primary goal of ecosystem conservation. Other governance incentives can be used to augment the benefits of successful stakeholder engagement. For example, community stewardship can be promoted through the allocation of legally enforced community property rights – as can be seen in marine protected areas such as Torre Guaceto (Italy) where only fishermen resident in one of the two adjacent municipalities are permitted to operate inside the protected area (ICF, IEEP and PML, 2018). This enhances the interest of those fishermen in ensuring the long-term sustainability of commercial species in the area. This has encouraged fishermen to both respect the restrictions on fishery activities, and to collaborate with the monitoring activities carried out by the MPA staff and report illegal fishing activity.

The socio-economic situation in a country or region can be an important factor influencing political support for nature conservation measures, especially where they may result in high opportunity costs (Box 4.2). In such cases, it is especially important to have a well-established governance structure, with decision making overseen by public authorities with clear legal mandates, that foster community stewardship through allocated property rights, and transparent and systematic processes to balance

trade-offs and limit the scale of potential opportunity costs. Where there are unavoidable and significant opportunity costs, then compensatory funding is likely to be required such as through CAP funded Natura measures or agri-environment measures (as further discussed in section 4.2.6).

Box 4.2 A lack of political will can undermine conservation efforts

The Cetáceos Mediterráneo - Conservation of cetaceans and turtles in Andalusia and Murcia (LIFE02 NAT/E/008610) aimed to engage all relevant stakeholders and interest groups in the development of management plans for both turtles and cetaceans in the southern coast of the Iberian Peninsula. The success of this project rested on the ability to arrive at a compromise between the users and managers of the sea, including by engaging with the fishing sector, which expressed concerns that conservation efforts would threaten local livelihoods. Despite a wealth of working documents, protocols and materials being produced and implemented, the conservation plan for the Common Bottlenose Dolphin (*Tursiops truncatus*) and Loggerhead Turtle (*Caretta caretta*) has not been legally approved due to a lack of political will.

The motivation, professionalism and collaboration of the people who are driving forward the nature conservation measures on the ground is also a key factor influencing the likely success of initiatives. As there are often many challenges to be solved, the final impacts of conservation projects can stand or fall depending on the commitment and drive of the key personnel involved. Clearly there are numerous successes where dedicated individuals and groups of people based in NGOs (PT-1 Great Bustard, FR-3 Eurasian Spoonbill, UK-5 Stone Curlew), zoos (EE-5 European Mink), universities/research institutions (EE-4 Common Spadefoot Toad), or collaborations between such organisations (CY-1 Loggerhead and Green Turtles) have pushed projects through from inception to success. Long-term commitment and collaboration at an organisational level was seen as vital to the success of the majority, if not all, these examples.

Even within public sector-led successes, it is often the determination of small groups of individuals that conceive, push for and deliver the conservation goals. For example, the reintroduction of European Bison to Slovakia (SK-5) was driven by employees of the State Nature Conservancy of the Slovakian Republic (ŠOPSR) in the Poloniny National Park team and other sections. In this case, there seem to have been political or administrative hurdles to be jumped, which at least delayed implementation of some conservation measures. This only emphasises the importance of determination on the part of the conservationists. In the case of Lesser Kestrels in Spain (ES-3), the formation of a team of biologists within the Junta de Andalucia generated a critical mass of conservation-minded staff who can be credited with driving several important policies and programmes forward. In this case, the Birds and Habitats Directives, Spanish legislation, political will and presumably public opinion combined to support the creation of these administrative teams with the mandate to deliver conservation goals. Furthermore, work on the Lesser Kestrel was also carried out by NGOs, either individually or in tandem with Spanish national and regional authorities and/or with private funding.

In some cases success can be largely the result of one particular highly motivated individual that has driven forward the conservation of a species over a long period of time. This is very well illustrated in the case study involving the European Mink (EE-5), as this project was championed by one such individual, who worked hard and persevered to overcome the initial resistance of the local population to the reintroduction of the species.

In conclusion, this study provides some supporting evidence from the case studies and literature that strong and coherent governance, with effective supporting institutions, is a key common factor that underpins many successful conservation measures, most obviously the protection of species that are at risk of persecution, and habitats that are vulnerable to harmful activities. Another common driver

of success is the strong motivation and commitment of particular individuals. What kind of organisation they work for is less important, though teams involving different sectors are perhaps best placed to address the multi-faceted dimensions of the work involved. Nevertheless, no matter how dedicated an individual or team, conservationists need the opportunity to operate (i.e. political/administrative permission) and the funding necessary to create the critical mass and continuity of expertise to drive and achieve large-scale impacts (see section 4.2.6 discussion on funding).

4.2.2 The role of land owners and other stakeholders

- *Taking into account that large areas of conservation interest in the EU are under private ownership and not primarily dedicated to conservation purposes, to what extent have there been targeted improvements that could clearly be linked to actions on private lands, both within with protected areas and the wider environment?*

- *What were the main drivers explaining the feasibility of such measures?*

In most Member States, many sites of high nature conservation importance consist of, or incorporate large areas of private land, and state owned land may also often be used for other purposes, such as forestry. Therefore, except for rare and very restricted species that only or predominantly occur on nature reserves, in almost all cases nature conservation needs to involve landowners, and other stakeholders (e.g. farming organisations, foresters, hunters, fishers, industry, local communities). This was shown in the Member States' responses to the questionnaire on factors affecting MDI, which revealed that, for those MDI where information was given on the proportion on private land, 21% of habitat MDI, 32% of bird MDI and 58% of HD species MDI occurred where more than 40% of the range of the habitats or species was on private land (Table 2-19). Thus, adequate and effective stakeholder consultation and engagement would seem to be essential to achieve many MDI. Indeed, there is good evidence relating to the implementation of the Nature Directives that where inadequate consultation with stakeholders has occurred, then this has often led to or exacerbated conflicts that held up conservation actions such as those concerning the designation of Natura 2000 sites and the establishment of conservation measures for them (Milieu, IEEP, and ICF, 2016).

The importance of avoiding conflicts in the management of the Natura 2000 network through better stakeholder engagement has been realised for some time, and consequently a European Commission project was started in 2009 to address the issue. It found that in most of the studied countries there were frameworks for stakeholder consultation (e.g. as part of management plan development), but these were mostly informative processes with limited participation, and joint goal setting and management planning was more an exception than a rule (Bouwma et al, 2010b). This was in part because the consultation procedures were often hampered by the large number of stakeholders, as well as a lack of (qualified) staff. However, it is widely recognised that the deeper the level of participation, the more likely it is that stakeholder support for nature conservation will be obtained. This has been demonstrated in France, where local committees including key stakeholders are strongly involved in developing and writing Natura 2000 management plans. The project also carried out a review of best practices (Alterra, Eurosite and ECNC, 2009/10) and produced a summary report with recommendations (Bouwma et al, 2010b), which is available on the DG Environment website[16].

This current review of drivers of success provides evidence that good stakeholder involvement can go beyond the avoidance of conflicts to provide a basis for developing joint positive nature conservation goals and carrying out substantial collaborative actions. This is illustrated in several of the case studies, including the Iberian Lynx in Spain (ES-4) which was run by national and regional governments, but in

[16] http://ec.europa.eu/environment/nature/natura2000/management/best_practice_en.htm

close in partnership with a number of public and private companies, hunting entities and NGOs. The involvement of the hunting organisations was especially important, as most of the land where the Iberian Lynx is present is privately owned and used for hunting. Through the coordination of a LIFE project (LIFE99 NAT/E/006336) the various hunting organisations were involved and used to communicate and coordinate the conservation actions, resulting in around 300 agreements with land owners to manage the habitats for the lynx and its main prey species, rabbits, as well as allowing access to their land for research and monitoring purposes. All this was achieved with no financial incentives, the benefits being instead the healthy lynx and rabbit populations, and some stimulation to local jobs and ecotourism.

An example of landscape scale actions for a species that was widely found on private land outside protected areas is that of the Common Spadefoot Toad in Estonia (EE-4). In this case, through two LIFE projects (primarily LIFE08NAT/EE/000257) major efforts were made to communicate with stakeholders, particularly landowners, to raise awareness of the need for pond restoration and creation for the species. Project staff communicated directly with local people and landowners on a frequent basis during the preparation and implementation of project actions, for example addressing landowners concerns about restrictions being placed on the use of their land. This led to voluntary agreements with the landowners to have ponds on their land, so that by the end of the project the number of ponds being used for breeding by the species had increased by over 200. Other case studies of MDI that were highly reliant on strong partnerships with private landowners and/or other stakeholders include the Lesser Kestrel (see above, ES-3), the Violet Copper butterfly (LU-1), the Northern Chamois (SK-4) and Corncrake in Latvia (LV-2). In the case of the chamois, successes were achieved in the High Tatras mountains of Slovakia where conservation programmes were supported by a 30-month participatory process; whilst local conflicts still create challenges in other parts of the country. Similarly, in the Corncrake case study, it was found that out of several LIFE projects for the species, the ones that were most successful where those that involved public stakeholders and had regular meetings with the press, public authorities, unions, and other associations to stimulate volunteer actions by landowners and others.

Evidence from the review of marine conservation measures also indicates that involving a wide range of stakeholders can help to achieve the targeted conservation outcomes. It provides a sense of ownership, trust and commitment and can foster long-term interest in protected areas. While users of the sea (e.g. fishermen) are a target group that deserves special attention, the need to involve terrestrial stakeholders may also be critical as many problems at sea have a terrestrial origin (e.g. marine litter). A novel and progressive approach for the sustainable management of coastal habitats, which can be also transferred to other coastal regions, has been initiated by fish and shellfish farmers in Ireland to promote public consultation on their operations and future plans (IE-1) (Department of Agriculture, Food and the Marine, 2015). The Co-ordinated Local Aquaculture Management Systems (CLAMS) is a national initiative throughout Ireland to manage aquaculture development in bays and inshore waters at a local level. CLAMS co-operatively tackles a range of issues and plans developed under CLAMS integrate aquaculture interests with relevant national policies and concerns of other interest groups using the bays and inshore waters. Ireland is leading the development of this unique and progressive approach to bay and inshore waters management (Department of Agriculture, Food and the Marine, 2015).

In conclusion, in most cases nature conservation needs to involve private landowners, and/or other stakeholders, even if the measures are to be carried out on state land as they may often require the collaboration of other state actors (e.g. forestry or water authorities). Thus, adequate and effective stakeholder consultation and engagement is essential, and there is evidence demonstrating this from the literature and numerous case studies. Where stakeholder consultation and involvement is inadequate then this can lead to conflicts that become a significant barrier to the implementation of

conservation actions. In contrast, good stakeholder involvement can go beyond the avoidance of conflicts, to deeper engagement that provides a basis for developing joint positive nature conservation goals and carrying out substantial collaborative actions.

4.2.3 The role of the Natura 2000 network and other protected areas

- *What is the importance of the Natura 2000 network of sites (and associated legal requirements in terms of site protection, site management, and setting of conservation objectives and measures) in relation to the targeted improvements?*

- *To what extent are targeted improvements related to area-based policies and measures (i.e. site management)?*

- *For targeted improvements that are based on area-based actions, what is the ownership structure of the land targeted by the improvement measures?*

Protected areas represent the cornerstones of almost all national and international conservation strategies and are thus considered to be essential for the conservation of biodiversity. This is explicitly recognised in a number of multi-national environmental agreements (e.g. CBD, Ramsar Convention, Bern Convention). The role of protected areas is a key component of the Birds Directive, through the designation of SPAs by Member States for Annex I listed birds and other migratory species. Subsequently the Habitats Directives also has the development of a coherent network of protected areas (i.e. SACs) at its heart. However, this takes a larger-scale biogeographical approach to conservation prioritisation. Under this the SCIs are identified within each biogeographical region to form an adequate representative system of sites, which may be based on a coverage target for each habitat or species that reflects their conservation priority. Once agreed with the European Commission the SCIs are designated as SACs by the respective Member State. Together the SPAs and SACs comprise the Natura 2000 network.

Now the Natura 2000 network (ie. SPAs and SACs) is nearly complete within the terrestrial environment, covering some 790,000 km^2 (18.2% of the EU land area), while the marine network covers 532,000 km^2 (c. 6% of the EU marine area)[17]. Although progress has been slower with the establishment of the marine Natura 2000 network, there is now an increasing pace of designation. It is also important to note that there is evidence that the Nature Directives were important drivers of this increase in protected area coverage, as this increased substantially in several Member States after the Directives came into force or the country acceded to the EU, including Croatia, Estonia, Spain and the UK (EEA, 2012; Underwood et al, 2014).

Furthermore, a study of population trends in birds has provided evidence of the benefits of SPAs on bird at a population level (Donald et al, 2007). This was shown by the finding that there is a positive correlation across the EU-15 between the population trend of species and the proportion of land designated as SPAs. Furthermore this pattern is apparent for both Annex 1 and non-annex 1 species, although the impact is significantly stronger for Annex 1 species. Unfortunately, the data required to carry out such an in depth analysis for HD species are currently unavailable. However, the State of Nature Report (EEA, 2015) compared the status and trends of Annex I habitats and Annex II species with their coverage in Natura 2000 sites, and found a statistically positive correlation between the level of Natura 2000 coverage and the conservation status trend amongst species and habitats that had an unfavourable status.

[17] Natura 2000 barometer, 18 May 2018 update https://www.eea.europa.eu/data-and-maps/dashboards/natura-2000-barometer

Evidence for the benefits of Natura 2000 and other protected areas on habitats and species covered by the Nature Directives comes from both the Article 12 and 17 reporting and numerous case studies. As indicated in
Table 2-17, the establishment of protected areas had the highest overall average percentage listing as a conservation measure that was considered to have a high-impact, being listed for 14.3% of Annex 1 habitat MDI, 16.5% Annex 2 species MDI and 26.1% Annex 1 bird species MDI. However, it should be noted that for each of these groups it was the second most frequently reported high-impact measure; but as the other measures were not consistent between the groups, it had the highest overall average high-impact of one single measure.

As discussed in section 4.2.3, the information provided by the Member States on MDI in the second stage consultation also shows the importance of the Natura 2000 and wider protected area network in two ways. Firstly, it is clear that the protected area networks across the EU contain a large proportion of the habitat area, and populations of HD species and birds for which MDI were observed, particularly for habitats and HD species (Table 2-19). Secondly, a large proportion of the most important actions that contributed to MDI occurred within the Natura 2000 network, especially for habitats (Table 2-20). The Member States reported many MDI where the major actions taken were within the Natura 2000 network, including many that are the subject of case studies, such as concerning the Freshwater Pearl Mussel (BE-1), *Dianthus diutinus* (HU-1), Hungarian Meadow Viper (HU-2), Northern Chamois (SK-4), Iberian Lynx (ES-4), Black Stork (HU-3), Great Bustard (PT-1), Yelkouan Shearwater and Mediterranean Storm Petrel (MT-1), Spanish Imperial Eagle (ES-2), Lesser Kestrel (ES-3).

There are more examples amongst the case studies of the Natura 2000 network and other protected areas being a key driver of MDI. Some of these demonstrate the importance of the protection *per se* given to the areas both in terms of preventing the potential loss of the sites (e.g. to developments) but also damaging activities. One such notable case is that of the Eurasian Spoonbill in France (FR-3). Spoonbills first bred in France at protected sites that had been important migratory stopovers previously. As the Spoonbill expanded its breeding sites along the Atlantic coast, new nature reserves were designated to protect it, most of which contributed to the Natura 200 network for the species. In the case of the lakeshore plant *Myotis rehsteineri* (AT-1), the designation of the Natura site provided the legal basis for limiting gravel extraction nearby, which enabled the restoration of the plant's beach habitat. Similarly, in the Netherlands, the designation of Natura 2000 sites, and interaction with spatial planning legislation, made it possible to introduce zoning measures to manage human disturbance on beaches that are used by nesting Little Terns (NL-4).

In some cases, protected area designation is additionally important for stimulating the required conservation measures for the habitats and species that are present, and increasing access to funding (e.g. LIFE projects). This is, for example, illustrated in the case of the Mediterranean Killifish in Slovenia (SI-2), where a number of Natura 2000 sites were established for the species in lagoons and disused saltpans. These designations protect the sites from damage and at the same time led to the establishment of conservation measures to restore suitable habitat conditions for the fish, which were threatened by the abandonment of traditional salt production. Similarly, in Lithuania a LIFE project (LIFE09 NAT/LT/000581) improved habitat conditions for the European Pond Turtle (LT-1), by firstly developing an expanded ecological network for the species, in part through the creation of four new Natura 2000 sites. This designation of the Natura 2000 sites in turn led to the development of site management plans which include specific habitat maintenance measures for a ten-year period. In the case of the moss *Drepanocladus vernicosus* (Nl-3), the designation of a site as a protected area allowed the site manager to make the drastic changes to the water management that were necessary to improve its water quality substantially. Although not intended this enabled the return of the species.

There were insufficient Member State responses to the factors affecting MDI in questionnaire 1B to enable a detailed comparison of land ownership between cases where the major focus was on site based activities in contrast to where they were of low importance. However, comparison of the data did not suggest that there are differences between the general pattern of findings for habitats, HD species and birds shown in Table 2-19.

In conclusion, whilst it is not possible to quantify the added impact that the designation, protection and management of the Natura 2000 and wider protected area network is having, it is obvious that it is often a key driver, whether directly or indirectly, of the observed MDI in habitats, HD species and birds. This is especially the case for habitats and species that tend to be concentrated within Natura 2000 network, but conservation measures within the network also play an important role for more widespread species as the sites often comprise high quality habitats/species' habitats that are key core areas in wider ecological networks.

4.2.4 The role of broad conservation measures

- *To what extent are targeted improvements related to broad non-site based policy measures and actions (e.g. those related to diffuse pollutants, etc.)?*

Whilst the analysis above has shown the importance of protected areas in driving many of the MDI, it is widely accepted that conservation measures are also needed in the wider environment, for two primary reasons. Firstly protected areas are not isolated from the wider environment, and therefore conservation measures are needed to address wide scale pressures and threats such as related to water and air pollution. Secondly, many habitats and species have dispersed distributions, and therefore their protection and conservation cannot be efficiently achieved just through the designation and management of protected areas for them.

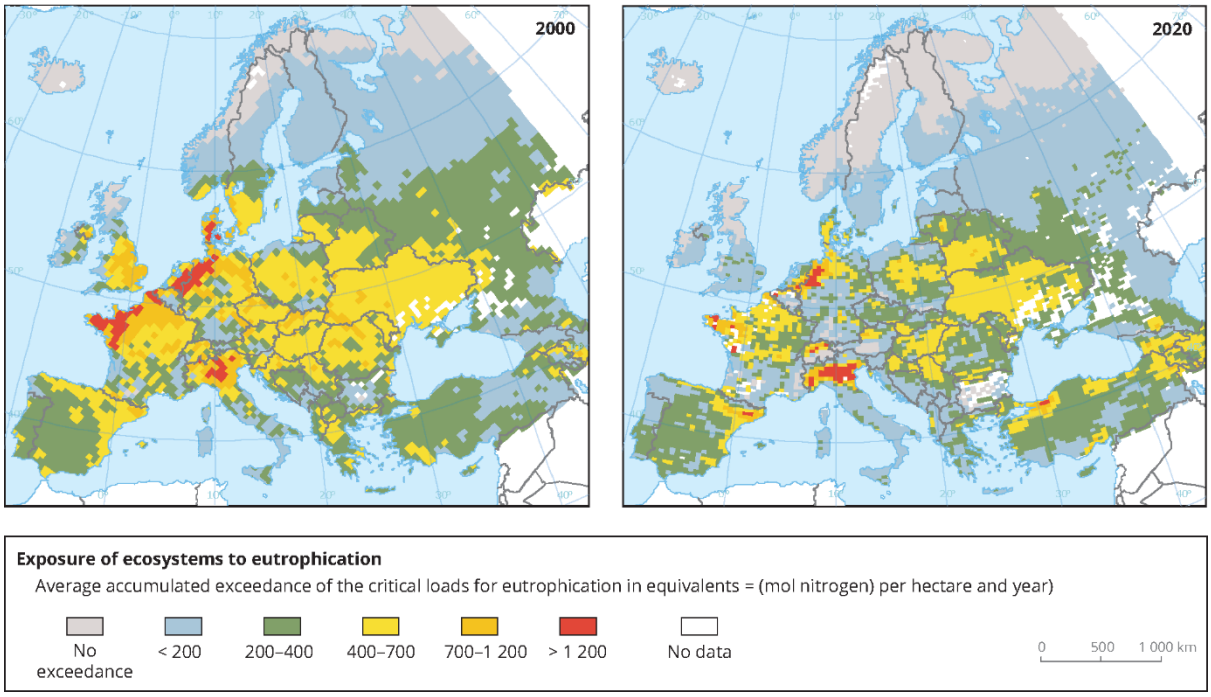
Evidence from this study suggests that broad scale measures were not an important component of most of the MDI as discussed in relation to the results presented in Table 2-20. This shows that for the MDI where the importance of the actions in the wider environment had been assessed in the 2nd phase consultation, actions in the wider environment were of insignificant or minor importance for nearly all habitats and 80% of species. They appeared to be more important for birds, being assessed as moderate importance for 64% of species and of major importance for 10%. However, it is difficult to interpret these results as the apparent low importance of actions in the wider environment may reflect the difficulties of implementing some broad conservation measures and achieving large-scale impacts that are sufficient to result in an MDI at a reporting level. It might also be partly due to some benefits from broad measures (e.g. reductions in pollution) being masked by more intensive shorter term conservation measures (e.g. vegetation management), so the benefits of the broader actions may not become apparent until later.

In fact, it is noteworthy that few MDI were identified for habitats with extensive distributions that are vulnerable to eutrophication from ongoing high levels of nitrogen deposition, as critical levels are being significantly exceeded over much of Europe, especially in Belgium, the Netherlands, Denmark, north-west France and parts of northern Italy (Figure 4-1). Such high levels of deposition are almost certainly a major constraint on the achievement of favourable conservation status of vulnerable habitats (Slootweg et al, 2014). According to the Member State Article 12/17 information supplied on pressures, only 12 MDI for habitats were found in the GID that listed nitrogen pollution (code H.04.02) as a pressure that was being addressed. Nine of these were heath and bog habitats in Belgium, one relating to the case study on north Atlantic wet heaths (BE-1), which clearly indicates that continuing high levels of nitrogen deposition is a major continuing pressure, resulting in the need for ongoing mitigation measures (e.g. turf/sod removal) and constraining further habitat restoration. Although the case shows that measures can be taken to overcome the ongoing pollution and achieve an MDI, it is

questionable how sustainable such measures are, both in financial terms (as the mitigation measures are intensive and expensive), and practical terms, as turf stripping damages the habitats and denudes the seed bank and soil fauna.

Figure 4-1 Areas exposed to eutrophication due to critical loads for freshwater and terrestrial habitats being exceeded

Source: EEA, 2017[18]



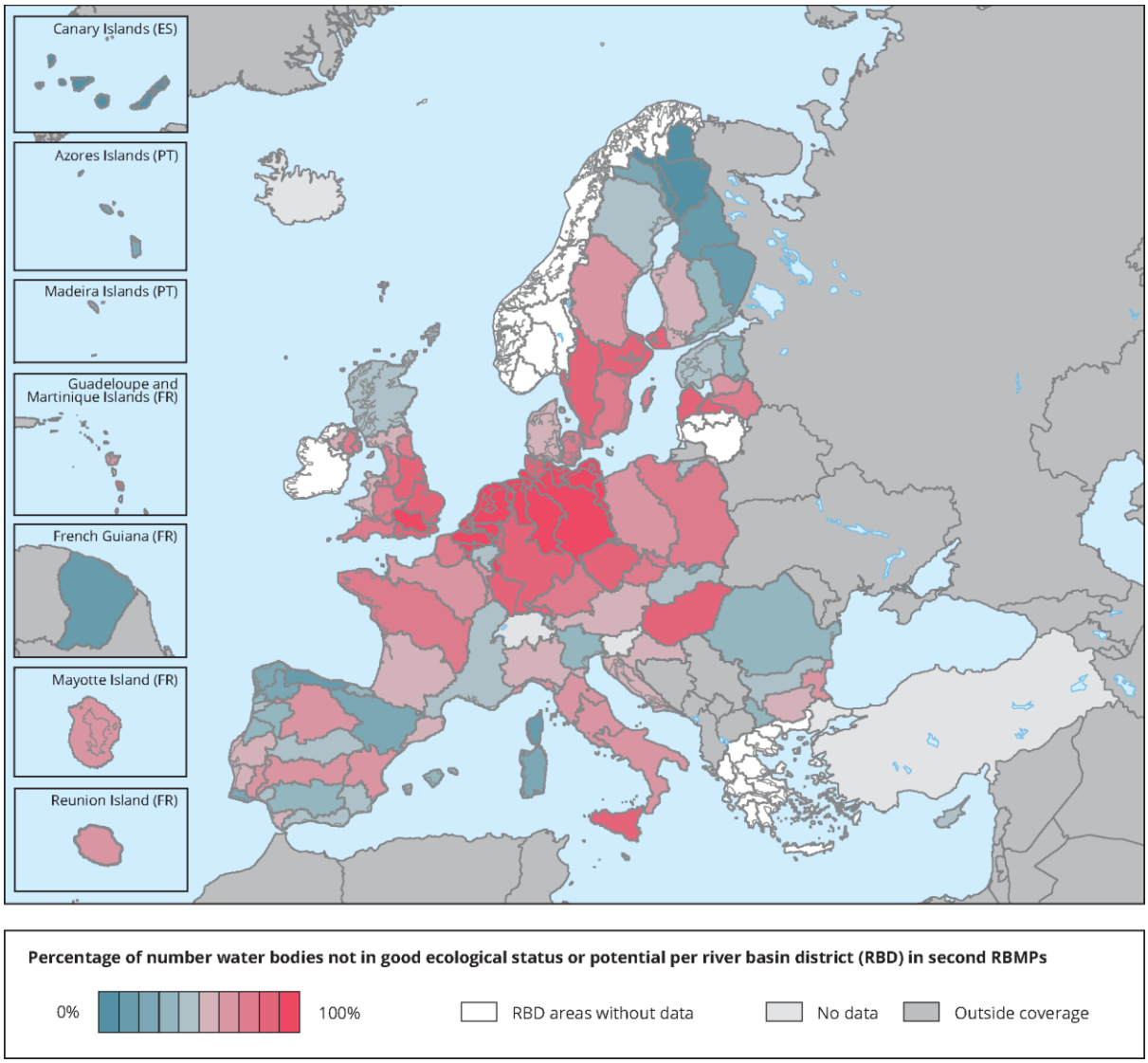
Despite the limitations of the evidence available to this study, it is clear that in some cases important broad based actions have been successful and at the very least contributed to some MDI. Most obviously the widespread general improvements that have occurred in water quality in rivers, lakes and coastal waters across much of Europe are likely to have played a major role in some MDI. Although this is not apparent from the limited Member States' responses to the questionnaire 1b on factors affecting MDI, it is demonstrated in the two case studies relating to the Habitats Directive Annex I habitat 'Water courses of plain to montane levels …' (3260) (DE-1 and EE-3). Such improvements were undoubtedly in part driven by the requirements to meet the WFD, such as in the Germany case study, where the federal states implemented strategic plans to meet WFD targets. In some states, such as North Rhine-Westphalia the plans also included targeted measures to more broadly renaturalise the river's aquatic ecosystem. Such improvements also contributed to the MDI in associated species such as Salmon, River Lamprey and Barbel. Elsewhere in the EU, such water quality and river habitat improvements have benefited other river species, including dispersed species such as the Eurasian Otter (NL-5). Similarly measurers to improve water quality made a major contribution to the increase in the population of the Green Gomphid dragonfly (*Ophiogomphus cecilia*) in Denmark (DK-1) – see next section.

However, it is important to bear in mind that a recent EEA study has indicated that whilst there has been progress in improving the quality of Europe's waterbodies, there are ongoing pressures from pollution (especially from diffuse sources from agriculture and atmospheric deposition),

[18] https://www.eea.europa.eu/data-and-maps/figures/exceedance-of-critical-loads-of

hydromorphological changes (such as from dams), and over-abstraction; and the vast majority of water bodies still fail to meet the EU's minimum target for 'good status' (EEA, 2018), especially in Belgium, the Netherlands and northern Germany (Figure 4-2).

Figure 4-2 The percentage of waterbodies not in good ecological status or potential in Europe



As noted above, for the bird species on which the Member States provided information in questionnaire 1b, wide-scale measures were considered to be of major importance for 10% (Table 2-20), which comprise the following four MDI: White-tailed Eagle (*Haliaeetus albicilla*) in Estonia, and Eastern Imperial Eagle, Great Bustard and European Roller (*Coracias garrulus*) in Hungary. None of these, or any of the birds where wide-scale actions were assessed as being of moderate importance, were covered by case studies; and therefore further information on the actions that were taken was not obtained in this study. Furthermore, none of the case studies on birds include widely dispersed species, although both the Great Bustard case study (PT-1) and Lesser Kestrel (ES-3) case study note that both species occur outside protected areas. They are to some extent affected by broad-scale agricultural pressures and measures to address them, such as agri-environment climate schemes and CAP greening measures (see further discussion below).

In conclusion, it is particularly difficult from the evidence collated in this study to draw reliable conclusions on the role of wide-scale conservation actions in driving MDI. On the face of it, relatively few observed MDI appear to have involved important wide-scale actions, especially amongst habitats and HD species, but it is also likely that difficulties with achieving some wide-scale actions (in particular reducing deposition of nitrogen on sensitive habitats), have been, and continue to be, barriers to achieving MDI. There are, however, some clear examples in the case studies of where broad-scale actions have undoubtedly been major drivers of the MDI concerned, including for some dispersed species.

4.2.5 The approaches to tackling pressures in agricultural and wetland ecosystems

- *Taking into account that species and habitats linked to agricultural and wetland ecosystems are currently showing the strongest levels of decline, are there any examples of targeted improvements related to such species or habitat types?*
- *If yes, what were the main drivers explaining these improvements?*

The EEA report on the State of Nature in the EU provides an analysis of trends in habitats and species based on the Member State Article 12 and 17 reporting data, in relation to Mapping and Assessment of Ecosystem Services (MAES) habitat types. This indicates that, for habitats and species combined, river and lake habitats and species have the highest proportion that are declining (over 30%) closely followed by those of croplands, other wetlands, and marine inlets and transitional waters, and then grasslands (about 25% declining). A similar picture is evident in relation to short-term population trends amongst birds, although the most severe declines are amongst marine species. Amongst terrestrial species, the largest proportion declining are associated with grasslands (over 40%) closely followed by croplands, whilst about 30% of birds of rivers, lakes and wetlands are declining.

The Article 12/17 reports also show that a high proportion of the habitats and species associated with agricultural and wetland ecosystems are subject to high-level pressures. For example, the most frequent high level pressures for bird species associated with both crop and grassland ecosystems are as a result of the modification of cultivation practices; whilst other common agriculture-related high level pressures include the mowing or cutting grasslands, use of pesticides, grazing and restructuring of agricultural parcels. Habitats and HD species are affected by similar pressures although they do not impact such a high proportion, with the most frequent pressure on habitats being grazing by livestock, whilst HD species are equally affected by the use of pesticides and the modification of cultivation practices. For wetlands, rivers and lakes, by far the most frequently reported high ranked pressure is changes in water body conditions, affecting birds, HD species and habitats, with surface water pollution being a clear second most frequent threat for rivers and lake habitats.

Given these deteriorating trends, and common high pressures, that affect a large proportion of agricultural and river, lake and other wetland habitats and species, it is clearly a major challenge to achieve MDI for such habitats and species, even if it is only halting a decline. Despite this, a number of MDI have been achieved for all these groups. To quantify these, the GID was used to identify confirmed MDI (i.e. MDI-A) that listed one or more agricultural pressures (i.e. Article 17 reporting code 'A'). This revealed 17, 33 and 47 MDI tackling agricultural pressures in the habitat, HD and bird MDI respectively. However, it should be noted that a few of these cases related to non-agricultural habitats, e.g. some rivers and wetlands, which were presumably impacted by agricultural activities, such as pollution from nutrient-rich run-off.

Insufficient information was received from the Member States on the factors affecting these agriculture-related MDI in the Ib questionnaire to objectively analyse these cases further and identify approaches that might have been most successful. However, the identified agriculture-related MDI include the following case studies, which provide further information and some indication of factors

that may have led to their success: Nordic alvar and precambrian calcareous flatrocks (EE-2 – see next section for details), inland salt meadows (SK-1 – see next section), semi-natural dry grasslands and scrubland facies on calcareous substrates (PL-1 – see next section), *Dianthus diutinus* (HU-1), Violet Copper (LU-1), Great Bustard (PT-1), Saker Falcon (SK-2), Eastern Imperial Eagle (SK-3) and Lesser Kestrel (ES-3). Several of these cases highlight the need for wide and effective consultation that establish excellent relations and a close partnership with farmers, even where agri-environment funding is being provided.

The Great Bustard case study at Portugal's key site, Castro Verde, provides an example of the challenges involved, but also what is possible, as the targeted population almost quadrupled between 1997 and 2012. The site is a SPA and was subject to zonal planning through the Portuguese RDP, most recently through the use of 'Integrated Territorial Intervention'. The local focus enabled the agri-environmental scheme to be designed with specific measures to protect birds. The main element was the maintenance of dry cereal-fallow crop rotations as these provide the preferred habitat of Great Bustard and other steppic birds, and, restricting the timing of mechanised agricultural activities on the fields to protect nests and juveniles. In addition, specific measures were included, such as paying for the installation of bird deterrents and underpasses on fences. The design and monitoring of the payment conditions was managed by a local support structure which included all relevant stakeholders. The NGO Liga para a Protecção da Natureza participated in the local support structure and carried out much of the environmental education and landowner/farmer engagement work, funded for five years by a LIFE project (LIFE07 NAT/P/000654). The programme was very successful in Castro Verde and the neighbouring National Park/SPA Vale do Guadiana. However, an unresolved challenge has been conserving the species in the rest of the country, as Portugal has not (yet) succeeded in rolling out the successes beyond the two SPAs. As a result, the other Great Bustard populations have almost all declined or been extirpated completely, especially outside the Natura 2000 network. Another problem is that the massively increased profitability of irrigated farming following the completion of the Alqueva dam now makes it financially impossible for the Portuguese Rural Development Programme (RDP) to provide the incentive levels necessary for farmers to maintain dry farming, so only legislation protecting Natura 2000 sites is effective, which in turn is generating local hostility towards nature conservation.

Despite its achievements, the case of the Great Bustard points to two particular problems with conserving agricultural habitats and species, which are likely to be applicable to many areas of the EU. Firstly, there are major problems with expanding such demanding conservation interventions on agricultural land to the wider environment outside Natura 2000 networks, especially where intensive consultations are required with all landowners to deal with their concerns and develop positive partnerships.

Secondly, expanding conservation interventions to the wider environment is expensive, and agri-environment funding may not be sufficient to cover areas beyond the Natura 2000 network, or other targeted areas. And this problem is greatly exacerbated where agricultural improvements are taking place (such as irrigation schemes), sometimes supported by EU funds, that provide more opportunities for landowners to adopt more intensive systems that have the potential to substantially increase the profitability of their farming. The evidence from this case study, and numerous other LIFE projects (Brauner, Korbertis and Latruberce, 2017), shows that, due to their low financial incentives, voluntary schemes such as agri-environment measures are often not taken up, no matter how good the relations with the farming community. For these reasons, whilst it will remain necessary to maintain the goodwill of farmers, securing and scaling up the achievement of improvements in the conservation status of habitats and species on agricultural land within the Natura 2000 network will need to be increasingly achieved through enforcement of Habitats Directive Article 6 to ensure that damaging agricultural improvements are prohibited. It would then be appropriate to use the CAP Natura 2000

funding measure (see next section) to compensate for reasonable forgone income where this is justified and agreed as part of a site management plan, or similar agreement, that should be developed in conjunction with farmers and other stakeholders. Increasing MDI on agricultural habitats in the wider environment will need improved implementation of all existing relevant environmental regulations (including the Nature Directives, WFD, SEA and EIA) combined with strengthened environmental components in the new CAP (cross-compliance and greening type measures) and a large increase in funding, which is further discussed in the next section.

For lake, river and most other wetland habitats the achievement of MDI might be expected to have been less challenging as the broad trend for these ecosystems has been towards improvement in habitat quality, especially in terms of water quality, driven in part by the WFD and the Urban Waste Water Treatment Directive; although as discussed in the previous section WFD targets are yet to be achieved in the majority of EU waterbodies (EEA, 2018). Furthermore, these ecosystems are more restricted in extent and many of the pressures are most appropriately dealt with through uncompensated enforcement of regulations (in accordance with the polluter pays principle), rather than the need for compensation payments for mandatory actions or voluntary incentive schemes. Despite these more favourable circumstances, there are only 22 confirmed MDI for habitats, 35 MDI for HD species and 30 for birds that indicate in the GID that they have addressed pressures relating to surface water quality (Code H02) and/or human induced changes in hydraulic conditions (J02). The reason for this relatively low number cannot be deduced from the information gathered in this study, but it may be that the progress towards achieving WFD objectives so far has not been sufficient for some habitats and species covered by the Nature Directives, and/or the objectives are not sufficiently ambitious.

As for the agriculture cases, insufficient information was received from the Member States on the drivers of the wetland MDI in the Ib questionnaire to objectively analyse these cases further and identify approaches that might have been most successful. However, the identified MDI included the following case studies, which provide some insights on the range of issues tackled and their approaches.

- Inland salt meadows in Slovakia were improved through a LIFE project that reversed the impacts of previous land drainage on ground water levels by hydrological restoration through the infilling of a deep drainage channel, as well as the restoration of saline conditions in the top soil, combined with vegetation removal and the reintroduction of traditional grazing (SK-1).

- The impacts of lowered ground water levels and vegetation succession on humid dune slacks (219) in the Netherlands were reversed through the restoration of hydrological conditions, including by reducing water abstraction impacts on sites, in combination with measures to restore vegetation structure and soil conditions, such as through increased mowing/grazing, and sod cutting (NL-1).

- The population of the Green Gomphid dragonfly has recovered in Denmark as a result of a combination of habitat protection and habitat restoration, with the key measures including improving the quality of water bodies and the physical conditions of watercourses, driven by WFD requirements, combined with more specific river habitat enhancement supported by LIFE projects (DK-1).

- Considerable efforts have been made to conserve the remaining populations of the Freshwater Pearl Mussel in eastern Wallonia (Belgium), through carefully researched and

targeted measures to improve water quality and habitat suitability for the species which have included removal of fish barriers, construction of suitable infrastructure to prevent cattle trampling, removal of coniferous trees, restoration of deciduous riverine forests, investment in water treatment plants, restrictions in fishing activities, and awareness raising campaigns (BE-2).

- The Eurasian Otter has recolonised the Netherlands, following the successful implementation of an Otter Recovery Plan involving national and local governments, water boards and nature management organisations, that included water quantity and quality improvement measures (e.g. source-oriented pollution control measures) as part of the implementation of the WFD and Rhine Action plan, habitat restoration by improving the ecological quality of river banks (e.g. creating reed beds, fencing of water margins, planting of trees and shrubs, and creating holts), combined with more specific actions to connect habitats and create safe routes for movement (NL-5).

Other relevant case studies involving river, lake or other wetland habitats and species, mentioned above are 'Water courses of plain to montane levels …' (3260) (DE-1 and EE-3), and mentioned below are those relating to the plant *Myosotis rehsteineri* in Austria (AT-1), a number of freshwater and wetland habitats, including natural eutrophic and dystrophic lakes, raised mires, transition mires, alkaline fens and bog forest associated species in Slovenia (SI-1) and boreal Baltic coastal meadows in Finland (FI-1).

In conclusion, whilst there are considerable challenges to conserving and restoring agricultural habitats and species due to the large areas involved and the high per unit costs of conservation measures (especially on intensive farmland) some MDI have been achieved. However, most on agricultural land have related to habitats and species that are relatively scarce and have a high proportion within Natura 2000 sites. It is therefore likely to be difficult to achieve MDI for other more dispersed agricultural species without increased implementation of the Nature Directives, both within and outside the Natura 2000 network, strengthened environmental components of the CAP and a considerable increase in targeted funding through the Natura 2000 measure and agri-environment climate schemes. The situation for rivers, lakes and wetlands is more supportive for the achievement of MDI, but further implementation of the WFD is necessary as the poor condition of some water bodies may be a barrier to improving the conservation status of some habitats and species.

4.2.6 Funding and resources requirements

Before considering the role of particular funds in achieving the observed MDI, it is necessary to consider the importance and context of financing, as the Fitness Check study concluded that the availability of funding is the most influential factor affecting the implementation of the Nature Directives (Box 4.1). This is because, as shown in the Article 12 and 17 reporting data (
Table 2-17) and the additional Member State information supplied on factors affecting the MDI, and the case studies, nature conservation entails a large number of activities that require funding, especially where the aim is to improve the status of habitats and species. These include administrative actions associated with designating protected areas, raising awareness of nature conservation requirements, consulting with stakeholders, preparing site and species management plans, developing agreements with landowners, carrying out surveillance and if necessary enforcement activities, and monitoring the conservation status of habitats and species. In addition, although regulations play an important part in maintaining a basic level of environmental protection, some form of incentive payments are normally required to compensate landowners for income forgone from new and additional restrictions (e.g. on agricultural improvements of semi-natural habitats or on logging in forests) or more ambitious positive habitat restoration measures and specific actions that aim to increase species populations.

Clearly, nature conservation and restoration therefore requires considerable levels of financing, especially where large-scale land / water management or enhancement measures are required that require high levels of compensation for mandatory actions or incentives for voluntary activities. Consequently, it has been estimated that the annual costs of implementation of the Natura 2000 network amount to €5,800 million per year for the EU27 (Gantioler et al, 2010). But it is important to note that this is undoubtedly an underestimate of the true costs of meeting the objectives of the network, because the estimate was based on questionnaire responses from Member States, amny of which provided information based on historic and/or budgeted expenditures rather than on future requirements to achieve favourable conservation status of habitats and species. Whilst consultees in the Nature Directives Fitness Check widely agreed that the increasing demand for funds driven by the obligations of the directives had resulted in an increase in supply, it is now acknowledged that there is a major gap between biodiversity conservation funding requirements and available funds (Milieu, IEEP and ICF, 2016). Strong evidence for this comes from a survey of Member State EU funding allocations for the 2007 – 2013 financing period, which found that a total of €550 – 1,150 million per year was budgeted for the Natura 2000 network, which only represents 9% – 19% of its estimated financing needs (Kettunen et al, 2011).

Although it was not envisaged that the implementation of the Nature Directives would be solely dependent on EU funding, there is evidence that a major cause of the funding gap is that the EU's integrated funding model, whereby the financing of Natura 2000 is through all relevant EU sectoral funds, has not been adequately realised, because the funding allocations for biodiversity have been insufficient and/or difficult to access (Kettunen et al, 2016). Based on a number of prior studies (European Court of Auditors, 2011, 2013, 2014; Kettunen et al, 2011; Kettunen et al, 2014; Kettunen, McConville and van Vliet, 2012; Kettunen, Torkler and Rayment, 2014), the Fitness Check study concluded that, in addition to the overall gap in financing, a number of constraints have prevented the use of EU funds for the implementation of the Nature Directives, including:

- a lack of integration of biodiversity requirements into EU sectoral funds at national, regional and local levels (e.g. through earmarking);
- eligibility gaps, which limit the opportunities for EU funds to be used for nature conservation activities especially ongoing management requirements;
- problems with uptake and absorption, such as resulting from capacity constraints within national and regional administrations and stakeholders; and
- problems with coordination, which limit the ability to direct funds to their main needs.

This study of the drivers of the successful implementation of the Nature Directives is not able to objectively examine the extent to which funding constraints have limited opportunities for improving the status of habitats and species, as information was not gathered on the reasons for failure (i.e. where there have been intentions to take actions to achieve genuine improvements, but these have not materialised or been adequate due to a lack of funding). Nevertheless, it is likely that the relatively low number of identified MDI, especially for some habitats and species that would be reliant on large-scale and relatively expensive measures (e.g. on intensive farmland and in productive forests), is at least in part the result of overall funding constraints, and barriers to access as described above.

- *To what extent has the LIFE program and its projects contributed to targeted improvements, alone or by creating demonstrative examples that have been upscaled later on?*

Evidence from this study has shown the importance of a number of funding mechanisms for nature conservation and restoration, and demonstrate that they have been major contributors to observed improvements in the condition of numerous habitats and species. Most obviously, and as also clearly shown by the Nature Directives Fitness Check (Milieu, IEEP and ICF, 2016), the LIFE programme plays

a major role in supporting implementation of the Nature Directives, especially with regard to measures that aim to restore habitats and/or species populations. This is firstly evident from the Member State responses to the 1b questionnaire on the factors affecting MDI, which showed that LIFE projects (which would have coincided with the LIFE+ programme for 2007-2013[19]) were by far the most important source of funding for those MDI for which the importance of funding sources were assessed (Table 2-24). Where the funding sources were assessed, LIFE projects were of major or essential importance for 41%, 43% and 33% of MDI amongst habitats, HD species and BD birds respectively. Those considered to be of essential importance from the Member State response are listed below in Table 4-1 (but note that only 13 Member States provided information on the factors affecting MDI, see Table 2-18).

Table 4-1 MDI for which Member States provided assessments of the importance of LIFE programme funding and considered it to be essential

Source: Member States responses to questionnaire 1b.

MS	Habitat and code / Species	Case study
Habitats		
BE	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) (6210)	
EE	* Active raised bogs (7710)	EE-1
EE	* Nordic alvar and precambrian calcareous flatrocks (6280)	EE-2
LT	Embryonic shifting dunes (2210)	
LV	Dry sand heaths with Calluna and Empetrum nigrum (2320)	LV-1
SI	Alkaline fens (7230)	
SI	Bog forest - Sphagnum spruce woods (91D0)	
SI	Natural dystrophic lakes and ponds (3160)	
SI	Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation (3150)	SI-1
SI	Raised bogs (7110)	
SI	Transition mires (7140)	
HD species		
ES	Iberian Lynx (*Lynx pardinus*)	ES-4
ES	Brown Bear (*Ursus arctosII*)	
HU	Hungarian Meadow Viper (*Vipera ursinii rakosiensis*)	HU-2
LU	Violet Copper (*Lycaena helle*)	LU-1
LU	Great Crested Newt (*Triturus cristatus*)	
PT	Iberian Lynx (*Lynx pardinus*)	
SI	Yellow- bellied Toad (*Bombina variegata*)	
SI	European Pond Turtle (*Emys orbicularis*)	
SI	Yellow-spotted Whiteface (*Leucorrhinia pectoralis*)	
SI	Fen Orchid (*Liparis loeselii*)	
SI	Italian Crested Newt (*Triturus carnifex*)	
SI	European Mudminnow (*Umbra krameri*)	
SK	Yellow-spotted Whiteface (*Leucorrhinia pectoralis*)	
BD Bird species		
ES	Cinereous Vulture (*Aegypius monachus*)	
ES	Spanish Imperial Eagle (*Aquila adalberti*)	ES-2
ES	European Roller (*Coracias garrulus*)	
ES	Lesser Kestrel (*Falco naumannii*)	ES-3
ES	Great Bustard (*Otis tarda*)	
MT	Mediterranean Storm Petrel (*Hydrobates pelagicus melitensis*)	MT-1

[19] http://ec.europa.eu/environment/life/about/index.htm#evaluation

MS	Habitat and code / Species	Case study
MT	Yelkouan Shearwater (*Puffinus yelkouan*)	MT-1
PT	Great Bustard (*Otis tarda*)	PT-1
SK	Saker Falcon (*Falco cherrug*)	SK-2
SK	Common Tern (*Sterna hirundo*)	

It is not possible to say from the evidence gathered from this study why LIFE funding seems to have been of such importance for MDI considering that LIFE funds are relatively small (i.e. €2,143 million, for the whole 2007-2013 LIFE+ programme, of which at least 50% of the budgetary resources for action grants were to be used for the conservation of nature and biodiversity) compared to other sources such as agri-environment funds (i.e. with its 2007-2013 EAFRD budget of €22,700 million)[20]. However, an evaluation study of the LIFE+ programme found that it was efficient and had good levels of absorption and high levels of impact when carried out (although there were significant administrative barriers to participation for some countries/stakeholders)[21]. A more recent study by the LIFE external monitoring team carried a number of ex-post evaluations of selected LIFE Nature projects, at least five-years after their completion, with the explicit aim of establishing if they had made a difference to the conservation status of their targeted habitats and species (Houston and Velghe, 2018). Although the situation was not clear for some projects, the study concluded that most of the projects had led to improvements in conservation status or trends, with 18 of the 20 selected projects judged to have had good or high impacts, of which eight had high impacts.

There are certainly a number of case studies from this study that illustrate the potential efficiency and effectiveness of LIFE Nature projects and their important contribution to the MDI of a range of habitats and species. Some examples are listed below, which aim to show a variety of the types of habitats, species and issues that were successfully tackled (but it is important to note that many more examples could be given, and their listing below does not imply that these are necessarily the most successful LIFE projects of their type).

- In the Italian Alps, the LIFE URSUS project (LIFE96 NAT/IT/003152) started a successful reintroduction of the Brown Bear through the translocation or ten bears from Slovenia to Adamello Brenta National Park, which was later supported by various LIFE projects between 2008-2012, including ARCTOS (LIFE09 NAT/IT/000160) and Corpo Forestale (LIFE04 NAT/IT/000190), which included the sharing of good practices relating to monitoring and management of problematic bears and measures to improve food availability (IT-1).

- The lakeshore restoration measures taken for the plant *Myosotis rehsteineri* in Austria (AT-1), as described in the section above, were initiated through a LIFE project (LIFE00 NAT/A/007069), with co-funding by the federal state and the local authority, which created sufficient political momentum to lead to a subsequent increase in funding allocations to continue the restoration measures.

- The considerable improvement in the conservation status of the Iberian Lynx in Spain has been largely achieved through 23 LIFE projects (see list in case study ES-4), which carried out key research activities, disseminated knowledge on the species' requirements to conservation managers, and actively communicated with and involved all stakeholders, particularly hunting

[20] https://enrd.ec.europa.eu/sites/enrd/files/assets/pdf/measure-information-sheets/2014-06-19/C_Infosheet_214.pdf

[21] Final Evaluation of LIFE+ - Summary of Conclusions and Recommendations (2010) http://ec.europa.eu/environment/life/about/documents/121214_conclusions.pdf

associations and land owners, leading to signed conservation agreements for the lynx covering over 250,000 ha of habitat.

- In the Belgian Ardennes, a substantial amount of restoration of the habitat Northern Atlantic wet heaths with *Erica tetralix* (4010) has been achieved through a series of LIFE projects (e.g. LIFE03 NAT/B/000019, LIFE05 NAT/B/000087, LIFE05 NAT/B/000088, LIFE05 NAT/B/000089, LIFE06 NAT/B/000091, LIFE10 NAT/BE/000706), which have supported the removal of trees and top soil, restoring hydrological conditions and carrying out habitat management through grazing and mowing; mostly on state land, but also through the purchase of private land in the best locations or the development of 30 year agreements with landowners.

- In Slovenia, the LIFE project WETMAN (LIFE09 NAT/SI/000374) has played a major role in improving the conservation status of a number of freshwater and wetland habitats, including natural eutrophic and dystrophic lakes, raised mires, transition mires, alkaline fens and bog forest associated species (SI-1). The project involved extensive stakeholder involvement and environmental education of the public, and supported practical re-establishment of suitable hydrological conditions and habitat restoration (e.g. removal of overgrowth and structuring of forest edges, and removal of invasive species), and produced conservation guidelines that are being incorporated into site and sectoral management plans covering 4,439 ha of habitat.

In conclusion, despite its relatively small size the LIFE program appears to be the most important funding related driver of MDI, as illustrated in a large proportion of the case studies, although the projects were sometimes supported by other funding such as agri-environment schemes to deliver large-scale habitat management actions etc. However, as discussed further in section 0, as the LIFE projects are relatively short-term sources of funding (focussing on on-off restoration works or demonstration projects), it is uncertain to what extent they will led to MDI that are sustained in the long-term.

- *To what extent have the Common Agricultural Policy and the Rural Development Programs thereunder contributed to targeted improvements?*

- *What have been the specific actions under these RDPs that [are] delivering most?*

- *Have certain types of project approaches within the above programs been more successful than others in delivering genuine improvements?*

The European Agricultural Fund for Rural Development (EAFRD) which funds Rural Development Programmes (RDPs) under Pillar II of the CAP provides by far the largest source of potential financing for the management of terrestrial habitats in the EU. It also offers some opportunities for the restoration of habitats and species (in particular through the 'non-productive investment' measures). Under the 2007-13 CAP programming period, when the funds would probably have had most impact on most MDI, the total EAFRD budget was €80,341 million[22]. Then the EAFRD measures of most relevance to biodiversity conservation in general were under Axis 2, and comprised measures directly concerned with Natura 2000, i.e. Natura 2000 payments and payments linked to the WFD (measure 214) and Forest Natura 2000 payments (224) and a larger number with the potential to support activities of wider benefit to biodiversity goals amongst other objectives, i.e. the agri-environment measure (214) and forest-environment measure (225). Some other RDP measures could also help support low intensity biodiversity-rich farming systems (i.e. High Nature Value farming) more generally, such as through schemes that promote premium products that are produced under such

[22] EU revenue and expenditure data http://ec.europa.eu/budget/figures/2007-2013/index_en.cfm

traditional farming systems, or that stimulate tourism thereby more widely supporting farmers and landowners and other beneficiaries in the rural community.

Of all the RDP measures the agri-environment measures were the most relevant in the 2007-2013 period as, although voluntary for farmers, they were compulsory for all Member States and received a much larger proportion of funding than the other biodiversity relevant measures listed above (i.e. €27,800 million for 2007-2012) which enabled them to cover some 22% of the EU-27 utilised agricultural area[23]. They gave the opportunity for Member States to develop locally adapted schemes that provided payments for managing and/or restoring habitats as well as other special measures for species. Numerous studies have shown the positive impacts that well designed and properly implemented agri-environment scheme measures can have on a wide range of species and habitats, especially as a result of higher level more specifically targeted and tailored schemes (Batáry et al, 2015; Broyer, Curtet and Chazal, 2014; European Commission, 2014a; Poláková et al, 2011; Whittingham, 2011)[24].

It is, therefore, not surprising that when the Member States assessed the contribution of agri-environment schemes to the MDI, they indicated that a significant number were highly dependent on them: 5% considered that they made a major or essential contribution for habitats, and 16% for bird species (Table 2-24). These and some case studies where the MDI was clearly highly dependent on agri-environment measures listed below.

- Restoration of boreal Baltic coastal meadows in Finland, achieved through targeted actions in Natura 2000 sites, including the reinstatement of grazing on several hundred hectares funded through the RDP agri-environment scheme (with attractive payment rates for the more valuable areas of habitat) and the non-productive investment measure, combined with significant national funding and targeted LIFE and Interreg funded projects (FI-1).

- Restoration of the Annex I Priority habitat Nordic alvar and precambrian calcareous flatrocks (6280) in Estonia, financed through LIFE projects, the EU Regional Development Fund and Cohesion Fund 2007-2013, and national funds in the environmental programme. As the habitat was considered ineligible for receipt of CAP Pillar 1 basic payments, maintenance of the required farming was supported through the Pillar 2 the RDP agri-environment measure, which in 2007-2013 introduced an option for grazing or mowing of semi-natural habitats (including alvars).

- Restoration of semi-natural dry grasslands and scrubland facies on calcareous substrates (6210) in Poland, through five LIFE projects since 2008 and funding for management measures from the agri-environment programme 2007-2013, which contained a package of schemes designed for semi-natural habitats and similar options within Natura 2000 sites for the protection of endangered bird species and natural habitats in Natura 2000 areas. These supported appropriate grazing levels, the use of no fertiliser, and in justified cases mowing (PL-1).

- Conservation of the Corncrake in Latvia, funded through four LIFE Nature programme action grants and the RDP agri-environment measure for the 'maintenance of biodiversity in grassland', which supported the extensive grazing and mowing necessary to maintain the species' habitat (LV-2).

[23] https://enrd.ec.europa.eu/sites/enrd/files/assets/pdf/measure-information-sheets/2014-06-19/C_Infosheet_214.pdf

[24] And numerous relevant conservation measures on the database of www.conservationevidence.com

- Conservation of the Great Bustard at Portugal's key site, Castro Verde (PT-1) – as described above.

These examples demonstrate the range of actions that can be supported by agri-environment schemes, and in some cases it is known that the practical habitat management / restoration measures were trialled or demonstrated through LIFE projects, with the intention of scaling up the coverage. However, in most cases it is not possible to reliably assess the degree to which these were subsequently scaled-up, as information on activities after the end of the projects is often lacking or incomplete. Furthermore, it is not known to what extent the agri-environment measures have been continued and adequately funded, especially as funding for biodiversity measures under Pillar II of the current 2014-2020 CAP is lower than before. Nor is it possible to deduce from the limited number of cases particular agri-environment scheme approaches that are most likely to achieve significant improvements in the status of habitats and species.

It is noteworthy that for a large proportion of MDI, and case studies, agri-environment schemes were not of importance. Member States considered that the agri-environment schemes did not make a major or essential contribution to any of the assessed MDI amongst HD species (Table 2-24). Furthermore, for a sizeable proportion of the assessed MDI agri-environment schemes were considered to have played an insignificant or minor role, i.e. 46% amongst habitats, 65% amongst HD species and 61% amongst birds. This suggests that other funds, that may be more suitable, are available or that financial incentives for the required conservation measures may not always be necessary, as for example in the case of the Lesser Kestrel (ES-3), but this is likely to be an unusual case.

Given that funding is normally necessary for land management measures, that the agri-environment measure is by far the largest source and that it can be targeted towards supporting the conservation of habitats and species that are the focus of the Nature Directives (in accordance with the envisaged integrated funding model) it might be expected that it would have played a more frequent and significant role in the MDI. The fact that it did not is probably due to a number of factors. Firstly, it is probably in part due to the fact that most agri-env measures aim to maintain, or slightly improve, habitats of existing high biodiversity value, rather than carrying out substantial restoration measures that could lead to MDI. But there is also evidence from a review of obstacles to LIFE project sustainability (Brauner, Korbertis and Latruberce, 2017), and the wider literature, that more funding and targeting of schemes to species and habitats is required to increase the scale of agri-environment schemes sufficiently to achieve landscape and population level improvements (Arponen et al, 2013; Broyer, Curtet and Chazal, 2014; Kleijn et al, 2006; O'Brien and Wilson, 2011; Poláková et al, 2011; Whittingham, 2007). CAP eligibility rules have also been found to be a significant barrier to farmers receiving basic payments and participating in agri-environment schemes in some low intensity agricultural systems, such as those that traditionally comprise a mixture of pasture with trees and scrub (King, 2010; Brauner, Korbertis and Latruberce, 2017). Evidence of this problem was found in the Corncrake case study (LV-2), as the Latvian PAF for 2014-2020 noted only a small part (less than 15%) of the agri-environment support was available for grassland management in Natura 2000 because:

- most of the agri-environmental funds were not targeted at habitat management in Natura 2000 areas or outside of them;
- the funds were not available for restoration of many areas with semi-natural habitats that were still capable of natural restoration (e.g. overgrown but still species-rich semi-natural grasslands); and
- fens and heaths traditionally managed as pastures or meadows were not eligible for support.

Thus, as such eligibility and targeting issues are known to have occurred in other Member States (e.g. also Finland – see FI-1), it seems very likely that the contribution of agri-environment schemes to improving the status of habitats and species under the Nature Directives was constrained to some extent in the 2007-2013 CAP period. As noted in the Nature Directives Fitness Check evaluation study, some changes were made in the CAP 2014-2020 eligibility criteria to broaden the definition of permanent grassland and allow the presence of shrubs and trees etc (Milieu, IEEP and ICF, 2016). However, the study also noted that eligibility problems still exist, which are not only limiting the potential application of agri-environment schemes to semi-natural habitats, but are also leading to serious damage to some habitats (EFNCP, 2015; Ruíz and Beaufoy, 2015). It therefore appears that urgent steps are still necessary to address this problem, and ensure that habitats and species that are the focus of the Nature Directives are, at the very least not subject to damage as a result of unintended consequences of eligibility rules, and are in fact more effectively targeted through CAP environmental measures.

As briefly mentioned above, the Natura 2000 payments and payments linked to the WFD (measure 214) and forest Natura 2000 payments measure (224) provide the opportunity for Member States to provide compensation for income foregone as a result of restrictions on actions (e.g. on agricultural improvements or logging areas of forest), identified through management plans or similar means. However, these were not mandatory measures for Member States, and for various reasons (including the slow progress with the development of management plans in some countries) they were little used: €297 million for measure 214 (33% of the programmed expenditure)[25] and €48.7 million for measure 224 in forests) or 50% of the programmed expenditure[26]. As a result of this low funding allocation, and the fact that the measures are more suited to maintaining FCS rather than improving the situation, it is not surprising that no evidence was found of the use of these payments in any of the case studies or MDI on which Member States provided information in questionnaire 1b.

Similarly, although the forest measures have the ability to support a range of forestry practices that could contribute to improvements in the condition of forest habitats and their species, these were relatively little used by Member States (€65 million or 21% of the programmed expenditure[27]). This may be one factor that contributed to the low number of MDI for forest habitats. On the other hand, the low use of these funds may be due to other funding sources being available and/or more appropriate. For example, a mix of forestry-focused funding instruments contributed to the improvement of the conservation status of European Yew woods (*Taxus baccata*) of the British Isle in Ireland (IE-2). In this context, Ireland's 2014–2020 Forestry Programme provides a core public funding basis for the implementation of the Strategy for Native Woodlands. Funding from the National Parks and Wildlife Service supported labour (staff, contractors) and material costs for yew woodlands measures within the Killarney National Park in Ireland. In addition, the Millennium Forests initiative also provided funding for the restoration of 16 Irish woodland communities, one of which being yew.

In conclusion, EU agri-environment schemes (and some other EAFRD Rural Development measures, and regional development funds) have supported some MDI, occasionally following LIFE projects to provide larger-scale and/or longer-term funding. However, considering the amount of funds available, their known contributions to MDI were less than expected. This may be partly because many schemes aim to maintain, rather than restore habitats. But it is also clear that the contribution of agri-environment measures to implementing the Nature Directives has probably been constrained by insufficient targeting and funding, and in some instances eligibility barriers for farmers of semi-natural habitats. Increasing the number and scale of MDI is therefore likely to be highly dependent on further

[25] https://enrd.ec.europa.eu/sites/enrd/files/assets/pdf/measure-information-sheets/C_Infosheet_213.pdf
[26] https://enrd.ec.europa.eu/sites/enrd/files/assets/pdf/measure-information-sheets/C_Infosheet_224.pdf
[27] https://enrd.ec.europa.eu/sites/enrd/files/assets/pdf/measure-information-sheets/2014-06-19/C_Infosheet_225.pdf

increasing the amount and accessibility of public funding conservation measures for habitats and species that are the focus of the Nature Directives especially with Natura 2000 sites.

- *To what extent have alternative funding sources (private donors, business sponsors, bank loans, etc.) been used in addition to public financial support?*

As discussed in section 2.4.4, evidence from the Member States' assessment of the importance funding sources suggest that private funding and innovative mechanisms have played an insignificant or minor role in in the MDI identified in this study (Table 2-24). However, it should be noted that in some of the case studies, business stakeholders have provided some indirect or in-kind-support. For example, electricity supply companies have undertaken substantial modification of electricity pylons and wires, to reduce collisions and electrocution, which has been important for a number of large raptors, such as the Spanish Imperial Eagle (ES-2).

4.2.7 The role of research and monitoring

A clear message that is apparent from the wider conservation literature and many of the case studies is that reliable, up-to-date and context relevant knowledge is required of the ecological requirements and pressures affecting habitats and species, so that appropriate, effective and efficient measures can be designed and implemented for them. Where there are knowledge gaps or uncertainties, then investment in improving the scientific evidence underpinning conservation projects can improve both the design of the project (hence improving chances of success) and also stakeholders' support. If necessary and circumstances allow, research or trials may need to be carried out to test the practicality, efficacy and efficiency of measures and their variations, and to check if there are any unforeseen problems before rolling out the measures more widely.

A good example of the value of carrying out careful research into the ecology and habitat requirements of the target species before undertaking practical conservation measures is the case of the Common Spadefoot toad in Estonia (EE-4). An increase in the species' range and population size was achieved through the rehabilitation or creation of suitable breeding ponds. This was guided by the results of advance research that identified the specific requirements of the species in terms of its required pond habitat and its spatial distribution (i.e. clusters of ponds close to others with the species, but separate from running water with fish). The project then used this information to identify the sites where pond enhancement or creation was needed and feasible (EE-4). Similar MDI cases where research into the habitat's or species' requirements and the effectiveness of conservation and restoration actions has been especially important relate to captive breeding of the European Mink (EE-5), the optimal design of reedbed habitats for the Eurasian Bittern (UK-4), the movements of otters and their requirements for habitat connectivity (NL-5) the design of electricity pylons to avoid electrocution of large raptors, such as for the Spanish Imperial Eagle (ES-2) and techniques to improve the condition of wet heathland in Belgium (BE-1).

Once measures are being implemented, then adequate, appropriately designed and targeted monitoring is needed to check that the measures are having their intended impacts, and if necessary to facilitate adaptive management (such as refinements to the practical measures). The importance of such monitoring is evident from the case study of the reintroduction of the European Bison in Poloniny National Park in eastern Slovakia (SK-5). From the outset the reintroduction programme included monitoring of the released bison (including through radio telemetry) of their feeding behaviour, habitat preferences, seasonal and daily activity, impacts on ecosystems, and their individual health status. This provided an improved understanding of the bison population in the national park, which led to better adapted conservation measures. Monitoring results can also be used to the benefit of other follow on projects as well, such as was the case with the conservation of the Pygmy Cormorant and Ferruginous Duck in Bulgaria (BG-1). As part of a LIFE conservation project for

a key site for the species (LIFE08 NAT/BG/000277), monitoring was carried out of breeding, passage and wintering birds to assess improvements in the species' habitat and the effectiveness of the project. The monitoring data were then used to inform the development of national species action plans, and the monitoring system has been taken up in a subsequent LIFE project.

The monitoring results should then feed into overall assessments of the status of the habitats and species (e.g. to support Article 12/17 reporting), which of course is essential if MDI are to be reliably identified, and lessons learnt from the process. Unfortunately, as discussed in chapter 2, there are currently numerous gaps in knowledge of the status of many habitats and species, and whether or not observed improvements are genuine and the result of conservation measures, and hence the list of MDI identified under this contract is incomplete. Again, there are particularly widespread gaps in knowledge of the status of marine ecosystems and their species, as well as in sparsely vegetated habitats, and in other habitats in southern and eastern parts of the EU.

4.2.8 Other factors

- *Are targeted improvements primarily limited to rare and narrowly distributed species and habitats, or are there also examples of improvements for common and widespread species? What were the main drivers explaining these improvements?*

With the information collected under this study it is not possible to objectively examine whether or not a disproportionately high number of MDI relate to rare and narrowly distributed species. This is because it would require a comparison of the area of distribution of habitats and species within the individual countries / biogeographical areas where they have achieved a MDI and where they have not; and the collation of such data is beyond the scope of this study. Furthermore, as discussed in Chapter 2, the MDI cannot be considered to be a representative set due to numerous data gaps, and therefore the distribution of their habitats and species could have hidden biases.

Nevertheless, there is an indication that a relatively high proportion of identified MDI are for relatively rare or scarce species with limited distributions. This is perhaps most reliably observed amongst the birds due to the relatively large number of MDI, with many rare and scarce species including raptors such as White-tailed Eagle, Spanish Imperial Eagle, Eastern Imperial Eagle and Saker Falcon, and agricultural birds such as Great Bustard and Corncrake, and seabirds such as Yelkouan Shearwater. But there are also numerous cases of species that are generally more dispersed, such as the Boreal Owl (*Aegolius funereus*), Common Kingfisher (*Alcedo atthis*), European Nightjar (*Caprimulgus europaeus*), European Roller, Common Quail (*Coturnix coturnix*), Middle Spotted Woodpecker (*Dendrocopos medius*), Collared Flycatcher (*Ficedula albicollis*) and Common Tern (*Sterna hirundo*). Similarly, some of the HD MDI were achieved for very rare species, such as *Myotis rehsteineri*, *Biscutella neustiaca* and the Hungarian Meadow Viper. But MDI also occurred amongst some more widely dispersed and common HD species, for example the Common Wall Lizard (*Podarcis muralis*), Great Crested Newt (*Triturus cristatus*), Beaver and Eurasian Otter. But care should also be taken in interpreting the lists of commoner species, as in some cases the MDI may have occurred in countries where they may be rare (which is why a country-specific comparison of their distributions would be required to objectively examine this further).

It might be expected that a relatively high proportion of MDI should relate to rare and narrowly distributed species as it will obviously be easier to tackle these if they are in a small area, especially if they are concentrated within protected areas. Furthermore, the total costs of conservation measures for narrowly distributed rare species can be expected to be relatively low (although per unit costs may be higher if special measures are required for them), compared to dispersed species, particularly if they occur in habitats where the direct costs of land management measures and/or opportunity costs are high, such as for many farmland species.

But it should also be borne in mind that other factors may increase the likelihood that conservation measures will be taken for rare species that may then lead to a MDI. Firstly rare species are often the most threatened and therefore are more likely to be the focus of targeted conservation measures. Secondly, rare species tend to attract more public and political interest, and it is therefore more likely that the support and funding required for conservation measures for them will be obtained. Thirdly, dedicated species action plans and their associated partnerships and measures are more often targeted towards rare species. This triggers action, and there is evidence to show that the preparation of such plans provides added conservation benefits, at least for birds (EEA, 2015), but these are most effective for rare and localised species (Barov & Derhé, 2011). In fact the benefits of such plans are evident in several of the case studies included in this study, such as concerning the North Sea Houting (DK-2), European Tree Frog (NL-2), Eurasian Otter (NL-5), Brown Bear (IT-1), Eurasian Spoonbill (FR-3) and Eurasian Bittern (UK-4). Many of the species that were included in a report on species that had recovered their populations in Europe were also the focus of species action plans (Deinet, et al, 2013). However, they are not always effective, and therefore the conclusions of an analysis that identified the factors that influence whether they work well or not is presented in Box 4.3.

In conclusion, it is uncertain if a disproportionately high number of MDI relate to species and habitats that are rare or narrowly distributed. However, this might be expected due to constraints on the ability to conserve dispersed species and also known intentional targeting of conservation measures, including action plans, towards rare species.

Box 4.3 Factors that influenced whether Species Action Plans for threatened birds in the EU worked well or failed

Source: Section taken from Barov & Derhé, 2011.

Action plans worked well when:

- The species is rare and localised, which makes it easier to manage with classic conservation tools (e.g. protected areas designation and management, nest guarding, restocking).
- Direct threats to the species were eliminated through better enforcement.
- Targeted funds were available and sustained (e.g. LIFE)
- There was direct interest of key stakeholders to contribute to the implementation of measures.
- Problems and threats were well diagnosed and their mechanisms understood.
- Good data exists or is gathered through the implementation to support management actions.
- Coordination and technical support for implementation and monitoring was taken by a dedicated organisation or a working group.
- Acute threat that was in the basis of the decline could be eliminated relatively easy (e.g. electrocution)
- Species could benefit from positive environmental trends (e.g. wetland restoration and improvement of water quality and fish stocks).

They failed when:

- Species was dispersed within a large heterogeneous habitat (e.g. agricultural mosaics).
- Classic conservation tools are ineffective or of limited extent (e.g. insufficient habitat included in protected areas)
- Key stakeholders had no interest to contribute (e.g. low uptake of agri-environmental measures).
- Financial incentives caused additional pressures for the species habitat (e.g. subsidies for irrigation, crop conversion, etc.)
- Threats are diffuse, difficult to manage, too complex (e.g. illegal poison use, agricultural intensification)
- Poor data to guide management and provide feedback (e.g. no monitoring schemes in place)
- No clear responsibility or push for implementation (e.g. none is responsible for the plan at national or international level)
- Plans are of poor quality, not supported by the stakeholders and organisations.
- No clear link to funds for implementation (eg not a priority for LIFE funding).

- They were most needed – to prevent structural pressures to biodiversity from other policies with impact on land-use (e.g. agriculture, fisheries, energy).

- *Are targeted improvements mostly related to habitats and species that react quickly to conservation measures or are there also examples of targeted improvements for species and habitats that are known to respond rather slowly to targeted measures?*

It is difficult to ascertain whether or not most of the MDI that have been identified relate to habitats and species that respond rapidly to conservation measures, as information on the time required for such measures to show benefits is not readily available. However, it is well known that forest habitats generally respond slowly to typical management measures, and this may be one reason for the relatively low number of identified forest MDI (12 cases, of which 4 were at a sub-reporting level out of 80 habitat MDI). On the other hand, it might also be due to other problems, such as conflicts between forestry and nature conservation, which have been relatively common in some countries (Milieu, IEEP & ICF, 2016), and the limited use of RDP funds by most Member States for forest conservation measures (see 4.2.6). Also, given that our list of MDI is incomplete, it may be due to chance. Nevertheless, there are some examples of forest MDI including the case study covering *Taxus baccata* woodland (IE-2).

It is particularly difficult to draw conclusions on this issue for species, as the MDI include a range of species that are likely to have differing response times to conservation measures (see Annex 7). What can be said is that MDI have occurred for some species with low reproductive rates including several covered in the case studies such as the Loggerhead Turtle and Green Turtle (CY-1), Brown Bear (IT-1), European Bison (SK-5) and several species of large raptor, such as the Spanish Imperial Eagle (ES-2) and Eastern Imperial Eagle (SK-3).

- *Are there examples of improvements based on targeted actions being taken outside of the EU territory?*

According to the Member State responses to the 1b questionnaire on MDI on the importance of actions outside the EU (e.g. for migratory species or with respect to long-distance pollution) there were no cases where such actions were thought to have contributed to MDI amongst habitats or HD species. For birds the actions were of insignificant, minor or unknown importance for all MDI for which the importance of the actions were assessed, except for two where the measures were considered to be essential: Yelkouan Shearwater and the Mediterranean Storm Petrel (MT-1). As seabirds that are widely dispersed outside the breeding season measures to reduce their mortality during this period are important.

As for other questions discussed above, care needs to be taken with interpreting these results, due to the gaps in the identification of MDI and the small number of responses from Member States on the factors affecting the MDI. Thus there may be MDI where these actions were important, but for which information on these was not provided. Moreover, the lack of identified cases where MDI were based, at least in part, on actions outside the EU should not be used as reliable evidence that such actions are of little importance to the habitats and species that are the focus of the Nature Directives. Rather, the results may be due to the difficulty of effectively carrying out conservation measures outside the EU sufficiently to remove barriers to the achievement of MDI. In fact there is considerable evidence to support this possibility for long-distance migratory birds, as a disproportionality high proportion of them are declining, and they have been shown to be vulnerable to a wide range of pressures when outside the EU that are not being addressed, such as hunting and persecution, accidental mortality from wind farms etc, habitat loss and degradation and climate change (Kirby et al, 2008).

4.3 Factors that lead to the long-term sustainability of conservation outcomes

4.3.1 Introduction

The information available on the MDI from the Article 12 and 17 reporting, and Member State questionnaire 1b consultation on factors affecting them relates to relatively recent conservation measures (i.e. up to about 2012), and therefore it is not possible to examine whether the measures have produced long-term impacts. This is a potentially important weakness of this study because short term interventions will only be successful if followed by ongoing efforts to maintain the species and habitats that have benefited from them. Moving from one project to another without sufficient attention to sustainability will risk these efforts and resources being undone. Indeed, the European Court of Auditors (2009) expressed concerns about the sustainability of impacts of LIFE Nature projects, given that conservation outcomes are usually only observed after project funding has ceased, while before the 2007/13 programme there was a lack of follow-up procedures or indicators to measure outcomes over time.

The case studies have therefore attempted to examine the longer-term impacts of the MDI to some extent by including information on more recent measures, the current status of the targeted habitats and species and planned future actions, gathered from project documents and interviews with project personnel. This provides some indication of the actions being taken to ensure long-term improvements, but the period covered is too short to draw conclusions on what factors actually lead to long-term sustainable MDI.

Therefore, to investigate this issue, an examination of some key literature on the longer-term outcomes of nature conservation projects has been carried out. In particular it has drawn on a 2014 report by the European Commission that examined the long term impact of LIFE Nature projects and the sustainability of conservation outcomes, based on evidence from ex-post evaluations (European Commission, 2014c). The key lessons from this report and some other sources are therefore summarised in the section below, in order to complement the more specific lessons from the MDI and case study lessons discussed above. In particular it focusses on the following particular challenges in achieving long term sustainability:

- moving from projects to long term conservation action;
- securing the long term maintenance of newly created or restored habitats;
- moving from species recovery to long term sustainable management; and
- securing long term regulatory commitments to conservation.

4.3.2 From projects to long term conservation action

The European Commission report on the long term impact of LIFE Nature projects and the sustainability of conservation outcomes concluded that, even though LIFE projects have a limited duration in nature conservation terms, follow-up evaluations have found that they generally have lasting impacts. Project beneficiaries are not obliged to sustain the project activity after its end, but are required to prepare 'After-LIFE' plans to address sustainability, as part of their final reports (Box 4.4). These plans require beneficiaries to set out how they will continue to develop and promote the project after completion and include sections on sustainability, continuation of activities and identification of long-term monitoring indicators. Ex-post evaluation, including many years after project completion, is vital in assessing long term impact.

Box 4.4 After-LIFE Requirements for LIFE Nature Projects

- Obligation on all LIFE Nature projects to produce After-LIFE conservation plans and include these in final reports (although there is no obligation to deliver the proposed activities).
- Requirement to maintain project websites for five years after closure (although there is no obligation to add to the information, so many just go into 'hibernation'). Older projects had no obligation to maintain the website beyond the end of the project.
- Requirement for beneficiaries to evaluate the success of their own project in their final report (following guidelines provided by European Commission).
- Evaluation of the final report by the external monitoring team (including expected long-term impacts).
- Introduction of limited (randomly selected) ex-post project visits missions (currently 20 Nature project visits per year).
- Results published in LIFE web summary – publicly available via the LIFE project database (However, results are not updated following ex-post visits).

Source: European Commission (2014)

The Commission report concluded that long term sustainability of LIFE projects can be enhanced by the following actions (with some relevant case studies from this study indicated):

- delivering tools to improve management capacity – examples include national working groups on species conservation (e.g. Iberian / Pyrenean Desman (*Galemys pyrenaicus*); Spanish Imperial Eagle); approval of conservation strategies (e.g. Iberian Lynx (ES-4); long-term management plans; new legislation (e.g. Royal Decrees on power lines and invasive species in Spain); identification of more cost-effective conservation interventions (e.g. for *Myosotis rehsteineri* at Lake Constance, Germany (AT-1);
- achieving buy-in from national authorities, which is important in securing the capacity needed for long term success;
- effective stakeholder engagement, which is important in ensuring balance between conservation and economic development needs, achieving positive attitudes among stakeholders, and co-operating with farmers, foresters, fishers and hunters;
- long term funding – through multiple LIFE projects (e.g. including Eurasian Bittern UK-4, Belgium Atlantic heaths BE-1) or pump priming followed by ongoing finance from other sources (e.g. the Nordic Alvar case study EE-2);
- good project design, ensuring a number of factors are in place such as knowledge of the conservation problem, stakeholder buy-in, strong partnerships, good consultation, realistic goals, sufficient capacity and competence;
- strong partnerships;
- contractual and legal arrangements (the LIFE programme contains provisions whereby land purchased and durable goods acquired must be indefinitely assigned to nature conservation activities beyond the end of the project);
- motivation and commitment; and
- ongoing monitoring.

4.3.3 Securing long term maintenance of habitats

The European Commission (2014c) report also highlighted the following range of considerations that influence the sustainability of outcomes for habitats benefiting from LIFE funding.

- Achieving sustainable outcomes for habitats requires good project design, clear specification of conservation objectives, appropriate legal protection and enforcement, and ongoing monitoring of conservation outcomes, especially for those which may take many years to achieve favourable conservation status.

- Different habitats vary in the degree to which they require ongoing management interventions. Some LIFE projects may deliver sufficient change to achieve long term impact (e.g. blocking of mire drainage), while others require sustained conservation interventions and continuous funding. Long term sustainability may be less of a challenge for habitats that require less intervention and for which there are fewer potential conflicts (e.g. Western Taiga forests).

- Knowledge and skills are important for the effective conservation and restoration of habitats, and therefore LIFE projects have produced best practice guides to disseminate lesson that can inform future conservation interventions.

- Sustainable finance for ongoing conservation management is important. Long term sustainability depends on moving from funding initial investments in habitat creation or restoration (e.g. through a LIFE project) to ongoing funding of annual land management, which is typically through EU agri-environment schemes, or in some cases national land management schemes.

- Delivery of long term outcomes for habitats depends on ongoing human impacts to be managed. A failure to do so can compromise conservation outcomes. For example, ongoing pollution of Southern Alpine Natura 2000 wetland sites has limited the success of the NEMOS project (LIFE00 NAT/IT/007281), the actions of which were focussing on habitat protection through SPA designation, the renaturalisation of canalised water course and the recreation of wetland habitats such as riverine woodland. By comparison the Vai palm forest project (LIFE98 NAT/GR/005264) combined habitat restoration with successful measures to reduce the impacts of forest fires, tourism and other threats.

- Positive socio-economic outcomes, such as job creation and tourism, can help to enhance public attitudes to long term conservation and contribute to the sustainability of outcomes – examples given in the report include the Aapa & Avi project, Finland (LIFE00 NAT/FIN/007060) and the Vai palm forests in Greece ((LIFE98 NAT/GR/005264).

- Engagement and buy-in from sectoral stakeholders, such as farmers and foresters, is important to achieve sympathetic land management over time.

- Land purchase may not always be the most cost-effective strategy, but in many cases it has played a key role in securing long term conservation outcomes, providing security of land tenure and solving land management conflicts.

Interventions are more likely to be successful if problems to be addressed are understood and relatively simple. Large scale, complex and multi-dimensional pressures and problems are likely to be harder to address. For example, a study on the effectiveness of 15 years (1996-2009) of nature conservation projects in the March-Thaya floodplain in Austria concluded that, despite continuous

efforts by NGOs and some €9 million invested from mainly public bodies, there was a decline in the conservation status of several species and habitat types. Although a LIFE project had a short-term positive effect on the target habitats and species it was insufficient to stop their continuing deterioration in the longer run. A major factor was that projects focused on short or medium term contractual arrangements and associated payments, without finding a more sustainable long term mechanism such as land purchase or other sustainable long-term arrangements.

4.3.4 From species recovery to long term management

Many conservation projects run by public bodies and NGOs have undertaken interventions designed to stop the decline of species. An important challenge, once species declines are reversed, is to put in place the conditions that enable their populations to be sustained without the need for ongoing intensive care.

Useful insights into the successful transition from species recovery to sustainable long term management of species populations are provided in a report produced as part of a recent a LIFE project in the UK on the Stone Curlew (UK-5)(RSPB, 2017). The report identifies 12 stages in achieving the recovery of a species, which move from monitoring through diagnosis, trial management and recovery management, through to sustainable management of species populations (Box 4.5).

Successfully reversing the decline of the Stone Curlew in England involved time-intensive interventions by the RSPB and its partners to find and protect individual nests, especially on arable farmland where they are at greatest risk from disturbance and damage to nests by agricultural operations. It was recognised that this approach was unsustainable in the long term. Efforts to achieve sustainable long term management, supported by EU LIFE, have involved:

- restoration of semi-natural grassland, providing sufficient new nesting habitat to compensate for the need to reduce nest protection efforts on arable land;
- improved management of nesting plots through agri-environment schemes;
- community engagement efforts, designed to encourage people to value and appreciate stone curlews and participate in their conservation; and
- working in partnership with farmers and volunteers, enabling them to take responsibility for stone curlew conservation efforts.

The RSPB has devoted much management and staff time, as well as scarce financial resources, on efforts to save the Stone Curlew and other species such as the Bittern (UK-4). It recognises the need to move to the sustainable management phase of species recovery as soon as possible, in order to free resources to reverse the declines of other rare species, although efforts to achieve this are still ongoing.

Box 4.5 The stages of species recovery

The RSPB (2017) identifies 12 stages in achieving the recovery of a species, which can be tracked through a species recovery curve. The aim is to progress a species through all twelve stages as efficiently as possible. Some species progress quickly, when the problem can be eliminated, for example legislating against unsustainable hunting or controlling non-native predators such as rats. However, for species requiring ongoing habitat management, it can be difficult to progress from 'Recovery' to 'Sustainable management':

Monitoring

M Species is under a watching brief- the only action is monitoring, (Note monitoring is required in every stage of the species recovery journey, but may be the only action at the start or end of the journey)

Diagnosis (research)

D1 No research undertaken/ cause of decline unknown

D2 Research underway, but limited understanding of cause of decline

D3 Research is providing strong indication of cause of decline

Trial management (solution testing/ research delivery)

T1 Diagnosis provides sufficient results to trial solutions, but work only initiated recently

T2 Trial management underway, but not yet clear evidence that it can deliver objectives

T3 Trial management is providing strong indication that it will deliver objectives

Recovery management (deployment of solution)

R1 Work initiated to roll out solutions across the species' range

R2 Solutions adopted across the species' range but too early to demonstrate success against population/ range targets

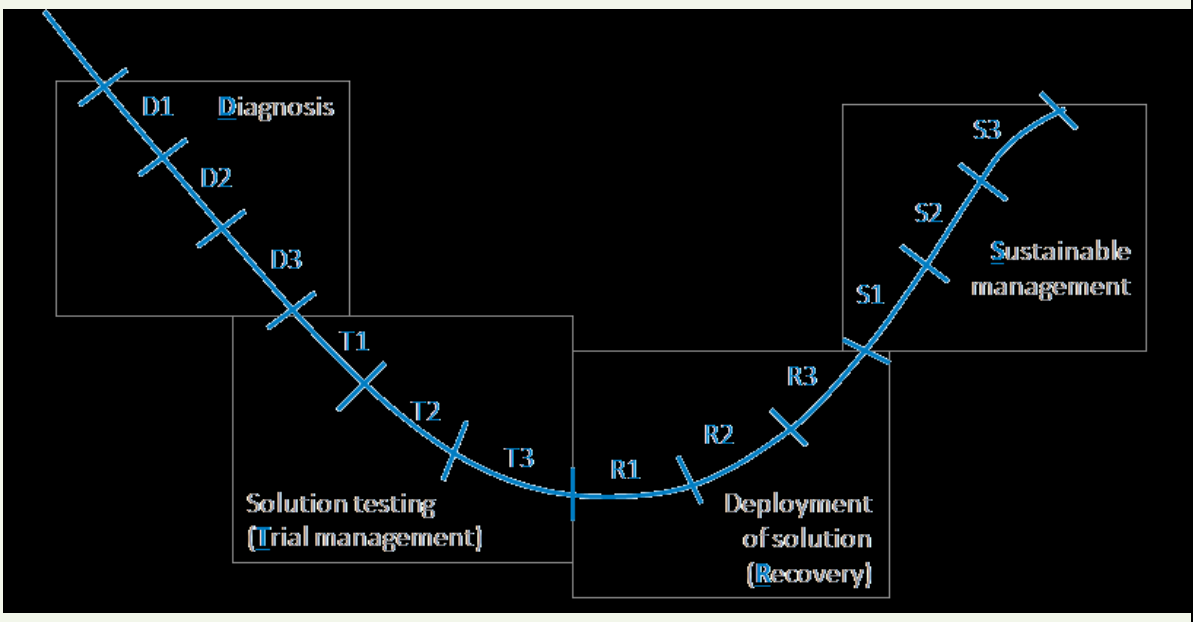
R3 Solutions enable achievement against population/ range targets but only with continued conservation intervention

Sustainable management

S1 Indication that population/ range targets being achieved with minimal conservation intervention

S2 Good evidence available that population/ range targets are being achieved and can be sustained with little or no conservation intervention (ie population maintained within regular land or marine management practices)

S3 Population/ range targets achieved and the species' conservation status secured (ie Green or Amber listed (not declining), and no longer meets the criteria for national biodiversity action planning).



Source: RSPB (2017)

4.3.5 Securing long term commitments and guarantees

Some conservation interventions involve a form of commitment, such as to meet regulatory requirements or as an agreement with a landowner for habitat restoration and management, which must be backed up by longer term arrangements to deliver lasting benefits for nature and biodiversity.

Some insights regarding the conditions that need to be satisfied to guarantee that conservation benefits will be delivered in the long term can be gained from the international literature on biodiversity offsetting, because it requires a commitment to deliver sustainable conservation gains in perpetuity. However, these conditions and the mechanisms required to achieve them are also applicable to other forms of conservation agreements. A study for the European Commission by Rayment *et al* (2014), involving an international review of best practice, found that security of long term conservation benefits depends on at least three main factors being satisfied:

- ensuring the effective ongoing delivery of conservation management activities through appropriate regulatory and management systems;
- securing the long term use of land for conservation purposes; and
- ensuring the financial sustainability of conservation management over time.

The specific mechanisms to satisfy these conditions are likely to include:

- **A binding contractual agreement** specifying conditions (e.g. regarding management actions, monitoring, reporting, financial aspects), that is enforceable (e.g. by a regulator/ authority).

- **A long term management plan**, normally as a condition of the contract, and specifying required actions, performance standards, targets, monitoring and reporting arrangements.

- **secure rights to manage the land for conservation purposes**, through purchase of the land if feasible and cost-effective, or long term leases or management agreements specifying conservation actions can be used but do not offer the same levels of long term security.

- **Obligations to use the land for conservation purposes in the long term**, for example through a covenant or easement specifying long term use, involvement of a 3rd party such as an NGO committed to conservation use, or long term regulatory oversight / public scrutiny, perhaps backed by information tools such as registers specifying that the land is to be used for conservation purposes.

- **Secure access to finance to fund conservation action,** normally by requiring establishment of an appropriate conservation fund, though there are alternatives (such as a bank guarantee).

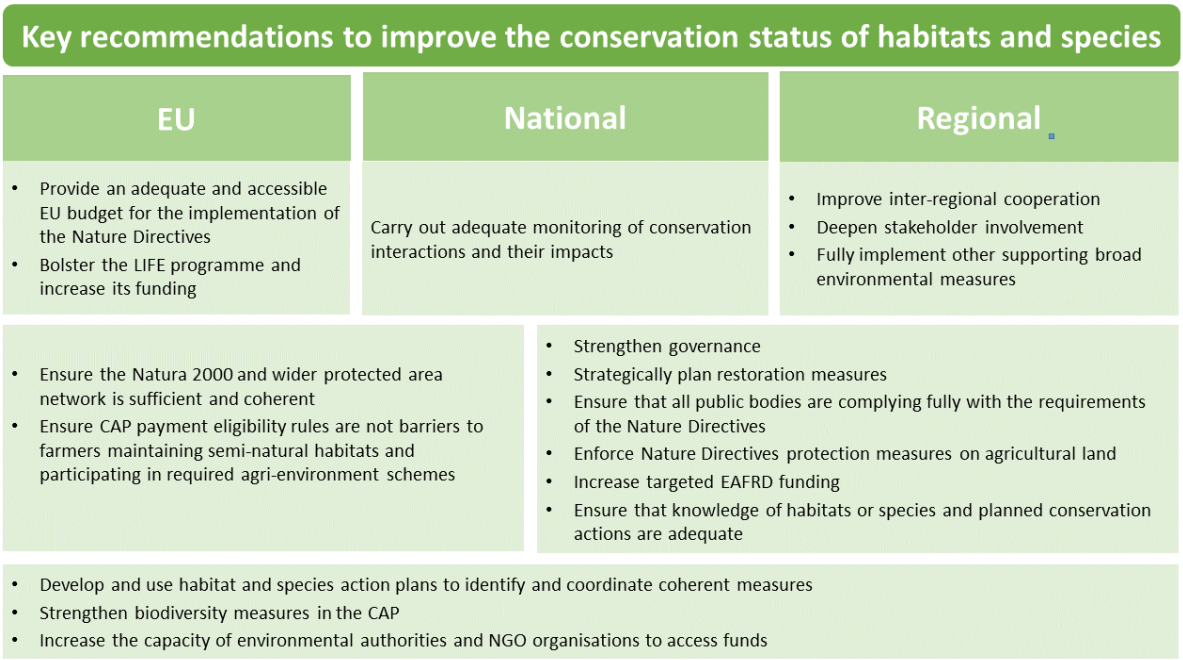
- **Safeguards against risk of failure**, such as through regulatory measures (i.e. the regulator secures all reasonable safeguards); contingency funds for unforeseen costs; and/or financial insurance against risk of technical or financial failure.

4.4 Key recommendations to improve the conservation status of habitats and species

The recommendations set out below, primarily relate to the key drivers of success identified in the discussion above (section 4.2), although some are crosscutting issues. In addition, some more specific recommendations are included relating to the preparation of the next State of Nature Report, and the biogeographical seminars that support the implementation of the Nature Directives as well as the future development of Prioritised Action Frameworks (PAFs). However, as the PAFs are currently being updated according to recently agreed guidance on their contents, it would now be of little value to provide detailed recommendations on specific aspects of the PAFs. Instead, the recommendations include broader suggestions relating to linked issues such as the prioritisation of habitats and species for conservation actions, and key funding sources.

Clearly, a large number of factors affect the success of conservation measures for habitats and species, and it would therefore be possible to provide a long and exhaustive list of recommendations. However, many key topics have been previously covered in other Commission studies and guidance, such as in relation to the Fitness Check, funding of nature conservation, habitat protection and management, restoration, species focussed measures and other actions (which are available on the DG Environment biodiversity website pages; although some are being updated, or will be in response to the Fitness Check and the new budget regulations). Therefore, to maximise the added value of this study, the list of recommendations (and summary in Figure 4-3) primarily draws on the evidence from this study, and focuses on those issues that are likely to have the most impact in terms of increasing the effectiveness and scale of conservation measures, and other relevant and topical issues that have not been covered in other studies. The recommendations are not prioritised but loosely grouped according to topic.

Figure 4-3 Summary of the general recommendations in relation to the levels of responsibility for carrying them out



4.4.1 General recommendations

1. **Strengthen governance**. Strong and coherent governance and institutions at national and regional level are required to provide the foundations (such as through species protection and protected area legislation, and coherent land use policies) on which targeted actions to improve the status of habitats and species is dependent. Steps should therefore be taken to ensure that such foundations are in place before embarking on conservation and restoration projects for habitats and species that are vulnerable to weak protection measures.

2. **Improve inter-regional cooperation**. For Member States that have devolved nature conservation and related governance structures, efforts may be needed to ensure that joint and co-ordinated actions are taken to achieve improvements across multiple regions. This is especially the case where species move across regional borders, such as for feeding, or roosting, or between breeding and wintering areas.

3. **Deepen stakeholder involvement**. A high priority should be given to involving stakeholders in conservation initiatives as early and as deeply as possible, through a participatory process rather than a limited consultation. Although this takes time and resources, effective conservation measures are normally dependent on the support of stakeholders and evidence shows that participatory approaches are the best means of achieving this in the long run. Similarly, it is important to ensure that the key staff responsible for the conservation measures are themselves highly motivated, and have the aptitude and enthusiasm to engage and genuinely involve stakeholders in the project concerned.

4. **Develop and use habitat and species action plans to identify and coordinate coherent measures.** The measures needed to achieve improvements in the conservation status of habitats and species can often be efficiently and effectively planned and implemented through the production of species action plans and habitat action plans (which should feed into the PAF process). Amongst other things, these should identify the key factors that are preventing the achievement of favourable conservation status and the conservation measures necessary to achieve favourable conservation status, as well as their relative importance and urgency, their costs and potential funding sources. In accordance with good practice they should have clear SMART objectives for actions and their outcomes, with responsibilities for actions identified. Such plans are more effective for some species and habitats than others, as indicated in Box 4.4, and therefore the need for such plans should be assessed and prioritised accordingly.

5. **Ensure the Natura 2000 and wider protected area network is sufficient and coherent.** A proven key measure for maintaining and improving the status of many habitats and species is the designation of an adequate and coherent network of Natura 2000 sites, and other types of protected area that may contribute to the overall network in the Member State. This not only helps protect habitats and species from ongoing pressures, but also triggers the development of conservation objectives and plans for the sites, which in turn increases access to targeted funding and other forms of support. The requirements for additional sites should therefore be investigated as a priority where it is suspected (e.g. as part of species or habitat action plan) that there are deficiencies in the total area of the network, or the representation of all requirements of the habitats and species in question (e.g. feeding areas, breeding sites), or required functional connectivity amongst sites (e.g. to enable movements between sites for migration, and/or to maintain meta populations and genetic variation). Where feasible the results of assessments of protected area requirements for individual species and habitats should be combined (e.g. as part of the PAF development process) to identify strategic

opportunities where protected area designation can simultaneously contribute to several species and habitats in a cost-effective way.

6. **Strategically plan restoration measures**. Similarly, where habitat restoration or re-creation is planned this should be carried out strategically (e.g. identifying priority areas for restoration within a region that may provide the most cost-effective benefits, such as by linking up or expanding small isolated populations of species or habitat patches), based on research into the specific requirements of the habitats and species concerned and the required spatial distribution of areas that will enable ecological processes to function as required and the colonisation of habitat patches etc.

7. **Ensure that all public bodies are complying fully with the requirements of the Nature Directives.** A relatively quick win in terms of improving the status of habitats and species may often occur through carrying out conservation measures on public land, such as through integrating species' or habitat's requirements (e.g. as identified through a species or habitat action plan) into the area's land use regulations (e.g. into state forestry plans, or site logging plans) and ensuring that public funded projects are compliant.

8. **Fully implement other supporting broad environmental measures.** Whilst some MDI have been achieved as a result of broad scale environmental measures (in particular water quality improvements driven by the WFD) it is likely that the limited progress in achieving good ecological status of water bodies in some Member States, and in particular reducing nitrogen deposition, is a barrier to improving the conservation status of some sensitive habitats and species. It is therefore important for the WFD and National Emission Ceilings Directive (NECD)[28] to be fully implemented according to their agreed timetable. In addition, to achieve the objectives of the Nature Directives, Member States need to ensure that pollution does not exceed the levels that would prevent the achievement of the favourable conservation status of habitats and species that are the focus of the Nature Directives (e.g. identified through research and preparation of habitat or species action plans). This may therefore require more stringent measures to reduce pollution and other pressures than required to achieve good ecological status under the WFD and to reduce emissions to lower levels than the ceilings allowed in the NECD.

9. **Enforce Nature Directives protection measures on agricultural land, and elsewhere where necessary**. More effective and widespread measures need to be taken to address the particular challenges to achieving favourable conservation status of agricultural habitats and species. In particular, within the Natura 2000 network, greater enforcement of protection measures (e.g. in relation to prohibiting the ploughing of grasslands or other detrimental actions) appears to be necessary combined with greater use of the Natura 2000 measure available under EAFRD to compensate for the economic impacts of landuse restrictions. To support this, a high priority should be given to the preparation of site management plans, where these do not already exist, for sites with habitats and species threatened by agricultural developments and other incompatible land uses, especially where these are resulting in high opportunity costs that cannot be addressed through voluntary agri-environment schemes.

10. **Strengthen biodiversity measures in the CAP and improve the implementation of other environmental regulations on agricultural land**. To increase the achievement of MDI in the wider agricultural environment, it necessary to strengthen the environmental components of the 2021-27 CAP, ensuring that strong biodiversity focused cross compliance and greening

[28] Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC

type measures (especially the equivalent of 2013-2020 Ecological Focus Areas and the Environmental Sensitive Permanent Grassland measure) are incorporated. CAP measures also need to be supported and completed by improved implementation of all other relevant environmental regulations, including the WFD, NECD, Strategic Environmental Assessment Directive[29] and Environmental Impact Assessment Directive[30].

11. **Provide an adequate and accessible EU budget allocation for the implementation of the Nature Directives**. A major reason for the relatively low number of MDI that have been identified in this study is almost certainly funding constraints that have hampered the implementation of the Nature Directives, as identified by the Nature Directives Fitness Check and other studies. It is therefore essential to implement the recommendations that have been made in the Fitness Check, and the follow up Action Plan for Nature, People and the Economy, to increase the amount of funding available for conservation measures for the habitat and species that are the focus of the Nature Directives, especially within the Natura 2000 network, and to increase the accessibility of the funds to all nature conservation actors. The PAFs have a key role to play in identifying and prioritising funding needs and sources, and therefore need to be prepared carefully and completely, and implemented fully.

12. **Increase the capacity of environmental authorities and NGO organisations involved in nature conservation to access funds.** Some authorities, NGOs and others have found it difficult to obtain funds for nature conservation actions, especially for core administration functions, strategic conservation planning, research and monitoring, stakeholder engagement, and further fundraising. This constrains conservation planning and activities, even sometimes when funding is available for specific practical projects and actions, as the potential beneficiaries often lack the staff capacity (in terms of numbers and knowledge) to prepare the necessary applications and supporting documents etc. This can result in available funds being left unused, and the country failing to meet its obligations under the Nature Directives, which may lead to financial penalties for the Member State. It is therefore wise for national / regional governments to ensure that authorities, and other nature conservation partners have, at the very least, the necessary capacity to access and use all available funds that can support the implementation of the Nature Directives. The Commission should also consider further ways of reducing administrative burdens for applicants and beneficiaries, and consider additional incentives for supporting applications for high EU priority projects and providing core funding for priority strategic activities (e.g. monitoring to support future Article 12 and 17 assessments – see below).

13. **Bolster the LIFE programme and increase its funding for nature projects, whilst also increasing complementary and longer-term funding sources**. Evidence from this study shows that the LIFE programme has been a very effective and efficient funding instrument that has driven many of the observed MDI. However, despite a planned increase in allocated budget for Nature Directives relevant spending for the 2021-2027 programme, it will not by itself be able to increase significantly the scale of action for species and habitats covered by the Nature Directives, and it is not intended to provide the funding for ongoing conservation measures required to maintain conservation gains in the long-term. Therefore, it is important that additional sources of funding are obtained to address more species and habitats, to increase the scale of action and to secure long-term funding of conservation measures. In particular, public funding is likely to be the main funding required for most habitats and species, but

[29] Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment
[30] Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment

more efforts should be made to identify, develop and secure other sources of private funding and use of innovative financing methods.

14. **Increase targeted EAFRD funding for implementation of the Nature Directives, especially through tailored agri-environment climate schemes.** It is particularly important that agri-environment climate funding is increasingly targeted to the habitats and species that are the focus of the Nature Directives, particularly within Natura 2000 sites. Alternatively, where agri-environment climate schemes and other voluntary RDP funding measures are not being taken up, Natura 2000 compensation measures could be used in combination with obligatory management measures include in management plans developed with stakeholders. Agri-environment schemes also need to be more appropriately tailored to the habitats and species that they are targeted towards (e.g. as identified in species, habitat and site management plans) as evidence indicates that such tailored schemes are much more effective than those with simpler generic measures. Where necessary other RDP measures (such as 'non-productive investment' measures) should be used to complement agri-environment schemes.

15. **Ensure CAP payment eligibility rules do not encourage damage to habitats and species covered by the Directives, or preclude farmers from obtaining CAP funds for their required conservation measures.** It is essential that Member States use the flexibility allowed within the last CAP reform to ensure that their payment eligibility rules do not create incentives that encourage landowners to damage HD Annex I habitats or other habitats that are important for species that are the focus of the Nature Directives; and that agri-environment climate and other RDP measures can be used to support high nature value farming systems and more specific targeted nature conservation management practices for such habitats and species

16. **Ensure that knowledge of a habitat's or species' ecology, effects of pressures and the impacts of planned conservation actions are adequate before implementing them at a large-scale**. This study has shown that reliable, up-to-date and context relevant knowledge is required of the ecological requirements and pressures affecting habitats and species, so that appropriate, effective and efficient measures can be designed and implemented for them. Therefore conservation actions should not be implemented at large scale, especially if they are likely to be costly or risky (e.g. to the target habitats or species, or concerning other potential environmental risks), until adequate research and/or trials have been carried out to address uncertainties.

17. **Carry out adequate monitoring of conservation interactions and their impacts, adjust actions if necessary, learn lessons and disseminate them.** Once measures are being implemented, then adequate, appropriately designed and targeted monitoring should be carried out, as this provides the ability to check that the measures are having their intended impacts, and if necessary to make adjustments to the measures that are being taken (i.e. thereby facilitating adaptive management). Once clear lessons have been learnt then they should be carefully documented and passed on, such as through publication in widely accessible scientific papers, presentations at meetings (e.g. biogeographical seminars) and inclusion on relevant websites[31].

[31] E.g. www.conservationevidence.com and https://chapter.ser.org/europe/knowledge-base/

4.4.2 Recommendations for achieving sustainable long term improvements

From the analysis in section 4.3 above, it is clear that a number of factors contribute to the long term sustainability of the outcomes of conservation interventions, and on this basis the following recommendations are made.

1. **Design and plan for the long term**. Planning for long term sustainability needs to be built into conservation plans from the outset. Plans, such as After-LIFE plans, should specify how the transition from short term conservation intervention to long term management will be achieved (taking into account and addressing potential ongoing pressures) and the necessary resources, partnerships, management and governance, monitoring and evaluation arrangements to support this. Financial planning also needs to manage the risks of reduction or even cessation of future funding. Diversification of financing strategies can help to avoid over-reliance on individual funding sources. Endowments, contingency funds, financial guarantees and insurance can all play a role in enhancing the security of future funding.

2. **Provide long term finance and incentives**. Ongoing management of species and habitats normally requires financial resources, and therefore it is important that conservation finance is secure in the long term, is sufficient to achieve the scale of management required, and is suited to ongoing annual conservation management.

3. **Maintain diverse partnerships and engagement**. The case studies examined in this project demonstrate that building broad and effective partnerships, involving a range of relevant stakeholders, can help to enhance the long-term sustainability of conservation management and its outcomes. While the commitment of a dedicated lead partner is often necessary to mobilise resources and efforts to achieve conservation outcomes in the short term, the sustainability of outcomes over time normally depends on establishing broader partnerships and engagement. This reduces the risks inherent on relying on particular organisations and individuals, while involving key partners such as farmers, landowners and local community groups can help to share the burden of responsibility and reduce dependence on conservation organisations. In addition, conservation partnerships allow for widening the management regime to adjusted areas that lay outside the N2000 network and in this way can act as buffer.

4. **Demonstrate socio-economic benefits**. While short term conservation actions may be driven by the conservation sector, longer term sustainability often depends on the support of local communities and businesses. Raising awareness and enhancing appreciation of species and habitats can motivate communities and businesses to value them and take responsibility for their protection. This can have positive effects in building local resistance to threats from disturbance, development, habitat damage and species persecution, and in mobilising resources for conservation through volunteering and local finance.

5. **Ensure that appropriate land uses and management are maintained**. Ensuring long term conservation outcomes depends on securing ongoing sympathetic land use and management over time. In some cases land purchase may be necessary to guarantee this, although legal designations and long term management agreements can also play a role. Legal mechanisms such as covenants and easements are another means of ensuring that land continues to be used for conservation purposes (Disselhoff, 2015; Racinska, Barratt & Marouli, 2015).

6. **If necessary, ensure commitments are underpinned by legal and contractual arrangements**. Where third parties are involved in the delivery of conservation actions, binding contractual arrangements can help to ensure that these are implemented as planned. This can be important in long term management agreements for sites and species. The LIFE programme

contains provisions whereby land purchased and durable goods acquired with LIFE funding must be indefinitely assigned to nature conservation activities beyond the end of the project.

4.4.3 Recommendations for the State of Nature Report

The next State of Nature Report (2014-2020) will be prepared by the European Environment Agency and associated European Topic Centre on Biological Diversity and builds on the outcomes of the Article 12 and 17 reporting (2014-2020). The report is likely to be based on the previous State of Nature Report (EEA 2015) and will primarily focus on the conservation/population status of protected habitats and species, drivers of improvement or further deterioration and the role of the Natura 2000 network for conservation/population status.

Findings from this study and, in particular, the case studies could be used to complement the quantitative assessments and provide positive and encouraging messages and lessons learned, such as regarding cooperation with stakeholders, financing, research and monitoring, of general interest to readers. Moreover, some of the more detailed information on conservation measures as reported in the case studies could offer useful insights for practitioners and authorities responsible for the implementation of the Nature Directives.

The quantitative analysis of the MDI in this study, and the information provided by the Member States in questionnaire 1b, is unlikely to be relevant to the next report as it will be out of date by then. Indeed, it is recommended that the identification and analysis of the MDI information from the Article 12 and 17 reports should be repeated as part of the development of the State of Nature Report as it is anticipated that the Member States' reporting will be more complete and a higher proportion of trends and changes in status will be marked as genuine or not. To facilitate such analysis, it is suggested that the results of this study are discussed with the expert reporting group on the Nature Directives, to show the value of providing indications of whether trends and changes in status are genuine or not. For example, if this was reported on sufficiently it would be possible to investigate in more detail, and with increased reliability, the degree to which MDI are dependent on the Natura 2000 network and to identify particularly important measures.

Also, because it was not within the scope of this study, it would be valuable to compare known MDI with cases where the same habitats and species have not achieved Genuine Improvements, to identify the most important barriers to MDI.

4.4.4 Recommendations for the Biogeographical Process

The Natura 2000 Biogeographical Process is an initiative of the European Commission that aims to support the Nature Directives by enhancing the implementation of the management, monitoring, financing and reporting of the Natura 2000 network. It is carried out through multi-stakeholder cooperation organised through seminars and workshops for each biogeographical region. These help to develop networks of expertise to collate and share information on pressures affecting habitats and species, their required conservation needs, and examples of best practice, in order to identify and prioritise Natura 2000 objectives and conservation measures for the region.

Given the importance of sharing information in the Biogeographical Process, it would seem appropriate to discuss the results of this study at a seminar for each of biogeographical regions. In addition to discussion of the overall results of the study in the context of the biogeographical region in question, the GID could also be used to extract and list MDI of specific relevance to the region for more focused consideration, in view of supporting a prioritization exercise that could lead to an upscaling of MDIs at the biogeographical region level.

Given the relatively small sample sizes for the MDI and the limited replies from the Member States on the factors affecting the MDI, it would be difficult to draw firm conclusions from a quantitative analysis, and for some regions very few or no MDI were identified (i.e. no MDI were identified for the Steppic, Black Sea, Macaronesian, Marine Black Sea and Marine Macaronesian regions), but some common themes might become apparent for other regions.

It is also suggested that the relevant case studies for each region could be discussed, and if there are sufficient cases, some common findings identified for the region. Also, if the cases include examples of best practice for certain measures these could be extracted or referred to in other documents produced for, or by, the seminars, to help disseminate the findings that are of most relevance to the issues being tackled in the region concerned.

As discussed in the section above, with the next update of the Article 12 and 17 reports, if Member States' reporting is more complete it should be possible to use the new data to carry out further more detailed and reliable analysis of the factors constraining Genuine Improvements and driving MDI. The importance and value of fully completing the Article 12 and 17 assessments should therefore be promoted at the biogeographical seminars. Then, if the dataset is sufficiently complete it should be possible to carry out more detailed and quantitative biogeographic specific analyses, which will be able to provide more useful context specific lessons.

References

Alterra, Eurosite, ECNC (2009/10) *Dealing with Conflicts in the Implementation and Management of the Natura 2000 Network Best Practice at the Local / Site Level (lot 3). A review of 24 Best Practice case studies*. Eurosite.

Arponen, A, Heikkinen, R K, Paloniemi, R, Pöyry, J, Similá, J and Kuussaari, M (2013) Improving conservation planning for semi-natural grasslands: Integrating connectivity into agri-environment schemes. *Biological Conservation* No 160, 234-241.

Avery, M (2015) *Inglorious. Conflict in the Uplands*. Bloomsbury, London.

Barov, B and Derhé, M (2011) *Review of the implementation of species action plans for threatened birds in the European Union 2004-2010*. BirdLife International report for the European Commission, Brussels.

Batáry, P, Dicks, L V, Kleijn, D and Sutherland, W J (2015) The role of agri-environment schemes in conservation and environmental management. *Conservation Biology* No 29 (4), 1006-1016.

Birdlife International (2013) *Setting Conservation Objectives for birds: interim position on standards and approaches for defining the Favourable Conservation Status of birds (focus on the national/sub-national level)*. Adopted by the EU Birds and Habitats Directive Task Force on 12 June 2013, BirdLife International & BirdLife Europe (unpublished), Brussels.

Bouwma. I M, van Apeldoorn, R and Kamphorst D A (2010a) *Current practices in solving multiple use issues of Natura 2000 sites: Conflict management strategies and participatory approaches*. Alterra, Wageningen, the Netherlands.

Bouwma, I M, van Apeldoorn, R, Çil, A, Snethlage, M, McIntosh, N, Nowicki, N and Braat, L C (2010b). *Natura 2000 – Addressing conflicts and promoting benefits*. Alterra, Wageningen, The Netherlands.

Brauner, R, Korbertis, M and Latruberce, M (2017) *Obstacles to the sustainability of results of LIFE Nature projects: impacts of EU policies.* Report to the European Commission, NEEMO LIFE team, Brussels.

Broyer, J, Curtet, L and Chazal, R (2014) How to improve agri-environment schemes to achieve meadow bird conservation in Europe? A case study in the Saône Valley, France. *Journal of Ornithology* No 155 (1), 145-155.

COWI (2009) Ex-post evaluation of projects and activities financed under the LIFE Programme. Final Report to the European Commission. Part 4: Thematic analysis - Nature

De Blust, G, Kruk, R W, van Apeldoorn, R and Sier, A R J (2010) *Natura 2000: Information and communication on the designation and management of Natura2000 sites. Main Report 3: Towards Integrated Management*. Alterra-rapport 2045, Alterra, Wageningen, The Netherlands.

Deinet, S, Ieronymidou, C, McRae, L, Burfield, I J, Foppen, R P, Collen, B and Böhm, M (2013) *Wildlife comeback in Europe: The recovery of selected mammal and bird species*. ZSL, BirdLife International and the European Bird Census Council, London, UK.

Department of Agriculture, Food and the Marine (2015). National Strategic Plan for Sustainable Aquaculture Development. Dublin.

Disselhoff, T (2015) *Alternative Ways to Support Private Land Conservation*. Report to the European Commission, Ref. No: E.3-PO/07.020300/2015/ENV.

Donald, P F, Sanderson, F J, Burfield, I J, S.M., B, Gregory, R D and Waliczky, Z (2007) International conservation policy delivers benefits for birds in Europe. *Science* No 317 (5839), 810-813.

EEA (2012) *Protected Areas in Europe - An Overview*. EEA Report - No 5/2012, European Environment Agency, Copenhagen.

EEA (2015) *State of nature in the EU: Results from reporting under the nature directives 2007-2012*. Technical report No 2/2015, European Environment Agency, Copenhagen.

EEA (2015) *State of nature in the EU: Results from reporting under the nature directives 2007-2012*. Technical report No 2/2015, European Environment Agency, Copenhagen.

EEA (2018) European waters. Assessment of status and pressures 2018. EEA Report 7/2018. Publications Office of the European Union, Luxembourg.

EFNCP (2015) *Europe's wood pastures - condemned to a slow death by the CAP?* European Forum on Nature Conservation and Pastoralism and Pogany-havas Association.

ETC/BD (2011) *Assessment, monitoring and reporting under Article 17 of the Habitats Directive: Explanatory Notes & Guidelines for the period 2007-2012*. Final version, European Topic Centre on Biological Diversity, Paris.

European Commission (2013) *Commission note on establishing conservation measures for Natura 2000 sites*. European Commission, Brussels.

European Commission (2014a) *Farming for Natura 2000. Guidance on how to integrate Natura 2000 conservation objectives into farming practices based on Member States good practice experiences*. European Commission, Brussels.

European Commission (2014b) *Managing Natura 2000 sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*. Habitats Committee Draft September 2014, European Commission, Brussels.

European Commission (2014c) *Long-term impact and sustainability of LIFE nature*. Luxembourg: Publications Office of the European Union.

European Commission (2017) *An Action Plan for nature, people and the economy*. SWD(2017) 139 final. European Commission.

European Court of Auditors (2009) *The sustainability and the Commission's management of the LIFE Nature projects*. Special Report No 11/2009.

European Court of Auditors (2011) *Is agri-environment support well designed and managed?* Special Report No 7/2011, Publications Office of the European Union, Luxembourg.

European Court of Auditors (2013) *Can the Commission and Member States show that the EU budget allocated to the Rural Development Policy is well spent?* Special Report No 12/2013, Publications Office of the European Union, Luxembourg.

European Court of Auditors (2014) *Is the ERDF effective in funding projects that directly promote biodiversity under the EU biodiversity strategy to 2020?* Special Report No 12/2014, Publications Office of the European Union, Luxembourg.

Eurosite (1999) *Management Planning Toolkit*. Eurosite, Tilburg, The Netherlandspp.

Eurosite (2010) *Dealing with Conflicts in the Implementation and Management of the Natura 2000 Network: Best Practice at the Local / Site Level (lot 3)*. A review of 24 Best Practice case studies, Eurosite, Brussels.

Gantioler, S, Rayment, M, Bassi, S, Kettunen, M, McConville, A J, Landgrebe, R, Gerdes, H and ten Brink, P (2010) *Costs and Socio-Economic Benefits associated with the Natura 2000 Network*. Final Report to the European Commission, DG Environment on Contract ENV.B.2/SER/2008/0038, Institute for European Environmental Policy / GHK / Ecologic, Brussels.

Hochkirch, A, Schmitt, T, Beninde, J, Hiery, M, Kinitz, T, Kirschey, J, Matenaar, D, Rohde, K, Stoefen, A, Wagner, N, Zink, A, Lötters, S, Veith, M and Proelss, A (2013) Europe needs a new vision for a Natura 2020 network. *Conservation Letters* No 6 (6), 462-467.

Houston, J and Velghe, D (2018) *Nature Ex-post exercise 2018 - Where LIFE has made a difference: Summary Report*. Report to the European Commission, NEEMO LIFE team, Brussels.

ICF, IEEP and PML (2018) *Study on the Economic Benefits of Marine Protected Areas*. Final Report to EASME, ICF, London.

Kati, V, Hovardas, T, Dieterich, M, Ibisch, P L, Mihok, B and Selva, N (2015) The challenge of implementing the European Network of Protected Areas Natura 2000. *Conservation Biology* No 29 (1), 260-270.

Kettunen, M, Baldock, D, Gantioler, S, Carter, O, Torkler, P, Arroyo Schnell, A, Baumueller, A, Gerritsen, E, Rayment, M, Daly, E and Pieterse, M (2011) *Assessment of the Natura 2000 co-financing arrangements of the EU financing instrument*. Institute for European Environmental Policy, Brussels, Belgium.

Kettunen, M, Torkler, P and Rayment, M (2014) *Financing Natura 2000 in 2014-2020: Guidance Handbook Part I: Description of EU funding opportunities in 2014-2020*. A publication commissioned by the European Commission DG Environment, Brussels.

Kettunen, M, Green, S, McConville, A J, Menadue, H, Newman, S, Poláková, J, Torkler, P and Underwood, E (2014) *Financing Natura 2000 in 2014-2020: Guidance Handbook Part II: Analysis of Natura 2000 management measures eligible for financing together with case studies*. A publication commissioned by the European Commission DG Environment, Brussels.

Kettunen, M, Illes, A, Baldock, D, Rayment, M, Ebrahim, N, Verstraeten, Y, Primmer, E, Rantala, S, Rekola, A and Santos, R S (2016) *Integration approach to financing of biodiversity: evaluation of results and analysis of options for the future*. Final report for the European Commission (DG ENV), Institute for European Environmental Policy, Brussels / London.

Kettunen, M, McConville, A J and van Vliet, W (2012) *Handbook on financing biodiversity in the context of the European Fund for Regional Development (EFRD)*. Practical guidance based on the lessons learned from SURF Nature project (ERDF Interreg IVC), Published by SURF-Nature Project, Cardiff.

King, M (2010) *An investigation into policies affecting Europe's semi-natural grasslands*. A report by the Grasslands Trust, European Forum on Nature Conservation and Pastoralism; European Commission (DG Environment), Derwentside, UK.

Kirby, J S, Stattersfield, A J, Butchart, S H M, Evans, M I, Jones, V R, O'sullivan, J, Tucker, G M and Newton, I (2008) Key conservation issues for migratory land- and waterbird species on the world's major flyways. *Bird Conservation International* No 18, S49-S73.

Kleijn, D, Baquero, R A, Clough, Y, Diaz, M, Esteban, J, Fernandez, F, Gabriel, D, Herzog, F, Holzschuh, A, Johl, R, Knop, E, Kruess, A, Marshall, E J P, Steffan-Dewenter, I, Tscharntke, T, Verhulst, J, West, T M and Yela, J L (2006) Mixed biodiversity benefits of agri-environment schemes in five European countries. *Ecology Letters* No 9 (3), 243-254.

Kruk, R W, De Blust, G, van Apeldoorn, R, Bouwma, I M and Sier, A R J (2010) *Natura 2000: Information and communication on the designation and management of Natura2000 sites. Main Report 2: Organizing the management in 27 EU Member States*. Alterra-rapport 2044, Alterra, Wageningen, Netherlands.

Lundquist, C.J. and Granek, E.F (2005) Strategies for Successful Marine Conservation: Integrating Socioeconomic, Political, and Scientific Factors. *Conservation Biology 1771–1778.*

McKenna, D, Naumann, S, McFarland, K, Graf, A and Evans, D (2014) *Literature review: The ecological effectiveness of the Natura 2000 network*. Technical paper No5/2014, ETC/BD report to the EEA, Paris.

Milieu, IEEP and ICF (2016) *Evaluation Study to support the Fitness Check of the Birds and Habitats Directives*. Milieu Ltd, Institute for European Environmental Policy and the ICF International, Brussels.

Natural England (2016) Conservation 21 - Natural England's Conservation Strategy for the 21st Century

O'Brien, M and Wilson, J D (2011) Population changes of breeding waders on farmland in relation to agri-environment management. *Bird Study* No 58 (4), 399-408.

Osmond, M., Airame, S., Caldwell, M. & Day, J. (2010). Lessons for marine conservation planning: A comparison of three marine protected area planning processes. *Ocean & Coastal Management* 53: 41–51.

Poláková, J, Tucker, G M, Hart, K, Dwyer, J and Rayment, M (2011) *Addressing biodiversity and habitat preservation through Measures applied under the Common Agricultural Policy*. Report prepared for DG Agriculture and Rural Development, Contract No. 30-CE-0388497/00-44, Institute for European Environmental Policy, London.

Potts, G R (1998) Global dispersion of nesting Hen Harriers Circus cyaneus; implications for grouse moors in the U.K. *Ibis* No 140 (1), 76-88.

Racinska, I., Barratt, L., Marouli, C. (2015). *LIFE and Land Stewardship. Current status, challenges and opportunities*. Report to the European Commission.

Rayment M, Haines R, McNeil D, Conway M, Tucker G and Underwood E (2014) Study on specific design elements of biodiversity offsets: Biodiversity metrics and mechanisms for securing long term conservation benefits. Report for the European Commission.

RSPB (2017) Achieving sustainable species recovery. Conference report: A recipe for success Lessons from the Stone-curlew LIFE project: RSPB EU LIFE+ end of project international conference, 28 February - 1 March 2017.

Ruíz, J and Beaufoy, G (2015) *Informe sobre la elegibilidad para pagos directos de la PAC de los pastos leñosos Españoles*. Report for the Spanish State Paying Agency (FEGA), Plataforma por la Ganadería Extensiva y el Pastoralismo, Spain.

Sanderson, F J, Pople, R G, Ieronymidou, C, Burfield, I J, Gregory, R D, Willis, S G, Howard, C, Stephens, P A, Beresford, A E and Donald, P F (2015) Assessing the performance of EU nature legislation in protecting target bird species in an era of climate change. *Conservation Letters* No 9 (3), 172-180.

Slootweg, J, Posch, M, Hettelingh, J-P and Mathijssen, L (2014) *Modelling and mapping the impacts of atmospheric deposition on plant species diversity in Europe*. CCE Status Report 2014 no. 2014-0075, Coordination Centre for Effects (CCE).

Underwood, E, Ashcroft, R, Kettunen, M, McConville, A J and Tucker, G M (2014) *Protected area approaches in the EU*. Report for the UK Joint Nature Conservation Committee, Institute for European Environmental Policy, London.

Wende, W, Tucker, G M, Quétier, F, Rayment, M and Darbi, M (2018) *Biodiversity Offsets. European Perspectives on No Net Loss of Biodiversity and Ecosystem Services*. Springer, Cham, Switzerland.

Whittingham, M J (2007) Will agri-environment schemes deliver substantial biodiversity gain, and if not why not? *Journal of Applied Ecology* No 44 (1), 1-5.

Whittingham, M J (2011) The future of agri-environment schemes: biodiversity gains and ecosystem service delivery? *Journal of Applied Ecology* No 48 (3), 509-513.

Annex 1: Validation of Article 17 reporting data

The review of Article 17 reporting data revealed that there are substantial limitations in terms of their utility for identifying Genuine Improvements in habitats and species in some Member States. In particular, three Member States (Bulgaria, Greece and Romania) did not include any assessments on the nature of changes, whilst Slovakia did not specify the reasons for having a high percentage of changes. Some Member States reported high levels of non-genuine changes in certain categories. Spain, for example, reports that nearly all changes in conservation status for habitat and HD species is due to a change in methodology (c1), while the majority of changes in Cyprus result from having more accurate data. To put the numbers into perspective, only 12 of the 27 Member States reported more than 5% of the changes in conservation status of habitats as being genuine. These Member States were AT, BE, DE, EE, HU, IE, LT, LU, LV, NL, SI, UK. The share of genuine changes in conservation status reported by the Member State was higher for HD species, where 17 of 27 Member States reported more than a 5% genuine change: AT, BE, CZ, DE, EE, FI, FR, HU, IE, IT, LT, LU, LV, NL, PL, SE, SI, UK. However, the overall grand total for both HD species and habitats was 8%.

It appears that the guidelines for Member State reporting were not fully clear for cases which show a positive trend, but where the conservation status remains the same between two reporting periods (U1 or U2). These cases should have been reported as a 'genuine change' in the 'Nature of Change' field. However, while the Netherlands reported all these cases as 'no change' despite reporting a positive trend, Belgium always reported such cases as 'genuine changes'. As a result, a list of Genuine Improvements based on the 'Nature of Change' field will almost inevitably neglect certain positive trend cases, depending on how Member States interpreted the guidance.

Despite the obvious shortcomings of the Article 17 reporting data on genuine changes, it was decided to not exclude any Member State reports beforehand, because consultations with national experts (as part of Task 1a: External validation and evidence) may address some of the data gaps, inconsistencies and uncertainties.

Annex 2: Relevant data in Article 12 reporting forms relating to population trends

3. Population trend		
3.1. Short-term trend (last 12 years)		
3.1.1. Period	*Ideally 2001-2012 (rolling 12-year time window) or period as close as possible to that, e.g. 1998-2010, if the best available data relate to surveys in those years.*	
3.1.2. Short-term trend, direction	*0 = stable / F = Fluctuating / + = Increase / - = Decrease / x = Unknown*	
3.1.3. Short-term trend, magnitude	**a) Minimum**	*Percentage change over period - if a precise figure, to give same value under 'minimum' and 'maximum'*
	b) Maximum	*Percentage change over period - if a precise figure, to give same value under 'minimum' and 'maximum'*
3.1.4. Method used	*3 = complete survey or a statistically robust estimate, 2 = estimate based on partial data with some extrapolation and/or modelling, 1 = estimate based on expert opinion with no or minimal sampling, 0 = absent data.*	
3.1.5. Quality	*3 = good / 2 = moderate / 1 = poor*	
3.1.6. Sources	*Give bibliographic references, link to Internet sites, expert contact details, etc.*	
3.2. Long-term trend (since c. 1980)		
3.2.1. Period	*Ideally 1980-2012 (although not an ecological baseline, c. 1980 is suggested because it is most policy-relevant to refer to a point of time close to when the Birds Directive was adopted).*	
3.2.2. Long-term trend, direction	*0 = Stable / F = Fluctuating / + = Increase / - = Decrease / x = Unknown*	
3.2.3. Long-term trend, magnitude	**a) Minimum**	*Percentage change over period - if a precise figure, to give same value under 'minimum' and 'maximum'*
	b) Maximum	*Percentage change over period - if a precise figure, to give same value under 'minimum' and 'maximum'*
3.2.4. Method used	*3 = complete survey or a statistically robust estimate, 2 = estimate based on partial data with some extrapolation and/or modelling, 1 = estimate based on expert opinion with no or minimal sampling, 0 = absent data.*	
3.2.5. Quality	*3 = good / 2 = moderate / 1 = poor*	
3.2.6. Sources	*Give bibliographic references, link to Internet sites, expert contact details, etc.*	
3.3. Additional information *(optional)*	*Other relevant information, complementary to the data requested under fields 3.1 and 3.2; free text, max. 500 characters, optional.*	

The form includes the same table for breeding range trends

Annex 3: Expert judgement on Annex I and II bird species triggering SPAs

Number of assessments of Annex I and II bird species triggering SPAs validated by expert judgement

MS	Verified by BirdLife	SPA trigger species - Annex I & II (only reports of good quality for short AND long-term trend)	SPA trigger species - Annex I & II (only reports of good quality for short-term trend AND moderate quality for long-term trend)	SPA trigger species - Annex I & II (only reports of poor OR moderate quality for short-term trend regardless of the data quality of the long term trend)	Genuine improvement cases added by BirdLife	Uncertain genuine improvement cases	Total genuine improvement cases sent out for MS Validation
BE	x	3	1	4	3	0	**11**
CY	x	1	0	2	0	0	**3**
FI	x	12	2	0	0	2	**16**
FR	x	36	4	13	12	0	**65**
DE	x	10	6	7	0	11	**34**
HU	x	6	3	5	0	2	**16**
IE	x	4	6	4	0	4	**18**
IT	x	8	1	12	9	1	**31**
MT	x	1	0	0	0	0	**1**
LV	x	3	1	3	0	2	**9**
NL	x	16	2	2	5	2	**27**
PL	x	3	8	12	0	0	**23**
RO	x	0	0	11	0	0	**11**
SI	x	3	2	3	7	0	**15**
SE	x	11	2	3	0	5	21
AT		12	5	7	0	0	**24**
BG		7	2	22	4	0	**35**
CZ		4	0	21	0	0	**25**
DK		8	1	3	0	0	**12**
EE		5	0	11	0	0	**16**
UK		34	0	7	0	0	**41**
LT		1	0	15	0	0	**16**
LU		4	2	3	0	0	**9**
PT		2	6	16	0	0	**24**
SK		9	1	8	0	0	**18**
ES		30	24	10	0	0	**64**
Total	**15**	**233**	**79**	**204**	**40**	**29**	**585**

Annex 4: First phase consultation with Member States

The first phase consultation was carried out through the distribution of a questionnaire, as an MS Excel file, to 26 Member States. This included all identified Genuine Improvements for habitats, HD species and BD birds, based on the analysis of the Art. 12 and 17 databases analyses as described in the previous section. In addition, a preliminary list of habitat types, birds and other species that were considered to have potentially shown Genuine Improvements at a smaller geographical scale than the reporting units (sub-reporting unit cases) were included. These sub-reporting unit cases, which were based on information provided by LIFE projects, required further scrutiny and input from national/regional experts.

The Member State authorities were asked to address the following steps and to include answers and any additional comments in the file (as necessary):

1. Verify the improvements that were reported as being genuine in the Article 17 databases for habitats and HD species and indicate if they are NOT correct, providing an indication of why .
2. Verify the bird trends assessments in Article 12 reports for bird species with positive trends and indicate if they are NOT correct, indicating why.
3. Verify the proposed cases of Genuine Improvements at regional (sub-reporting) level that have been compiled and indicate if they are NOT correct, indicating why.
4. Add additional regional (sub-reporting) cases of Genuine Improvements and supporting data and/or references.
5. For each Genuine Improvement, complete any gaps and/or update the information on the reasons for Genuine Improvement.

The questionnaire was sent out to Member States in mid-July 2017, and they were initially asked to provide responses with three weeks. However, this period was extended to 1st of September 2017. After this period, 19 responses were received from the 26 Member States[32] contacted.

[32] Due to a lack of reporting on Art.12/17 Croatia and Greece were not contacted.

Annex 5: Relevant data in Article 12 and 17 reporting forms relating to conservation measures

a) Reporting form

8. SPA coverage and conservation measures		
To be reported only for species triggering SPA classifications; i.e. species listed in Annex I, plus a selection of key migratory species for which SPAs have been classified, as identified in the species checklist. Passage species are not to be reported under section 8.1 but only for conservation measures under section 8.2.		
8.1 Population inside the SPA network		
8.1.1 Population size Estimation of population size included in the SPA network (on the national level).	**a) Unit**	*Use same unit as in field 2.2.a.*
	b) Minimum	*Number (raw, i.e. not rounded) – if a precise count, to report the same value for maximum and minimum*
	c) Maximum	*Number (raw, i.e. not rounded) – if a precise count, to report the same value for maximum and minimum*
8.1.2 Method used	*3 = complete survey or a statistically robust estimate, 2 = estimate based on partial data with some extrapolation and/or modelling, 1 = estimate based on expert opinion with no or minimal sampling, 0 = absent data.*	
8.1.3 Short-term trend of population size in the SPA network (on the national level). **– *(optional)***	*0 = Stable / F = Fluctuating / + = Increase / - = Decrease / x = Unknown. - Optional*	

8.2 Conservation measures

List up to 20 conservation measures taken (i.e. already being implemented) within the reporting period and provide information about their importance, location and evaluation.

Fields 8.2.2-8.2.5 to be filled in for each reported measure.

8.2.1 Measure	**8.2.2 Type** *Tick the relevant case(s)*					**8.2.3 Ranking**	**8.2.4 Location** *Tick the relevant case concerning where the measure is PRIMARILY applied*			**8.2.5 Broad evaluation of the measure** *Tick the relevant case*					
	a) Legal/statutory	**b) Administrative**	**c) Contractual**	**d) Recurrent**	**e) One-off**		**a) Inside**	**b) Outside**	**c) Both inside and outside**	**a) Maintain**	**b) Enhance**	**c) Long term**	**d) No effect**	**e) Unknown**	**f) Not evaluated**
Use codes from the checklist on conservation measures						*Highlight – using a capital 'H' – up to 5 of the most important measures*									

b) Classification of conservation measures used for Art. 12 and Art.17 reporting

code	description
1	No measures
1.1	No measures needed for the conservation of the habitat/species
1.2	Measures needed, but not implemented
1.3	No measure known/ impossible to carry out specific measures
2	Measures related to agriculture and open habitats
2.0	Other agriculture-related measures
2.1	Maintaining grasslands and other open habitats
2.2	Adapting crop production
3	Measures related to forests and wooded habitats
3.0	Other forestry-related measures
3.1	Restoring/improving forest habitats
3.2	Adapt forest management
4	Measures related to wetland, freshwater and coastal habitats
4.0	Other wetland-related measures
4.1	Restoring/improving water quality
4.2	Restoring/improving the hydrological regime
4.3	Managing water abstraction
4.4	Restoring coastal areas
5	Measures related to marine habitats
5.0	Other marine-related measures
5.1	Restoring marine habitats
6	Measures related to spatial planning
6.0	Other spatial measures
6.1	Establish protected areas/sites
6.2	Establishing wilderness areas/ allowing succession
6.3	Legal protection of habitats and species
6.4	Manage landscape features
6.5	Adaptation/ abolition of military land use
7	Measures related to hunting, taking and fishing and species management
7.0	Other species management measures
7.1	Regulation/ Management of hunting and taking
7.2	Regulation/ Management of fishery in limnic systems
7.3	Regulation/ Management of fishery in marine and brackish systems
7.4	Specific single species or species group management measures
8	Measures related to urban areas, industry, energy and transport
8.0	Other measures
8.1	Urban and industrial waste management
8.2	Specific management of traffic and energy transport systems
8.3	Managing marine traffic
9	Measures related to special resource use
9.0	Other resource use measures
9.1	Regulating/Management exploitation of natural resources on land
9.2	Regulating/Managing exploitation of natural resources on sea

Annex 6: Responses from Member States on the call of evidence

Summary of responses to consultation questionnaires in relation to birds that are SPA trigger species listed on Annex I and II of the Birds Directive

MS	Response to questionnaire		Article 12 data	Comments
	1a	1b		
AT	√	-	No further data was sent in 1a quest. ,No data was sent in 1b quest.	Validation of GIs and info on reasons for GI and non-GI in 1a quest. No response to 1b quest.
BE	-	-	No data was sent	Responded but no feedback on bird species in 1a/1b quest.
BG	-	-	No data was sent	Responded but no feedback on bird species due to lack of human capacity in 1a/1b quest.
CY	-	-	No further data was sent in 1a quest. No data sent in 1b quest.	Responded but no feedback on bird species in 1a quest. No response to 1b quest.
CZ	√	√	No further data was sent in 1a quest. (Some) info on drivers was sent in 1b quest.	Validation of GI and info on reasons only for non-GI in 1a quest. In 1b quest. data was provided in part A2 'Other factors for the GI' but no data in part B.
DE	√	-	No further data was sent in 1a quest. No data was sent in 1b quest.	Validation of GI and info on reasons for GI and 'impossible to validate' cases in 1a quest. No response to 1b quest.
DK	√	√	No further data was sent in 1a quest. (Some) info was sent in 1b quest.	Validation of GI and info on reasons for GI and non-GI in 1a quest. In 1b quest., validation of MDI for certain bird species, but no info in part B on drivers. Some info was sent via email on specific bird species and possible reasons for their increase.
EE	√	√	No further data was sent in 1a quest. (Some) info on drivers was sent in 1b quest.	Validation of GI and info on reasons for non-GI and 'unclear' cases in 1a quest. In 1b quest., some data was provided in part B on drivers.
ES	-	√	No further data was sent in 1a quest. (Some) info on drivers was sent in 1b quest.	Responded but no feedback on bird species in 1a quest. In 1b quest., some data was provided in part B on drivers
FI	√	-	No further data was sent in 1a quest. No data sent in 1b quest.	Validation of GI and info on reasons for GI and non-GI in 1a quest. No response to 1b quest.
FR	√	-	No further data was sent in 1a quest. No data sent in 1b quest.	Validation of GI and info on reasons for non-GI and 'unclear' cases in 1a quest. No response to 1b quest.
HU	√	√	Bird species added by MS in 1a quest. Info on drivers was sent in 1b quest.	Validation of GI and info on reasons for GI and non-GI in 1a quest. In 1b quest., data was provided in part B on drivers.
IE	√	-	No further data was sent in 1a quest. No data sent in 1b quest.	Responded on bird species but no validation of GI in 1a quest. No response to 1b quest.
IT	-	-	No data was sent	Responded but no feedback on bird species in 1a/1b quest. (for 1b quest. due to lack of analysis).
LT	-	√	No data sent in 1a quest. Info on drivers was sent in 1b quest.	No response to 1a quest. In 1b quest. data was provided in part B on drivers.
LU	-	√	No data sent in 1a quest. Info on drivers was sent in 1b quest.	No response to 1a quest. In 1b quest. data was provided in part B on drivers.
LV	√	√	No further data was sent in 1a quest. (Some) info on drivers was sent in 1b quest.	Validation of GI and info on reasons for GI and 'unclear' cases in 1a quest. In 1b quest. some info was provided in part B on drivers.
MT	√	√	Bird species added by MS in 1a quest. Info on drivers was sent in 1b quest.	Validation of existing GI in 1a quest. In 1b quest., info was provided in part B on drivers.
NL	√	√	No further data was sent in 1a quest. Sub-reporting bird species with conservation measures added by Ms and (some) info provided in 1b quest.	Responded on bird species but no validation of GI in 1a quest. In 1b quest. sub-reporting bird species were added and data was provided in part A on conservation measures, and in part B on 'Case study opinion', but not on drivers.
PL	√	-	No further data was sent in 1a quest. No data sent in 1b quest.	Validation of GI and info on reasons only for non-GI in 1a quest. Responded but no feedback on bird species in 1b quest. due to insufficiently detailed data.
PT	-	√	No data sent in 1a quest. (Some) info on drivers was sent in 1b quest.	No response to 1a quest. In 1b quest., data was provided in part B on drivers (lack of capacity/data to fill in drivers for all birds).
RO	-	-	No data was sent	Responded but no feedback on bird species in 1a quest. No response to 1b quest.
SE	-	-	No data was sent	No response to 1a/1b quest.

MS	Response to questionnaire		Article 12 data	Comments
	1a	1b		
SI	√	√	No further data was sent in 1a quest. (Some) info on drivers was sent in 1b quest.	Validation of GI and info on reasons for GI and non-GI in 1a quest. In 1b quest., data was provided in part B on drivers.
SK	-	√	No data was sent in 1a quest. (Some) info on drivers was sent in 1b quest.	No response to 1a quest. In 1b quest., some data was provided in part B on drivers.
UK	-	-	No data was sent	No response to 1a/1b quest.
Total	**14**	**13**		

Summary of responses to consultation questionnaires in relation to Habitats Directive Annex I habitats and Annex II, IV and V species

MS	Response to questionnaires		Article 17 data	Comments
	1a	1b		
AT	√	-	No further data was sent in 1a quest. No data sent in 1b quest.	No GI cases for Art. 17 habitats identified. Validation of GIs for Art.17 species but no info on GI reasons in 1a quest. No response to 1b quest.
BE	√	√	Art. 17 species added by MS in 1a quest. Info on drivers was sent in 1b quest.	Answer only for CON (from Wallonia) in 1a quest.: validation of GI for Art. 17 species, but no validation of GI for habitats. Answer only for CON (from Wallonia) in 1b quest.: some data provided in part B on drivers for Art. 17 species and all data - for habitats.
BG	-	-	No further data was sent in 1a/1b quest.	No GI cases for Art. 17 habitats and species identified. Responded but no data sent due to lack of human capacity in 1a/1b quest.
CY	√	-	No further data was sent in 1a quest. No data sent in 1b quest.	No GI cases for Art. 17 habitats identified. Validation of GI for Art. 17 species and info on reasons for GI in 1a quest. No response to 1b quest.
CZ	√	√	Art. 17 species added by MS in 1a quest. (Some) info on measures was sent in 1b quest.	Validation of GIs for Art. 17 habitats and species and info on reasons only for non-GI in 1a quest. In 1b quest., some data was provided in part B for Art. 17 species on B3 measures; and for Art. 17 habitats on B2 conservation measures.
DE	√	-	No further data was sent in 1a quest. No data sent in 1b quest.	Validation of GIs for Art. 17 habitats and species and info on reasons for GI and non-GI in 1a quest. No response to 1b quest.
DK	√	√	Sub-reporting species added by MS in 1a quest. No data sent in 1b quest.	Validation of GIs for Art.17 species and sub-reporting species, and info on reasons for GI and non-GI, but no validation of GI for habitats in 1a quest. In 1b quest., feedback but no data on Art. 17 species in part B; and no feedback on habitats.
EE	√	√	Sub-reporting species and sub-reporting habitats added in 1a quest. Info on drivers was sent in 1b quest.	Validation of GI for Art. 17 species and info on reasons only for non-GI in 1a quest. In 1b quest., data was provided in part B on drivers for Art.17 species and habitats, and for sub-reporting species and sub-reporting habitats.
ES	√	√	No further data was sent in 1a quest. (Some) info on drivers was sent in 1b quest.	No GI cases for Art. 17 habitats identified. No validation of GI cases for Art. 17 species but for sub-reporting habitats and no info on reasons behind in 1a quest. In 1b quest., some data was provides in part B on drivers for Art. 17 species. No feedback on Art. 17 habitats.
FI	√	-	Sub-reporting species and sub-reporting habitats added and sub-reporting species deleted by MS in 1a quest. No data sent in 1b quest.	Validation of GIs for Art. 17 habitats, species, sub-reporting species and sub-reporting habitats, and info on reasons for GIs and non-GI in 1a quest. No response to 1b quest.
FR	√	-	No further data was sent in 1a quest. No data sent in 1b quest.	No GI cases for Art. 17 habitats identified. Validation of GIs for Art. 17 species and info on reasons for GI and 'unclear' cases in 1a quest. No response to 1b quest.
HU	√	√	No further data was sent in 1a quest. Info on drivers was sent in 1b quest.	No GI cases for Art. 17 habitats identified. Validation of GIs for Art. 17 species and sub-reporting habitats and info on reasons for GI and non-GI in 1a quest. In 1b quest., data was provided in part B on drivers for Art. 17 species, but no feedback on Art. 17 habitats.
IE	√	-	One Art. 17 habitat added in 1a quest. No data sent in 1b quest.	Validation of GI for Art. 17 habitats and species, and info on reasons only for non-GI for Art. 17 habitats in 1a quest. No response to 1b quest.
IT	√	-	No further data was sent in 1a/1b quest.	No GI cases for Art. 17 habitats identified. Validation of GI for Art.17 species but not habitats in 1a quest. Responded but no data/feedback on Art. 17 habitats and species in 1b quest. due to lack of analysis.

MS	Response to questionnaires		Article 17 data	Comments
	1a	1b		
LT	-	√	No further data was sent in 1a quest. (Some) info on drivers and conservation measures was sent in 1b quest.	No response to 1a quest. In 1b quest., data was provided in part B on conservation measures for sub-reporting species; and on drivers for Art. 17 habitats. In addition, info on Art. 17 habitats and species via email.
LU	-	√	No data sent in 1a quest. Info on drivers was sent in 1b quest.	No response to 1a quest. In 1b quest., data was provided in part B on drivers for Art. 17 habitats and species.
LV	√	√	No further data was sent in 1a quest. (Some) info on drivers was sent in 1b quest.	No GI cases for Art. 17 species identified. Validation of GI for Art. 17 habitats and info on reasons for GI in 1a quest. In 1b quest., some data was provided in part B on drivers for Art. 17 habitats, but no feedback on Art. 17 species.
MT	√	√	Art. 17 species added by MS in 1a quest. No further data was sent in 1b quest.	No GI cases for Art. 17 habitats identified. Validation of GIs for Art.17 species and info on reasons for GI in 1a quest. In 1b quest., some Art. 17 species reported as GI but not MDI, therefore no info in part B on drivers. No feedback on Art. 17 habitats.
NL	√	√	No further data was sent in 1a quest. (Some) info on drivers was sent in 1b quest.	No validation of GI of Art. 17 habitats and species, but some feedback on species in 1a quest. In 1b quest., some data provided in part B on drivers for Art. 17 habitats and species, and sub-reporting species.
PL	√	-	Species added in 1a quest. No data sent in 1b quest.	Validation of GIs for Art. 17 habitats, species and sub-reporting habitats, and info on reasons for species and sub-reporting habitats for GIs and non-GIs in 1a quest. Responded but no data/feedback on Art. 17 habitats and species was provided in 1b quest. due to insufficiently detailed data.
PT	-	√	No data sent in 1a quest. (Some) info on conservation measures and drivers was sent in 1b quest.	No response to 1a quest. In 1b quest., some data was provided in part A on conservation measures for sub-reporting habitats; and in part B on drivers for Art. 17 species and sub-reporting habitats.
RO	-	-	No data was sent	No GI cases for Art. 17 habitats and species identified, only cases for sub-reporting habitats and species. Responded but no feedback on Art. 17 habitats and species in 1a quest due to no reporting in 2007. No response to 1b quest.
SE	-	-	No data was sent	No response to 1a/1b quest.
SI	√	√	Sub-reporting species and sub-reporting habitats added by MS in 1a quest. Info on conservation measures and drivers was sent in 1b quest.	Validation of GI for Art. 17 habitats, species, sub-reporting habitats and sub-reporting species, and info on reasons for GI and non-GI in 1a quest. In 1b quest, data was provided in part A on conservation measures for sub-reporting habitat and sub-reporting species; In part B on drivers for Art.17 habitats and species, as well as for sub-reporting habitats and sub-reporting species.
SK	-	√	No data sent in 1a quest. Info on conservation measures and drivers was sent in 1b quest.	No response to 1a quest. In 1b quest., some data was provided in part A on conservation measures for sub-reporting habitats; in part B - on drivers for Art.17 habitats and species.
UK	-	-	No data was sent	No response to 1a/1b quest.
Total	**18**	**14**		

Annex 7 MDI-A, MDI-B and sub-reporting level MDI-A identified in this study

Habitats Directive Annex I habitats

General information					Measure Driven Improvement (MDI)		
Member State	Biogeographical region	Habitat code	Habitat group	Habitat name	MDI-A	MDI-B	SR_MDI-A
BE	ATL	91E0	Forests	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)		1	
BE	CON	91D0	Forests	Bog woodland	1		
BE	CON	9190	Forests	Old acidophilous oak woods with Quercus robur on sandy plains	1		
BE	ATL	9120	Forests	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)		1	
BE	CON	7150	Bogs, mires & fens	Depressions on peat substrates of the Rhynchosporion	1		
BE	CON	7140	Bogs, mires & fens	Transition mires and quaking bogs	1		
BE	CON	7110	Bogs, mires & fens	Active raised bogs	1		
BE	CON	6230	Grasslands	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	1		
BE	CON	6210	Grasslands	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	1		
BE	CON	6110	Grasslands	Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi	1		
BE	CON	4030	Heath & scrub	European dry heaths	1		
BE	CON	4010	Heath & scrub	Northern Atlantic wet heaths with Erica tetralix	1		
BE	ATL	3110	Freshwater habitats	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)		1	
BE	ATL	2330	Dunes habitats	Inland dunes with open Corynephorus and Agrostis grasslands		1	
BE	ATL	2190	Dunes habitats	Humid dune slacks		1	
BE	ATL	5130	Sclerophyllous scrubs	Juniperus communis formations on heaths or calcareous grasslands		1	
CZ	CON	3220	Freshwater habitats	Alpine rivers and the herbaceous vegetation along their banks	1		
DE	ATL	6240	Grasslands	Sub-Pannonic steppic grasslands		1	
DE	ATL	3260	Freshwater habitats	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation		1	
DK	CON	7110	Bogs, mires & fens	Active raised bogs		1	
DK	ATL	7110	Bogs, mires & fens	Active raised bogs		1	
DK	ATL	1150	Coastal habitats	Coastal lagoons		1	
DK	MBAL	1160	Coastal habitats	Large shallow inlets and bays		1	

General information					Measure Driven Improvement (MDI)		
Member State	Biogeographical region	Habitat code	Habitat group	Habitat name	MDI-A	MDI-B	SR_MDI-A
DK	MATL	1160	Coastal habitats	Large shallow inlets and bays		1	
DK	CON	1150	Coastal habitats	Coastal lagoons		1	
EE	BOR	3260	Freshwater habitats	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	1		
EE	BOR	6450	Grasslands	Northern boreal alluvial meadows	1		
EE	BOR	6270	Grasslands	Fennoscandian lowland species-rich dry to mesic grasslands	1		
EE	BOR	6210	Grasslands	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	1		
EE	BOR	1630	Coastal habitats	Boreal Baltic coastal meadows	1		
EE	BOR	6280	Grasslands	Nordic alvar and precambrian calcareous flatrocks			1
EE	BOR	7110	Bogs, mires & fens	Active raised bogs			1
EE	BOR	3260	Freshwater habitats	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation			1
FI	BOR	1630	Coastal habitats	Boreal Baltic coastal meadows		1	
IE	MATL	1110	Coastal habitats	Sandbanks which are slightly covered by sea water all the time		1	
IE	ATL	8110	Rocky habitats	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)		1	
IE	MATL	1160	Coastal habitats	Large shallow inlets and bays		1	
IE	MATL	1140	Coastal habitats	Mudflats and sandflats not covered by seawater at low tide		1	
IE	MATL	1130	Coastal habitats	Estuaries		1	
IE	ATL	91J0	Forests	Taxus baccata woods of the British Isles		1	
IE	ATL	91E0	Forests	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)		1	
IE	ATL	91A0	Forests	Old sessile oak woods with Ilex and Blechnum in the British Isles		1	
IE	ATL	4060	Heath & scrub	Alpine and subalpine heath		1	
LT	BOR	2110	Dunes habitats	Embryonic shifting dunes	1		
LT	BOR	2120	Dunes habitats	Shifting dunes along the shoreline with Ammophila arenaria (‘white dunes’)	1		
LV	BOR	2320	Dunes habitats	Dry sand heaths with Calluna and Empetrum nigrum	1		
NL	ATL	3150	Freshwater habitats	Natural eutrophic lakes with Magnopotamion or Hydrocharition — type vegetation	1		
NL	ATL	3140	Freshwater habitats	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	1		
NL	ATL	2190	Dunes habitats	Humid dune slacks	1		
PL	CON	6210	Grasslands	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)		1	

General information					Measure Driven Improvement (MDI)		
Member State	**Biogeographical region**	**Habitat code**	**Habitat group**	**Habitat name**	**MDI-A**	**MDI-B**	**SR_MDI-A**
PT	MED	6510	Grasslands	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)			1
PT	MED	91E0	Forests	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)			1
PT	MED	92A0	Forests	Salix alba and Populus alba galleries			1
PT	MED	9340	Forests	Quercus ilex and Quercus rotundifolia forests			1
PT	MED	6230	Grasslands	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)			1
PT	MED	7140	Bogs, mires & fens	Transition mires and quaking bogs			1
SI	CON	1410	Coastal habitats	Mediterranean salt meadows (Juncetalia maritimi)	1		
SI	CON	1150	Coastal habitats	Coastal lagoons	1		
SI	CON	3150	Freshwater habitats	Natural eutrophic lakes with Magnopotamion or Hydrocharition — type vegetation			1
SI	ALP	7110	Bogs, mires & fens	Active raised bogs			1
SI	ALP	7140	Bogs, mires & fens	Transition mires and quaking bogs			1
SI	ALP	7230	Bogs, mires & fens	Alkaline fens			1
SI	ALP	91D0	Forests	Bog woodland			1
SK	PAN	1340	Coastal habitats	Inland salt meadows	1		
UK	MATL	1140	Coastal habitats	Mudflats and sandflats not covered by seawater at low tide		1	
UK	MATL	1160	Coastal habitats	Large shallow inlets and bays		1	
UK	MMED	1170	Coastal habitats	Reefs		1	
UK	ATL	1210	Coastal habitats	Annual vegetation of drift lines		1	
UK	ATL	1310	Coastal habitats	Salicornia and other annuals colonizing mud and sand		1	
UK	ATL	1320	Coastal habitats	Spartina swards (Spartinion maritimae)		1	
UK	ATL	1330	Coastal habitats	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		1	
UK	ATL	2150	Dunes habitats	Atlantic decalcified fixed dunes (Calluno-Ulicetea)		1	
UK	ATL	2170	Dunes habitats	Dunes with Salix repens ssp. argentea (Salicion arenariae)		1	
UK	ATL	3110	Freshwater habitats	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)		1	
UK	ATL	3140	Freshwater habitats	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.		1	
UK	ATL	3150	Freshwater habitats	Natural eutrophic lakes with Magnopotamion or Hydrocharition — type vegetation		1	
UK	ATL	3180	Freshwater habitats	Turloughs		1	
UK	ATL	3260	Freshwater habitats	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation		1	

General information					Measure Driven Improvement (MDI)		
Member State	**Biogeographical region**	**Habitat code**	**Habitat group**	**Habitat name**	**MDI-A**	**MDI-B**	**SR_MDI-A**
UK	ATL	4010	Heath & scrub	Northern Atlantic wet heaths with Erica tetralix		1	
UK	ATL	91D0	Forests	Bog woodland		1	
					25	**41**	**14**
				Total	**80**		

Habitats Directive Annex II, IV and V species

General information					Measure Driven Improvement (MDI)		
Member State	Biogeographical region	Species code	Taxonomic group	Species name	MDI-A	MDI-B	SR_MDI-A
AT	CON	1355	Mammals	*Lutra lutra*		1	
AT	CON	1037	Arthropods	*Ophiogomphus cecilia*		1	
AT	CON	1324	Mammals	*Myotis myotis*		1	
AT	ALP	1670	Vascular plants	*Myosotis rehsteineri*		1	
AT	ALP	1337	Mammals	*Castor fiber*		1	
AT	CON	1917	Vascular plants	*Artemisia pancicii*		1	
AT	ALP	1355	Mammals	*Lutra lutra*		1	
AT	ALP	1689	Vascular plants	*Dracocephalum austriacum*		1	
BE	ATL	1903	Vascular plants	*Liparis loeselii*		1	
BE	ATL	1355	Mammals	*Lutra lutra*		1	
BE	ATL	1337	Mammals	*Castor fiber*		1	
BE	ATL	1103	Fish	*Alosa fallax*		1	
BE	ATL	1099	Fish	*Lampetra fluviatilis*		1	
BE	ATL	1042	Arthropods	*Leucorrhinia pectoralis*		1	
BE	CON	1029	Molluscs	*Margaritifera margaritifera*	1		
BE	CON	1044	Arthropods	*Coenagrion mercuriale*	1		
BE	CON	1042	Arthropods	*Leucorrhinia pectoralis*	1		
CY	MMED	1224	Reptiles	*Caretta caretta*		1	
CY	MMED	1227	Reptiles	*Chelonia mydas*		1	
CZ	PAN	1324	Mammals	*Myotis myotis*	1		
CZ	PAN	1303	Mammals	*Rhinolophus hipposideros*	1		
CZ	CON	1324	Mammals	*Myotis myotis*	1		
CZ	CON	1321	Mammals	*Myotis emarginatus*	1		
CZ	CON	1303	Mammals	*Rhinolophus hipposideros*	1		
CZ	CON	1091	Arthropods	*Astacus astacus*	1		
CZ	CON	4045	Arthropods	*Coenagrion ornatum*	1		
CZ	CON	4073	Vascular plants	*Dianthus arenarius ssp. bohemicus*	1		
CZ	PAN	4067	Vascular plants	*Echium russicum*	1		
CZ	CON	1617	Vascular plants	*Angelica palustris*	1		
CZ	CON	1337	Mammals	*Castor fiber*	1		
CZ	PAN	1337	Mammals	*Castor fiber*	1		

General information					Measure Driven Improvement (MDI)		
Member State	Biogeographical region	Species code	Taxonomic group	Species name	MDI-A	MDI-B	SR_MDI-A
DE	MATL	1364	Mammals	*Halichoerus grypus*		1	
DE	CON	5339	Fish	*Rhodeus amarus*		1	
DE	CON	1337	Mammals	*Castor fiber*		1	
DE	CON	1256	Reptiles	*Podarcis muralis*		1	
DE	CON	1149	Fish	*Cobitis taenia*		1	
DE	CON	1060	Arthropods	*Lycaena dispar*		1	
DE	ATL	5339	Fish	*Rhodeus amarus*		1	
DE	ATL	5085	Fish	*Barbus barbus*		1	
DE	ATL	1805	Vascular plants	*Jurinea cyanoides*		1	
DE	ATL	1337	Mammals	*Castor fiber*		1	
DE	CON	1387	Non-vascular plants	*Orthotrichum rogeri*		1	
DE	CON	6167	Arthropods	*Gomphus flavipes*		1	
DE	CON	1355	Mammals	*Lutra lutra*		1	
DE	ATL	1355	Mammals	*Lutra lutra*		1	
DE	ATL	1324	Mammals	*Myotis myotis*		1	
DE	ATL	1099	Fish	*Lampetra fluviatilis*		1	
DE	CON	1805	Vascular plants	*Jurinea cyanoides*		1	
DE	CON	1396	Non-vascular plants	*Notothylas orbicularis*		1	
DE	CON	1363	Mammals	*Felis silvestris*		1	
DE	CON	1352	Mammals	*Canis lupus*		1	
DE	CON	1304	Mammals	*Rhinolophus ferrumequinum*		1	
DE	CON	1106	Fish	*Salmo salar*		1	
DE	CON	1103	Fish	*Alosa fallax*		1	
DE	ATL	1106	Fish	*Salmo salar*		1	
DE	ATL	1102	Fish	*Alosa alosa*		1	
DE	ATL	1029	Molluscs	*Margaritifera margaritifera*		1	
DK	CON	1037	Arthropods	*Ophiogomphus cecilia*	1		
DK	ATL	1113	Fish	*Coregonus oxyrhynchus*		1	
EE	BOR	1197	Amphibians	*Pelobates fuscus*			1
EE	BOR	1356	Mammals	*Mustela lutreola*			1
ES	ATL	1354	Mammals	*Ursus arctos*	1		
ES	ATL	1092	Arthropods	*Austropotamobius pallipes*	1		
ES	ALP	1092	Arthropods	*Austropotamobius pallipes*	1		

General information					Measure Driven Improvement (MDI)		
Member State	Biogeographical region	Species code	Taxonomic group	Species name	MDI-A	MDI-B	SR_MDI-A
ES	MED	1362	Mammals	*Lynx pardinus*	1		
FI	ALP	1911	Mammals	*Alopex lagopus*		1	
FR	ATL	1060	Arthropods	*Lycaena dispar*		1	
FR	ATL	1506	Vascular plants	*Biscutella neustriaca*		1	
FR	CON	1042	Arthropods	*Leucorrhinia pectoralis*		1	
FR	ATL	1042	Arthropods	*Leucorrhinia pectoralis*		1	
FR	ALP	1059	Arthropods	*Maculinea teleius*		1	
HU	PAN	1071	Arthropods	*Coenonympha oedippus*	1		
HU	PAN	1614	Vascular plants	*Apium repens*	1		
HU	PAN	1617	Vascular plants	*Angelica palustris*	1		
HU	PAN	4074	Vascular plants	*Dianthus diutinus*	1		
HU	PAN	4096	Vascular plants	*Gladiolus palustris*	1		
HU	PAN	4121	Reptiles	*Vipera ursinii rakosiensis*	1		
IT	MED	1352	Mammals	*Canis lupus*		1	
IT	CON	1352	Mammals	*Canis lupus*		1	
IT	ALP	1354	Mammals	*Ursus arctos*		1	
IT	CON	1502	Vascular plants	*Erucastrum palustre*		1	
LT	BOR	1188	Amphibians	*Bombina Bombina*			1
LT	BOR	1220	Reptiles	*Emys orbicularis*			1
LU	CON	1134	Fish	*Rhodeus sericeus amarus*	1		
LU	CON	1337	Mammals	*Castor fiber*	1		
LU	CON	4038	Arthropods	*Lycaena helle*	1		
LU	CON	1166	Amphibians	*Triturus cristatus*	1		
NL	ATL	1037	Arthropods	*Ophiogomphus cecilia*	1		
NL	ATL	1042	Arthropods	*Leucorrhinia pectoralis*	1		
NL	ATL	1059	Arthropods	*Maculinea teleius*	1		
NL	ATL	1134	Fish	*Rhodeus sericeus amarus*	1		
NL	ATL	1166	Amphibians	*Triturus cristatus*	1		
NL	ATL	1193	Amphibians	*Bombina variegata*	1		
NL	ATL	1203	Amphibians	*Hyla arborea*	1		
NL	ATL	1261	Reptiles	*Lacerta agilis*	1		
NL	ATL	1340	Mammals	*Microtus oeconomus arenicola*	1		
NL	ATL	1341	Mammals	*Muscardinus avellanarius*	1		

General information					Measure Driven Improvement (MDI)		
Member State	Biogeographical region	Species code	Taxonomic group	Species name	MDI-A	MDI-B	SR_MDI-A
NL	ATL	1355	Mammals	*Lutra lutra*	1		
NL	ATL	1387	Non-vascular plants	*Orthotrichum rogeri*	1		
NL	ATL	1393	Non-vascular plants	*Drepanocladus vernicosus*	1		
PL	CON	1321	Mammals	*Myotis emarginatus*		1	
PL	CON	1352	Mammals	*Canis lupus*		1	
PL	ALP	1381	Non-vascular plants	*Dicranum viride*		1	
PL	CON	1428	Vascular plants	*Marsilea quadrifolia*		1	
PL	CON	1758	Vascular plants	*Ligularia sibirica*		1	
PL	CON	1832	Vascular plants	*Caldesia parnassifolia*		1	
PL	CON	1887	Vascular plants	*Coleanthus subtilis*		1	
PL	CON	1898	Vascular plants	*Eleocharis carniolica*		1	
PL	ALP	1898	Vascular plants	*Eleocharis carniolica*		1	
PL	CON	2608	Mammals	*Spermophilus suslicus*		1	
PL	ALP	4003	Mammals	*Marmota marmota latirostris*		1	
PL	ALP	4006	Mammals	*Rupicapra rupicapra tatrica*		1	
PL	CON	4021	Arthropods	*Phryganophilus ruficollis*		1	
PL	CON	4087	Vascular plants	*Serratula lycopifolia*		1	
PL	CON	4096	Vascular plants	*Gladiolus palustris*		1	
PT	MED	1362	Mammals	*Lynx pardinus*	1		
SE	BOR	1130	Fish	*Aspius aspius*		1	
SE	BOR	1477	Vascular plants	*Pulsatilla patens*		1	
SI	CON	1152	Fish	*Aphanius fasciatus*	1		
SI	CON	1042	Arthropods	*Leucorrhinia pectoralis*			1
SI	CON	1167	Amphibians	*Triturus carnifex*			1
SI	CON	1188	Amphibians	*Bombina bombina*			1
SI	CON	1193	Amphibians	*Bombina variegata*			1
SI	CON	1220	Reptiles	*Emys orbicularis*			1
SI	ALP	1903	Vascular plants	*Liparis loeselii*			1
SI	CON	2011	Fish	*Umbra krameri*			1
SK	PAN	1042	Arthropods	*Leucorrhinia pectoralis*	1		
SK	ALP	4006	Mammals	*Rupicapra rupicapra tatrica*	1		
SK	PAN	2285	Vascular plants	*Colchicum arenarium*	1		
SK	ALP	2647	Mammals	*Bison bonasus*	1		

General information					Measure Driven Improvement (MDI)		
Member State	**Biogeographical region**	**Species code**	**Taxonomic group**	**Species name**	**MDI-A**	**MDI-B**	**SR_MDI-A**
UK	ATL	1304	Mammals	*Rhinolophus ferrumequinum*		1	
UK	ATL	1103	Fish	*Alosa fallax*		1	
UK	ATL	4035	Arthropods	*Gortyna borelii lunata*		1	
					49	**73**	**11**
				Total	**133**		

Birds Directive Annex I & II SPA trigger species

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
AT	A129	*Otis tarda*	Wintering		1	
AT	A074	*Milvus milvus*	Breeding		1	
AT	A511	*Falco cherrug*	Breeding		1	
AT	A043	*Anser anser*	Wintering		1	
AT	A404	*Aquila heliaca*	Breeding		1	
AT	A131	*Himantopus himantopus*	Breeding		1	
AT	A129	*Otis tarda*	Breeding		1	
AT	A393	*Phalacrocorax pygmeus*	Breeding		1	
AT	A075	*Haliaeetus albicilla*	Breeding		1	
AT	A084	*Circus pygargus*	Breeding		1	
AT	A246	*Lullula arborea*	Breeding		1	
BE	A394	*Anser albifrons albifrons*			1	
BE	A617-A	*Ixobrychus minutus minutus*			1	
BE	A688-A	*Botaurus stellaris stellaris*			1	
BE	A338	*Lanius collurio*			1	
BE	A238	*Dendrocopos medius*			1	
BE	A612	*Luscinia svecica*			1	
BE	A246	*Lullula arborea*			1	
BG	A020	*Pelecanus crispus*	Wintering		1	
BG	A020	*Pelecanus crispus*	Breeding		1	
BG	A036	*Cygnus olor*	Breeding		1	
BG	A037	*Cygnus columbianus bewickii*	Wintering		1	
BG	A038-C	*Cygnus cygnus*	Wintering		1	
BG	A058-B	*Netta rufina*	Wintering		1	
BG	A060-B	*Aythya nyroca*	Breeding		1	
BG	A073	*Milvus migrans*	Breeding		1	
BG	A075	*Haliaeetus albicilla*	Breeding		1	
BG	A081	*Circus aeruginosus*	Breeding		1	
BG	A084	*Circus pygargus*	Breeding		1	
BG	A089	*Aquila pomarina*	Breeding		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
BG	A092	*Hieraaetus pennatus*	Breeding		1	
BG	A129	*Otis tarda*	Wintering		1	
BG	A132-B	*Recurvirostra avosetta*	Breeding		1	
BG	A236	*Dryocopus martius*	Breeding		1	
BG	A307	*Sylvia nisoria*	Breeding		1	
BG	A393	*Phalacrocorax pygmeus*	Breeding		1	
BG	A393	*Phalacrocorax pygmeus*	Wintering		1	
BG	A403	*Buteo rufinus*	Breeding		1	
BG	A433	*Lanius nubicus*	Breeding		1	
BG	A439	*Hippolais olivetorum*	Breeding		1	
BG	A635	*Ardeola ralloides ralloides*	Breeding		1	
BG	A667-B	*Ciconia ciconia ciconia*	Breeding		1	
BG	A688-B	*Botaurus stellaris stellaris*	Wintering		1	
BG	A688-B	*Botaurus stellaris stellaris*	Breeding		1	
BG	A697	*Egretta garzetta garzetta*	Breeding		1	
BG	A698	*Casmerodius albus albus*	Wintering		1	
BG	A723	*Fulica atra atra*	Wintering		1	
BG	A667-B	*Ciconia ciconia*	Breeding		1	
CY	A242	*Melanocorypha calandra*	Breeding		1	
CY	A179	*Larus ridibundus*	Wintering		1	
CY	A728	*Vanellus spinosus*	Breeding		1	
CY	A403	*Buteo rufinus*	Breeding		1	
CY	A707	*Aquila fasciatus*	Breeding		1	
CZ	A030-B	*Ciconia nigra*	Breeding	1		
CZ	A043	*Anser anser*		1		
CZ	A074	*Milvus milvus*	Breeding	1		
CZ	A075	*Haliaeetus albicilla*	Breeding	1		
CZ	A122	*Crex crex*	Breeding	1		
CZ	A193	*Sterna hirundo*	Breeding	1		
CZ	A217	*Glaucidium passerinum*	Breeding	1		
CZ	A220	*Strix uralensis*	Breeding	1		
CZ	A223	*Aegolius funereus*	Breeding	1		

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
CZ	A238	*Dendrocopos medius*	Breeding	1		
CZ	A610-A	*Nycticorax nycticorax nycticorax*	Breeding	1		
CZ	A612	*Luscinia svecica cyanecula*	Breeding	1		
CZ	A617-B	*Ixobrychus minutus minutus*	Breeding	1		
CZ	A639-B	*Grus grus grus*	Breeding	1		
CZ	A667-B	*Ciconia ciconia ciconia*	Breeding	1		
CZ	A703	*Anas strepera strepera*	Breeding	1		
CZ	A708	*Falco peregrinus peregrinus*	Breeding	1		
CZ	A081	*Circus aeruginosus*	Breeding	1		
CZ	A236	*Dryocopus martius*	Breeding	1		
CZ	A321	*Ficedula albicollis*	Breeding	1		
CZ	A234	*Picus canus*	Breeding	1		
DE	A058-A	*Netta rufina*	Breeding		1	
DE	A050	*Anas penelope*	Wintering		1	
DE	A176	*Larus melanocephalus*	Breeding		1	
DE	A246	*Lullula arborea*	Breeding		1	
DE	A162	*Tringa totanus*	Wintering		1	
DE	A642-B	*Podiceps auritus auritus*	Wintering		1	
DE	A706	*Melanitta nigra nigra*	Wintering		1	
DE	A719	*Porzana parva parva*	Breeding		1	
DE	A654-B	*Mergus merganser merganser*	Breeding		1	
DE	A040	*Anser brachyrhynchus*	Wintering		1	
DE	A617-A	*Ixobrychus minutus minutus*	Breeding		1	
DE	A688-B	*Botaurus stellaris stellaris*	Breeding		1	
DE	A688-A	*Botaurus stellaris stellaris*	Breeding		1	
DE	A708	*Falco peregrinus peregrinus*	Breeding		1	
DE	A734	*Chlidonias hybrida*	Breeding		1	
DE	A215	*Bubo bubo*	Breeding		1	
DE	A030-B	*Ciconia nigra*	Breeding		1	
DE	A084	*Circus pygargus*	Breeding		1	
DE	A038-A	*Cygnus cygnus*	Breeding		1	
DE	A639-B	*Grus grus grus*	Wintering		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
DE	A639-B	*Grus grus grus*	Breeding		1	
DE	A075	*Haliaeetus albicilla*	Breeding		1	
DE	A129	*Otis tarda*	Breeding		1	
DE	A094	*Pandion haliaetus*	Breeding		1	
DE	A607-A	*Platalea leucorodia leucorodia*	Breeding		1	
DE	A720	*Porzana pusilla intermedia*	Breeding		1	
DE	A612	*Luscinia svecica cyanecula*	Breeding		1	
DE	A187	*Larus marinus*	Breeding		1	
DE	A698	*Casmerodius albus albus*	Wintering		1	
DK	A050	*Anas penelope*	Wintering	1		
DK	A654-B	*Mergus merganser merganser*	Wintering	1		
DK	A704	*Anas crecca crecca*	Wintering	1		
DK	A091	*Aquila chrysaetos*	Breeding	1		
DK	A639-B	*Grus grus grus*	Breeding	1		
DK	A688-A	*Botaurus stellaris stellaris*	Breeding	1		
DK	A702	*Anser fabalis rossicus*	Wintering	1		
EE	A091	*Aquila chrysaetos*	Breeding	1		
EE	A075	*Haliaeetus albicilla*	Breeding	1		
EE	A094	*Pandion haliaetus*	Breeding	1		
ES	A149	*Calidris alpina*	Wintering		1	
ES	A246	*Lullula arborea*	Breeding		1	
ES	A687	*Columba palumbus palumbus*	Breeding		1	
ES	A231	*Coracias garrulus*	Breeding	1		
ES	A091	*Aquila chrysaetos*	Breeding		1	
ES	A399	*Elanus caeruleus*	Breeding		1	
ES	A073	*Milvus migrans*	Breeding		1	
ES	A143	*Calidris canutus*	Wintering		1	
ES	A092	*Hieraaetus pennatus*	Breeding		1	
ES	A731-A	*Sterna nilotica nilotica*	Breeding		1	
ES	A129	*Otis tarda*	Breeding	1		
ES	A129	*Otis tarda*	Wintering		1	
ES	A058-A	*Netta rufina*	Breeding		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
ES	A179	*Larus ridibundus*	Breeding		1	
ES	A205	*Pterocles alchata*	Breeding		1	
ES	A078	*Gyps fulvus*	Breeding		1	
ES	A639-B	*Grus grus grus*	Wintering		1	
ES	A095	*Falco naumanni*	Breeding	1		
ES	A081	*Circus aeruginosus*	Wintering		1	
ES	A081	*Circus aeruginosus*	Breeding		1	
ES	A215	*Bubo bubo*	Breeding		1	
ES	A635	*Ardeola ralloides ralloides*	Breeding		1	
ES	A133	*Burhinus oedicnemus*	Breeding		1	
ES	A224	*Caprimulgus europaeus*	Breeding		1	
ES	A079	*Aegypius monachus*	Breeding	1		
ES	A054	*Anas acuta*	Wintering		1	
ES	A056	*Anas clypeata*	Wintering		1	
ES	A704	*Anas crecca crecca*	Wintering		1	
ES	A703	*Anas strepera strepera*	Wintering		1	
ES	A405	*Aquila adalberti*	Wintering	1		
ES	A405	*Aquila adalberti*	Breeding		1	
ES	A698	*Casmerodius albus albus*	Wintering		1	
ES	A667-A	*Ciconia ciconia ciconia*	Breeding		1	
ES	A697	*Egretta garzetta garzetta*	Wintering		1	
ES	A100	*Falco eleonorae*	Breeding		1	
ES	A723	*Fulica atra atra*	Wintering		1	
ES	A076	*Gypaetus barbatus*	Breeding	1		
ES	A130	*Haematopus ostralegus*	Wintering		1	
ES	A176	*Larus melanocephalus*	Breeding		1	
ES	A604	*Larus michahellis*	Breeding		1	
ES	A179	*Larus ridibundus*	Wintering		1	
ES	A612	*Luscinia svecica cyanecula*	Wintering		1	
ES	A663-A	*Phoenicopterus roseus*	Wintering		1	
ES	A663-A	*Phoenicopterus roseus*	Breeding		1	
ES	A607-A	*Platalea leucorodia leucorodia*	Wintering		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
ES	A607-A	*Platalea leucorodia leucorodia*	Breeding		1	
ES	A700	*Plegadis falcinellus falcinellus*	Breeding		1	
ES	A141	*Pluvialis squatarola*	Wintering		1	
ES	A191	*Sterna sandvicensis*	Breeding		1	
ES	A209	*Streptopelia decaocto*	Breeding		1	
ES	A351	*Sturnus vulgaris*	Breeding		1	
ES	A161	*Tringa erythropus*	Wintering		1	
ES	A164	*Tringa nebularia*	Wintering		1	
ES	A058-A	*Netta rufina*	Wintering		1	
ES	A132-A	*Recurvirostra avosetta*	Breeding		1	
ES	A151	*Philomachus pugnax*	Wintering		1	
ES	A158	*Numenius phaeopus*	Wintering		1	
ES	A452	*Bucanetes githagineus*	Breeding		1	
ES	A056	*Anas clypeata*	Breeding		1	
ES	A392	*Phalacrocorax aristotelis desmarestii*	Wintering		1	
ES	A392	*Phalacrocorax aristotelis desmarestii*	Breeding		1	
ES	A082	*Circus cyaneus*	Wintering		1	
ES	A617-A	*Ixobrychus minutus minutus*	Breeding		1	
ES	A153	*Gallinago gallinago*	Breeding		1	
ES	A207	*Columba oenas*	Breeding		1	
ES	A162	*Tringa totanus*	Breeding		1	
ES	A055	*Anas querquedula*	Breeding		1	
FI	A166	*Tringa glareola*	Breeding		1	
FI	A631-A	*Sterna albifrons albifrons*	Breeding		1	
FI	A703	*Anas strepera strepera*	Breeding		1	
FI	A091	*Aquila chrysaetos*	Breeding		1	
FI	A688-B	*Botaurus stellaris stellaris*	Breeding		1	
FI	A045-C	*Branta leucopsis*	Breeding		1	
FI	A239	*Dendrocopos leucotos*	Breeding		1	
FI	A708	*Falco peregrinus peregrinus*	Breeding		1	
FI	A639-B	*Grus grus grus*	Breeding		1	
FI	A075	*Haliaeetus albicilla*	Breeding		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
FI	A614-A	*Limosa limosa limosa*	Breeding		1	
FI	A094	*Pandion haliaetus*	Breeding		1	
FI	A140	*Pluvialis apricaria*	Breeding		1	
FR	A725-A	*Tetrax tetrax tetrax*	Wintering		1	
FR	A242	*Melanocorypha calandra*	Breeding		1	
FR	A077	*Neophron percnopterus*	Breeding		1	
FR	A131	*Himantopus himantopus*	Breeding		1	
FR	A079	*Aegypius monachus*	Breeding		1	
FR	A704	*Anas crecca crecca*	Wintering		1	
FR	A705	*Anas platyrhynchos platyrhynchos*	Wintering		1	
FR	A707	*Aquila fasciatus*	Breeding		1	
FR	A634-A	*Ardea purpurea purpurea*	Breeding		1	
FR	A734	*Chlidonias hybrida*	Breeding		1	
FR	A037	*Cygnus columbianus bewickii*	Wintering		1	
FR	A095	*Falco naumanni*	Breeding		1	
FR	A723	*Fulica atra atra*	Wintering		1	
FR	A625-A	*Glareola pratincola pratincola*	Breeding		1	
FR	A076	*Gypaetus barbatus*	Breeding		1	
FR	A078	*Gyps fulvus*	Breeding		1	
FR	A176	*Larus melanocephalus*	Breeding		1	
FR	A157	*Limosa lapponica*	Wintering		1	
FR	A094	*Pandion haliaetus*	Breeding		1	
FR	A607-A	*Platalea leucorodia leucorodia*	Breeding		1	
FR	A607-A	*Platalea leucorodia leucorodia*	Wintering		1	
FR	A132-A	*Recurvirostra avosetta*	Breeding		1	
FR	A193	*Sterna hirundo*	Breeding		1	
FR	A731-A	*Sterna nilotica nilotica*	Breeding		1	
FR	A725-A	*Tetrax tetrax tetrax*	Breeding		1	
FR	A073	*Milvus migrans*	Breeding		1	
FR	A130	*Haematopus ostralegus*	Breeding		1	
FR	A217	*Glaucidium passerinum*	Breeding		1	
FR	A708	*Falco peregrinus peregrinus*	Breeding		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
FR	A703	*Anas strepera strepera*	Wintering		1	
FR	A231	*Coracias garrulus*	Breeding		1	
FR	A048	*Tadorna tadorna*	Breeding		1	
FR	A048	*Tadorna tadorna*	Wintering		1	
FR	A144	*Calidris alba*	Wintering		1	
FR	A169	*Arenaria interpres*	Wintering		1	
HU	A075	*Haliaeetus albicilla*	Breeding	1		
HU	A698	*Casmerodius albus albus*	Breeding	1		
HU	A215	*Bubo bubo*	Breeding	1		
HU	A394	*Anser albifrons albifrons*	Wintering	1		
HU	A404	*Aquila heliaca*	Breeding	1		
HU	A708	*Falco peregrinus peregrinus*	Breeding	1		
HU	A129	*Otis tarda*	Breeding	1		
HU	A393	*Phalacrocorax pygmeus*	Breeding	1		
HU	A030-B	*Ciconia nigra*	Breeding	1		
HU	A060-B	*Aythya nyroca*	Breeding	1		
HU	A043	*Anser anser*	Breeding	1		
HU	A321	*Ficedula albicollis*	Breeding	1		
HU	A350	*Corvus corax*		1		
HU	A231	*Coracias garrulus*		1		
HU	A340	*Lanius excubitor*		1		
HU	A236	*Dryocopus martius*		1		
IT	A060-B	*Aythya nyroca*	Wintering		1	
IT	A074	*Milvus milvus*	Wintering		1	
IT	A667-A	*Ciconia ciconia ciconia*	Breeding		1	
IT	A231	*Coracias garrulus*	Breeding		1	
LT	A038-A	*Cygnus cygnus*	Breeding	1		
LT	A089	*Aquila pomarina*	Breeding	1		
LT	A089	*Aquila pomarina*				1
LT	A151	*Philomachus pugnax*	Breeding	1		
LT	A197	*Chlidonias niger*	Breeding	1		
LT	A193	*Sterna hirundo*	Breeding	1		

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
LT	A719	*Porzana parva parva*	Breeding	1		
LT	A234	*Picus canus*	Breeding	1		
LT	A612	*Luscinia svecica cyanecula*	Breeding	1		
LT	A338	*Lanius collurio*	Breeding	1		
LT	A075	*Haliaeetus albicilla*	Breeding	1		
LT	A639-B	*Grus grus grus*	Breeding	1		
LT	A217	*Glaucidium passerinum*	Breeding	1		
LT	A081	*Circus aeruginosus*	Breeding	1		
LT	A688-B	*Botaurus stellaris stellaris*	Breeding	1		
LT	A255	*Anthus campestris*	Breeding	1		
LT	A220	*Strix uralensis*	Breeding	1		
LT	A239	*Dendrocopos leucotos*	Breeding	1		
LT	A166	*Tringa glareola*	Breeding	1		
LT	A631-A	*Sterna albifrons albifrons*	Breeding	1		
LT	A030-B	*Ciconia nigra*	Breeding	1		
LU	A617-A	*Ixobrychus minutus minutus*	Breeding	1		
LU	A074	*Milvus milvus*	Breeding	1		
LU	A073	*Milvus migrans*	Breeding	1		
LU	A215	*Bubo bubo*	Breeding	1		
LU	A708	*Falco peregrinus peregrinus*	Breeding	1		
LU	A234	*Picus canus*	Breeding	1		
LU	A238	*Dendrocopos medius*	Breeding	1		
LU	A030-A	*Ciconia nigra*	Breeding	1		
LU	A246	*Lullula arborea*	Breeding	1		
LU	A113	*Coturnix coturnix*	Breeding	1		
LU	A224	*Caprimulgus europaeus*	Breeding	1		
LV	A067	*Bucephala clangula*	Wintering	1		
LV	A091	*Aquila chrysaetos*	Breeding	1		
LV	A122	*Crex crex*	Breeding	1		
LV	A075	*Haliaeetus albicilla*	Wintering	1		
LV	A075	*Haliaeetus albicilla*	Breeding	1		
LV	A094	*Pandion haliaetus*	Breeding	1		

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
LV	A238	*Dendrocopos medius*	Breeding	1		
MT	A464	*Puffinus yelkouan*	Breeding	1		
MT	A695	*Hydrobates pelagicus melitensis*		1		
NL	A768	*Numenius arquata arquata*	Wintering		1	
NL	A732	*Sterna caspia caspia*			1	
NL	A617-A	*Ixobrychus minutus minutus*	Breeding		1	
NL	A338	*Lanius collurio*	Breeding	1		
NL	A703	*Anas strepera strepera*	Wintering		1	
NL	A634-A	*Ardea purpurea purpurea*	Breeding	1		
NL	A224	*Caprimulgus europaeus*	Breeding	1		
NL	A698	*Casmerodius albus albus*	Wintering		1	
NL	A084	*Circus pygargus*	Breeding	1		
NL	A038-A	*Cygnus cygnus*	Wintering		1	
NL	A075	*Haliaeetus albicilla*	Wintering		1	
NL	A607-A	*Platalea leucorodia leucorodia*	Breeding	1		
NL	A607-A	*Platalea leucorodia leucorodia*		1		
NL	A723	*Fulica atra atra*	Wintering		1	
NL	A058-A	*Netta rufina*	Wintering	1		
NL	A631-A	*Sterna albifrons albifrons*	Breeding	1		
NL	A295	*Acrocephalus schoenobaenus*		1		
NL	A191	*Sterna sandvicensis*		1		
NL	A246	*Lullula arborea*		1		
NL	A229	*Alcedo atthis*		1		
NL	A276	*Saxicola torquata*		1		
PL	A193	*Sterna hirundo*	Breeding		1	
PL	A234	*Picus canus*	Breeding		1	
PL	A074	*Milvus milvus*	Breeding		1	
PL	A075	*Haliaeetus albicilla*	Breeding		1	
PL	A038-A	*Cygnus cygnus*	Wintering		1	
PL	A043	*Anser anser*	Breeding		1	
PL	A038-A	*Cygnus cygnus*	Breeding		1	
PL	A176	*Larus melanocephalus*	Breeding		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
PL	A610-A	*Nycticorax nycticorax nycticorax*	Breeding		1	
PL	A060-B	*Aythya nyroca*	Breeding		1	
PL	A220	*Strix uralensis*	Breeding		1	
PL	A654-B	*Mergus merganser merganser*	Breeding		1	
PL	A217	*Glaucidium passerinum*	Breeding		1	
PL	A215	*Bubo bubo*	Breeding		1	
PL	A703	*Anas strepera strepera*	Breeding		1	
PT	A607-A	*Platalea leucorodia leucorodia*	Breeding		1	
PT	A607-A	*Platalea leucorodia leucorodia*	Wintering		1	
PT	A663-A	*Phoenicopterus roseus*	Wintering		1	
PT	A129	*Otis tarda*	Breeding	1		
PT	A667-A	*Ciconia ciconia ciconia*	Breeding		1	
PT	A707	*Aquila fasciatus*	Breeding		1	
PT	A704	*Anas crecca crecca*	Wintering		1	
PT	A058-A	*Netta rufina*	Wintering		1	
PT	A346	*Pyrrhocorax pyrrhocorax*	Breeding		1	
PT	A132-A	*Recurvirostra avosetta*	Wintering		1	
PT	A141	*Pluvialis squatarola*	Wintering		1	
PT	A074	*Milvus milvus*	Wintering		1	
PT	A722	*Porphyrio porphyrio porphyrio*	Breeding		1	
PT	A094	*Pandion haliaetus*	Wintering		1	
PT	A390	*Oceanodroma castro*	Breeding	1		
PT	A131	*Himantopus himantopus*	Wintering		1	
PT	A078	*Gyps fulvus*	Breeding		1	
PT	A639-B	*Grus grus grus*	Wintering		1	
PT	A709	*Falco peregrinus brookei*	Breeding		1	
PT	A095	*Falco naumanni*	Breeding		1	
PT	A082	*Circus cyaneus*	Breeding		1	
PT	A081	*Circus aeruginosus*	Breeding		1	
PT	A081	*Circus aeruginosus*	Wintering		1	
PT	A091	*Aquila chrysaetos*	Breeding		1	
PT	A769	*Sylvia undata all others*	Breeding		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
PT	A625-A	*Glareola pratincola pratincola*	Breeding		1	
PT	A420	*Pterocles orientalis*	Breeding		1	
PT	A635	*Ardeola ralloides ralloides*	Breeding		1	
RO	A393	*Phalacrocorax pygmeus*	Breeding		1	
RO	A020	*Pelecanus crispus*	Wintering		1	
RO	A698	*Casmerodius albus albus*	Wintering		1	
RO	A067	*Bucephala clangula*	Wintering		1	
RO	A705	*Anas platyrhynchos platyrhynchos*	Wintering		1	
RO	A193	*Sterna hirundo*	Breeding		1	
SE	A409	*Tetrao tetrix tetrix*	Breeding		1	
SE	A701	*Anser fabalis fabalis*	Wintering		1	
SE	A642-A	*Podiceps auritus auritus*	Breeding		1	
SE	A073	*Milvus migrans*	Breeding		1	
SE	A631-A	*Sterna albifrons albifrons*	Breeding		1	
SE	A194	*Sterna paradisaea*	Breeding		1	
SE	A191	*Sterna sandvicensis*	Breeding		1	
SE	A043	*Anser anser*	Breeding		1	
SE	A045-C	*Branta leucopsis*	Wintering		1	
SE	A081	*Circus aeruginosus*	Breeding		1	
SE	A038-A	*Cygnus cygnus*	Breeding		1	
SE	A038-A	*Cygnus cygnus*	Wintering		1	
SE	A708	*Falco peregrinus peregrinus*	Breeding		1	
SE	A639-B	*Grus grus grus*	Breeding		1	
SE	A075	*Haliaeetus albicilla*	Breeding		1	
SE	A132-A	*Recurvirostra avosetta*	Breeding		1	
SE	A732	*Sterna caspia caspia*	Breeding		1	
SE	A072	*Pernis apivorus*	Breeding		1	
SE	A179	*Larus ridibundus*	Breeding		1	
SE	A182	*Larus canus*	Breeding		1	
SE	A224	*Caprimulgus europaeus*	Breeding		1	
SE	A703	*Anas strepera strepera*	Breeding		1	
SE	A640	*Larus fuscus fuscus*	Breeding		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
SE	A320	*Ficedula parva*	Breeding		1	
SE	A082	*Circus cyaneus*	Breeding		1	
SE	A222	*Asio flammeus*	Breeding		1	
SE	A223	*Aegolius funereus*	Breeding		1	
SI	A682-B	*Charadrius alexandrinus alexandrinus*	Breeding	1		
SI	A708	*Falco peregrinus peregrinus*	Breeding	1		
SK	A067	*Bucephala clangula*	Wintering		1	
SK	A705	*Anas platyrhynchos platyrhynchos*	Wintering		1	
SK	A061	*Aythya fuligula*	Wintering		1	
SK	A091	*Aquila chrysaetos*	Breeding		1	
SK	A404	*Aquila heliaca*	Breeding	1		
SK	A698	*Casmerodius albus albus*	Breeding	1		
SK	A511	*Falco cherrug*	Breeding	1		
SK	A708	*Falco peregrinus peregrinus*	Breeding		1	
SK	A075	*Haliaeetus albicilla*	Breeding		1	
SK	A176	*Larus melanocephalus*	Breeding		1	
SK	A193	*Sterna hirundo*	Breeding	1		
SK	A220	*Strix uralensis*	Breeding		1	
SK	A241	*Picoides tridactylus*	Breeding		1	
SK	A393	*Phalacrocorax pygmeus*	Wintering		1	
SK	A610-A	*Nycticorax nycticorax nycticorax*	Breeding		1	
SK	A058-A	*Netta rufina*	Breeding		1	
SK	A075	*Haliaeetus albicilla*	Wintering		1	
SK	A081	*Circus aeruginosus*	Breeding		1	
SK	A703	*Anas strepera strepera*	Breeding		1	
SK	A409	*Tetrao tetrix tetrix*	Breeding		1	
SK	A119	*Porzana porzana*	Breeding		1	
SK	A129	*Otis tarda*	Wintering		1	
SK	A617-B	*Ixobrychus minutus minutus*	Breeding		1	
SK	A688-B	*Botaurus stellaris stellaris*	Breeding		1	
SK	A229	*Alcedo atthis*	Breeding		1	
UK	A704	*Anas crecca crecca*	Wintering		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
UK	A703	*Anas strepera strepera*	Breeding		1	
UK	A703	*Anas strepera strepera*	Wintering		1	
UK	A040	*Anser brachyrhynchus*	Wintering		1	
UK	A091	*Aquila chrysaetos*	Breeding		1	
UK	A688-A	*Botaurus stellaris stellaris*	Breeding		1	
UK	A674-A	*Branta bernicla hrota*	Wintering		1	
UK	A674-B	*Branta bernicla hrota*	Wintering		1	
UK	A045-A	*Branta leucopsis*	Wintering		1	
UK	A133	*Burhinus oedicnemus*	Breeding		1	
UK	A143	*Calidris canutus*	Wintering		1	
UK	A224	*Caprimulgus europaeus*	Breeding		1	
UK	A081	*Circus aeruginosus*	Breeding		1	
UK	A122	*Crex crex*	Breeding		1	
UK	A038-B	*Cygnus cygnus*	Wintering		1	
UK	A697	*Egretta garzetta garzetta*	Wintering		1	
UK	A708	*Falco peregrinus peregrinus*	Breeding		1	
UK	A689	*Gavia arctica arctica*	Breeding		1	
UK	A176	*Larus melanocephalus*	Breeding		1	
UK	A179	*Larus ridibundus*	Breeding		1	
UK	A157	*Limosa lapponica*	Wintering		1	
UK	A616	*Limosa limosa islandica*	Wintering		1	
UK	A246	*Lullula arborea*	Breeding		1	
UK	A074	*Milvus milvus*	Breeding		1	
UK	A094	*Pandion haliaetus*	Breeding		1	
UK	A072	*Pernis apivorus*	Breeding		1	
UK	A346	*Pyrrhocorax pyrrhocorax*	Wintering		1	
UK	A346	*Pyrrhocorax pyrrhocorax*	Breeding		1	
UK	A132-A	*Recurvirostra avosetta*	Wintering		1	
UK	A132-A	*Recurvirostra avosetta*	Breeding		1	
UK	A733	*Sterna dougallii dougallii*	Breeding		1	
UK	A191	*Sterna sandvicensis*	Breeding		1	
UK	A646	*Sylvia undata dartfordiensis*	Breeding		1	

General information				Measure Driven Improvement (MDI		
Member State	**Species code**	**Species name**	**Season**	**MDI-A**	**MDI-B**	**SR_MDI-A**
UK	A166	*Tringa glareola*	Breeding		1	
UK	A466-A	*Calidris alpina schinzii*	Breeding		1	
UK	A164	*Tringa nebularia*	Breeding		1	
UK	A119	*Porzana porzana*	Breeding		1	
UK	A706	*Melanitta nigra nigra*	Wintering		1	
UK	A001-A	*Gavia stellata*	Wintering		1	
UK	A688-A	*Botaurus stellaris stellaris*	Wintering		1	
UK	A694	*Hydrobates pelagicus pelagicus*	Breeding		1	
UK	A158	*Numenius phaeopus*			1	
				114	**340**	**1**
			Total	**455**		

Annex 8 Analysis of the measures listed by Member States as contributing to MDI A & B

Only measures that were considered to have had a high impact and maintained or enhanced the habitat or species are included. Shading indicates the measures that were most frequently used by the individual Member State.

Habitats Directive Annex I habitats	Percentage of reported measures with a high impact														
Measure	**BE**	**CZ**	**DE**	**EE**	**FI**	**IE**	**LT**	**LU**	**NL**	**PL**	**PT**	**SI**	**SK**	**UK**	**Mean %**
2.1 Maintaining grasslands and other open habitats	32.4%	0.0%	0.0%	33.3%	100.0%	5.3%	0.0%	0.0%	25.0%	25.0%	16.7%	0.0%	0.0%	10.8%	17.7%
6.1 Establish protected areas/sites	2.9%	50.0%	20.0%	33.3%	0.0%	5.3%	0.0%	0.0%	0.0%	0.0%	33.3%	0.0%	50.0%	5.4%	14.3%
3.1 Restoring/improving forest habitats	11.8%	0.0%	0.0%	0.0%	0.0%	15.8%	0.0%	100.0%	0.0%	0.0%	25.0%	13.3%	0.0%	0.0%	11.8%
4.4 Restoring coastal areas	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.8%	8.1%
4.2 Restoring/improving the hydrological regime	5.9%	0.0%	20.0%	6.7%	0.0%	5.3%	0.0%	0.0%	0.0%	0.0%	8.3%	33.3%	0.0%	13.5%	6.6%
4.1 Restoring/improving water quality	2.9%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	10.8%	6.0%
6.3 Legal protection of habitats and species	0.0%	0.0%	0.0%	0.0%	0.0%	47.4%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%	5.4%	5.6%
6.0 Other spatial measures	0.0%	50.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%
4 Measures related to wetland, freshwater and coastal habitats	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	3.6%
3.2 Adapt forest management	11.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	26.7%	0.0%	0.0%	2.7%
6.4 Manage landscape features	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%	0.0%	2.6%
4.3 Managing water abstraction	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	10.8%	2.6%
2.2 Adapting crop production	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%	5.4%	2.2%
2 Measures related to agriculture and open habitats	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	2.0%
2.0 Other agriculture-related measures	0.0%	0.0%	0.0%	26.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%
9.2 Regulating/Managing exploitation of natural resources on sea	0.0%	0.0%	0.0%	0.0%	0.0%	21.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	1.7%
7 Measures related to hunting, taking and fishing and species management	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	13.3%	0.0%	0.0%	1.0%

Habitats Directive Annex I habitats	Percentage of reported measures with a high impact														
Measure	**BE**	**CZ**	**DE**	**EE**	**FI**	**IE**	**LT**	**LU**	**NL**	**PL**	**PT**	**SI**	**SK**	**UK**	**Mean %**
7.4 Specific single species or species group management measures	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.7%	0.0%	5.4%	0.9%
6.2 Establishing wilderness areas/ allowing succession	11.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%
6.5 Adaptation/ abolition of military land use	11.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%
7.2 Regulation/ Management of fishery in limnic systems	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.7%	0.0%	2.7%	0.7%
4.0 Other wetland-related measures	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.4%
7.1 Regulation/ Management of hunting and taking	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.4%	0.4%
1.2 Measures needed, but not implemented	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.2%
7.3 Regulation/ Management of fishery in marine and brackish systems	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.2%
8.1 Urban and industrial waste management	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.2%

Habitats Directive Annex II species	Percentage of reported measures with a high impact																					
Measure	**AT**	**BE**	**CY**	**CZ**	**DE**	**DK**	**EE**	**ES**	**FI**	**FR**	**HU**	**IT**	**LT**	**LU**	**MT**	**NL**	**PL**	**PT**	**SE**	**SI**	**SK**	**UK**	**Mean %**
7.4 Specific single species or species group management measures	23.5 %	4.5%	25.0 %	14.3 %	18.8 %	0.0%	100.0 %	23.1 %	33.3 %	0.0%	5.6%	25.0 %	0.0%	33.3 %	0.0%	15.8 %	11.1 %	25.0 %	0.0%	0.0%	16.7 %	12.5 %	17.6 %
6.1 Establish protected areas/sites	0.0%	4.5%	25.0 %	57.1 %	6.3%	0.0%	0.0%	7.7%	33.3 %	50.0 %	11.1 %	0.0%	0.0%	0.0%	22.2 %	7.9%	30.6 %	25.0 %	16.7 %	0.0%	41.7 %	25.0 %	16.5 %
6.3 Legal protection of habitats and species	0.0%	22.7 %	25.0 %	0.0%	7.8%	50.0 %	0.0%	30.8 %	0.0%	0.0%	0.0%	25.0 %	0.0%	16.7 %	22.2 %	7.9%	16.7 %	25.0 %	0.0%	0.0%	16.7 %	0.0%	12.1 %
2.1 Maintaining grasslands and other open habitats	5.9%	9.1%	0.0%	0.0%	3.1%	0.0%	0.0%	0.0%	0.0%	50.0 %	27.8 %	0.0%	0.0%	16.7 %	0.0%	7.9%	11.1 %	0.0%	33.3 %	0.0%	0.0%	12.5 %	8.1%
4.2 Restoring/improving the hydrological regime	17.6 %	18.2 %	0.0%	0.0%	12.5 %	50.0 %	0.0%	0.0%	0.0%	0.0%	5.6%	0.0%	0.0%	0.0%	0.0%	15.8 %	2.8%	0.0%	0.0%	30.8 %	8.3%	0.0%	7.3%
4 Measures related to wetland, freshwater and coastal habitats	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0 %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	4.9%
7.1 Regulation/ Management of hunting and taking	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	33.3 %	0.0%	5.6%	12.5 %	0.0%	0.0%	22.2 %	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	3.8%
6.4 Manage landscape features	0.0%	0.0%	25.0 %	0.0%	7.8%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.1 %	7.9%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5 %	3.3%
4.0 Other wetland-related measures	11.8 %	9.1%	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	11.1 %	12.5 %	0.0%	16.7 %	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	3.2%
4.1 Restoring/impro	5.9%	13.6 %	0.0%	0.0%	7.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7 %	0.0%	13.2 %	0.0%	0.0%	0.0%	0.0%	0.0%	12.5 %	3.2%

Habitats Directive Annex II species	Percentage of reported measures with a high impact																					
Measure	**AT**	**BE**	**CY**	**CZ**	**DE**	**DK**	**EE**	**ES**	**FI**	**FR**	**HU**	**IT**	**LT**	**LU**	**MT**	**NL**	**PL**	**PT**	**SE**	**SI**	**SK**	**UK**	**Mean %**
ving water quality																							
7.0 Other species management measures	17.6 %	4.5%	0.0%	0.0%	3.1%	0.0%	0.0%	7.7%	0.0%	0.0%	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	0.0%	0.0%	0.0%	8.3%	0.0%	2.4%
3.2 Adapt forest management	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	0.0%	16.7 %	23.1 %	8.3%	0.0%	2.3%
2.0 Other agriculture-related measures	11.8 %	0.0%	0.0%	0.0%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	12.5 %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5 %	2.1%
7.2 Regulation/ Management of fishery in limnic systems	0.0%	4.5%	0.0%	0.0%	6.3%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	23.1 %	0.0%	0.0%	1.9%
6.0 Other spatial measures	0.0%	0.0%	0.0%	28.6 %	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%
3.1 Restoring/improving forest habitats	0.0%	4.5%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	0.0%	16.7 %	7.7%	0.0%	0.0%	1.8%
4.4 Restoring coastal areas	5.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.2 %	2.6%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	1.7%
8.2 Specific management of traffic and energy transport systems	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0 %	0.0%	0.0%	0.0%	0.0%	1.2%
8.0 Other measures	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	12.5 %	0.0%	0.0%	0.0%	2.6%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%
1.2 Measures needed, but not implemented	0.0%	0.0%	0.0%	0.0%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	0.0%	16.7 %	0.0%	0.0%	0.0%	1.1%
4.3 Managing water abstraction	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5 %	0.9%

Habitats Directive Annex II species	Percentage of reported measures with a high impact																					
Measure	**AT**	**BE**	**CY**	**CZ**	**DE**	**DK**	**EE**	**ES**	**FI**	**FR**	**HU**	**IT**	**LT**	**LU**	**MT**	**NL**	**PL**	**PT**	**SE**	**SI**	**SK**	**UK**	**Mean %**
6.2 Establishing wilderness areas/ allowing succession	0.0%	4.5%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
3.0 Other forestry-related measures	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.1 %	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
2.2 Adapting crop production	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
2 Measures related to agriculture and open habitats	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
1.1 No measures needed for the conservation of the habitat/species	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%

Birds Directive Annex I species	Percentage of reported measures with a high impact																								
Measure	**AT**	**BE**	**BG**	**CY**	**CZ**	**DE**	**DK**	**EE**	**ES**	**FI**	**FR**	**HU**	**IT**	**LT**	**LU**	**LV**	**MT**	**NL**	**PL**	**PT**	**RO**	**SE**	**SI**	**SK**	**UK**	**Mean %**
6.1 Establish protected areas/sites	3.7%	0.0%	22.1%	50.0%	0.0%	22.9%	60.0%	50.0%	41.0%	14.3%	32.0%	18.5%	0.0%	69.0%	5.6%	33.3%	25.0%	78.3%	0.0%	19.0%	37.5%	13.6%	0.0%	30.0%	27.8%	26.1%
6.3 Legal protection of habitats and species	0.0%	0.0%	29.1%	0.0%	0.0%	7.3%	20.0%	50.0%	41.0%	7.1%	6.7%	9.2%	50.0%	3.4%	27.8%	55.6%	25.0%	0.0%	100.0%	1.6%	25.0%	0.0%	0.0%	32.5%	30.8%	20.9%
7.4 Specific single species or species group management measures	25.9%	0.0%	1.2%	0.0%	0.0%	12.5%	0.0%	0.0%	3.6%	21.4%	8.0%	7.7%	50.0%	17.2%	0.0%	0.0%	12.5%	4.3%	0.0%	0.0%	0.0%	36.4%	0.0%	11.3%	6.0%	8.7%
4.2 Restoring/improving the hydrological regime	7.4%	12.5%	9.3%	10.0%	20.7%	7.3%	0.0%	0.0%	1.2%	0.0%	10.7%	10.8%	0.0%	3.4%	11.1%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5%	22.7%	0.0%	0.0%	6.8%	5.9%
3.1 Restoring/improving forest habitats	3.7%	12.5%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.1%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.1%	100.0%	0.0%	0.0%	5.7%
2.1 Maintaining grasslands and other open habitats	11.1%	12.5%	5.8%	0.0%	3.4%	9.4%	0.0%	0.0%	0.0%	7.1%	12.0%	7.7%	0.0%	0.0%	5.6%	11.1%	0.0%	13.0%	0.0%	11.1%	0.0%	18.2%	0.0%	1.3%	5.3%	5.4%
7.1 Regulation/ Management of hunting and taking	0.0%	0.0%	1.2%	10.0%	6.9%	6.3%	20.0%	0.0%	9.0%	0.0%	2.7%	12.3%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	7.9%	6.3%	0.0%	0.0%	0.0%	0.8%	4.3%
4.0 Other wetland-related measures	3.7%	12.5%	0.0%	0.0%	0.0%	4.2%	0.0%	0.0%	0.6%	7.1%	1.3%	9.2%	0.0%	0.0%	11.1%	0.0%	0.0%	4.3%	0.0%	12.7%	0.0%	0.0%	0.0%	18.8%	0.0%	3.4%
3.2 Adapt forest management	7.4%	0.0%	2.3%	0.0%	0.0%	3.1%	0.0%	0.0%	0.0%	7.1%	5.3%	4.6%	0.0%	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%	3.2%	6.3%	0.0%	0.0%	6.3%	1.5%	2.6%
4.1 Restoring/improving water quality	0.0%	25.0%	5.8%	0.0%	3.4%	1.0%	0.0%	0.0%	0.0%	7.1%	0.0%	1.5%	0.0%	0.0%	5.6%	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	2.3%	2.1%

Birds Directive Annex I species	Percentage of reported measures with a high impact																								
Measure	**AT**	**BE**	**BG**	**CY**	**CZ**	**DE**	**DK**	**EE**	**ES**	**FI**	**FR**	**HU**	**IT**	**LT**	**LU**	**LV**	**MT**	**NL**	**PL**	**PT**	**RO**	**SE**	**SI**	**SK**	**UK**	**Mean %**
6.4 Manage landscape features	0.0 %	0.0 %	5.8 %	0.0 %	13.8%	5.2 %	0.0 %	0.0 %	1.2 %	0.0 %	1.3 %	0.0 %	0.0 %	6.9 %	5.6 %	0.0 %	0.0 %	0.0 %	0.0 %	1.6 %	6.3 %	0.0 %	0.0 %	0.0 %	0.0 %	1.9 %
8.2 Specific management of traffic and energy transport systems	7.4 %	0.0 %	0.0 %	0.0 %	13.8%	0.0 %	0.0 %	0.0 %	0.6 %	0.0 %	6.7 %	7.7 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	7.9 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.8 %
2.0 Other agriculture-related measures	14.8%	0.0 %	0.0 %	0.0 %	0.0 %	2.1 %	0.0 %	0.0 %	0.0 %	0.0 %	2.7 %	0.0 %	0.0 %	0.0 %	11.1%	0.0 %	0.0 %	0.0 %	0.0 %	9.5 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.6 %
2.2 Adapting crop production	11.1%	0.0 %	1.2 %	0.0 %	6.9 %	7.3 %	0.0 %	0.0 %	0.0 %	0.0 %	2.7 %	6.2 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.6 %	0.0 %	0.0 %	0.0 %	0.0 %	2.3 %	1.6 %
4.3 Managing water abstraction	0.0 %	25.0%	7.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	2.3 %	1.4 %
1.2 Measures needed, but not implemented	0.0 %	0.0 %	2.3 %	30.0%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.3 %
6.0 Other spatial measures	0.0 %	0.0 %	0.0 %	0.0 %	3.4 %	3.1 %	0.0 %	0.0 %	0.0 %	0.0 %	2.7 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	22.2%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.3 %
3.0 Other forestry-related measures	0.0 %	0.0 %	0.0 %	0.0 %	20.7%	1.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.3 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.9 %
7.3 Regulation/ Management of fishery in marine and brackish systems	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	12.5%	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	2.3 %	0.6 %
6.2 Establishing wilderness areas/ allowing succession	0.0 %	0.0 %	0.0 %	0.0 %	6.9 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	6.3 %	0.0 %	0.0 %	0.0 %	0.0 %	0.5 %
9.1 Regulating/Man	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	2.1 %	0.0 %	0.0 %	0.0 %	7.1 %	1.3 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	2.3 %	0.5 %

Birds Directive Annex I species	Percentage of reported measures with a high impact																								
Measure	**AT**	**BE**	**BG**	**CY**	**CZ**	**DE**	**DK**	**EE**	**ES**	**FI**	**FR**	**HU**	**IT**	**LT**	**LU**	**LV**	**MT**	**NL**	**PL**	**PT**	**RO**	**SE**	**SI**	**SK**	**UK**	**Mean %**
agement exploitation of natural resources on land																										
9.2 Regulating/Managing exploitation of natural resources on sea	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	7.1 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.5 %	0.3 %
4.4 Restoring coastal areas	0.0 %	0.0 %	1.2 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.6 %	0.0 %	1.3 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	5.3 %	0.3 %
8.0 Other measures	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	7.1 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.3 %
7.0 Other species management measures	0.0 %	0.0 %	1.2 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.2 %	0.0 %	1.3 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.5 %	0.2 %
1.1 No measures needed for the conservation of the habitat/species	3.7 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.1 %
5.0 Other marine-related measures	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	2.1 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.1 %
7.2 Regulation/ Management of fishery in limnic systems	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	2.1 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.1 %
9.0 Other resource use measures	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
6.5 Adaptation/ abolition of	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.8 %	0.0 %

Birds Directive Annex I species	Percentage of reported measures with a high impact																								
Measure	**AT**	**BE**	**BG**	**CY**	**CZ**	**DE**	**DK**	**EE**	**ES**	**FI**	**FR**	**HU**	**IT**	**LT**	**LU**	**LV**	**MT**	**NL**	**PL**	**PT**	**RO**	**SE**	**SI**	**SK**	**UK**	**Mean %**
military land use																										
8.3 Managing marine traffic	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.8 %	0.0 %

Annex 9 List of case studies sorted by habitat type and species group and biogeographical region

MS & no.	Habitat / species included	Habitat type / taxa	BGR
EE-1	Active raised bogs* [7110]	Habitat - bog	BOR
SI-1	Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation [3150], Natural dystrophic lakes and ponds [3160], Raised bogs [7110], Transition mires [7140], Alkaline fens [7230], Bog forest - Sphagnum spruce woods [91D0].	Habitat - bogs, freshwater wetlands & forest	CON / ALP
IE-1	Sandbanks which are slightly covered by sea water all the time [1110], Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Large shallow inlets and bays [1160]	Habitat – coastal & halophytic	ATL MAR
FI-1	Boreal Baltic coastal meadows [1630]	Habitat – coastal & halophytic	BOR
UK-1	Mudflats and sandflats not covered by seawater at low tide [1140], Salicornia and other annuals colonizing mud and sand [1310], *Spartina* swards (Spartinion maritimae) [1320], Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	Habitat – coastal & halophytic	MATL / ATL
SK-1	Inland salt meadows [1340]	Habitat – coastal & halophytic	PAN
NL-1	Humid dune slacks (2190)	Habitat - dunes	ATL
LV-1	Dry sand heaths (2320)	Habitat - dunes	BOR
IE-2	*Taxus baccata* woods (91J0)	Habitat - forest	ATL
EE-2	Nordic alvar and precambrian calcareous flatrocks * [6280]	Habitat - grassland	BOR
PL-1	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]	Habitat - grassland	CON
BE-1	N Atlantic wet heaths (4010) + other habitats and associated species	Habitat - heath & scrub	ATL
EE-3	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]	Habitat - river	BOR
DE-1	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260], European bitterling (*Rhodeus amarus),* Barbel (*Barbus barbus*), Eurasian Otter (*Lutra lutra*), European River Lamprey (*Lampetra fluviatilis*), Atlantic Salmon (*Salmo salar*)	Habitat - river, fish & mammal	ATL
NL-2	European Tree Frog (*Hyla arborea*)	Amphibian	ATL
EE-4	Common Spadefoot (*Pelobates fuscus*)	Amphibian	BOR
BG-1	Pygmy Cormorant (*Phalacrocorax pygmeus*) & Ferruginous Duck (*Aythya nyroca*)	Bird	-
ES-2	Spanish Imperial Eagle (*Aquila adalberti*)	Bird	-
ES-3	Lesser Kestrel (*Falco naumanni*)	Bird	-
FR-3	Eurasian Spoonbill (*Platalea leucorodia*)	Bird	-
HU-3	Black Stork (*Ciconia nigra*)	Bird	-
LV-2	Corncrake (*Crex crex*)	Bird	-
MT-1	Yelkouan Shearwater (*Puffinus yelkouan*) & Mediterranean Storm Petrel (*Hydrobates pelagicus melitensis*)	Bird	-
NL-4	Little Tern (*Sterna albifrons*)	Bird	-
PT-1	Great Bustard (*Otis tarda*)	Bird	-
SK-2	Saker Falcon (*Falco cherrug*)	Bird	-
SK-3	Eastern Imperial Eagle (*Aquila heliaca*)	Bird	-
UK-4	Eurasian Bittern (*Botaurus stellaris*)	Bird	-
UK-5	Eurasian Stone Curlew / Eurasian Thick-knee (*Burhinus oedicnemus*)	Bird	-
FR-2	Egyptian Vulture (*Neophron percnopterus*), Cinerous Vulture (*Aegypius monachus*), Bearded Vulture (*Gypaetus barbatus*) & Griffon Vulture (*Gyps fulvus*)	Birds	-
DK-2	North Sea Houting (*Coregonus oxyrhynchus*)	Fish	ATL
UK-3	Twaite Shad (*Alosa fallax*)	Fish	ATL
SI-2	Mediterranean Killifish (*Aphanius fasciatus*)	Fish	CON

MS & no.	Habitat / species included	Habitat type / taxa	BGR
LU-1	Violet Copper (*Lycaena helle*)	Invertebrate - butterfly	CON
ES-1	White-clawed Crayfish (*Austropotamobius pallipes*)	Invertebrate - crustacean	MED
DK-1	Green Gomphid (*Ophiogomphus cecilia*)	Invertebrate - dragonfly	CON
BE-2	Freshwater Pearl Mussel (*Margaritifera margaritifera*)	Invertebrate - mollusc	CON
UK-2	Fisher's Estuarine Moth (*Gortyna borelii lunata*)	Invertebrate - moth	ATL
NL-3	Varnished Hook-moss / Slender Green Feather-moss *(Drepanocladus vernicosus)*	Lower plant	ATL
SK-4	Northern Chamois (*Rupicapra rupicapra tatrica*)	Mammal	ALP
SK-5	European Bison (*Bison bonasus*)	Mammal	ALP
DE-2	Eurasian Beaver (*Castor fiber*)	Mammal	ATL
IT-1	Brown Bear (*Ursus arctos*)	Mammal	ATL
NL-5	Eurasian Otter (*Lutra lutra*)	Mammal	ATL
UK-6	Greater Horseshoe Bat (*Rhinolophus ferrumequinum*)	Mammal	ATL
EE-5	European Mink (*Mustela lutreola*)	Mammal	BOR
ES-4	Iberian Lynx (*Lynx pardinus*)	Mammal	MED
AT-1	*Myosotis rehsteineri*	Higher Plant	ALP
FR-1	*Biscutella neustriaca*	Higher Plant	ATL
HU-1	Long-lasting Pink (*Dianthus diutinus*)	Higher Plant	PAN
LT-1	European Pond Turtle (*Emys orbicularis*)	Reptile	BOR
HU-2	Hungarian Meadow Viper / Orsini's Viper *(Vipera ursinii rakosiensis)*	Reptile	PAN
CY-1	Loggerhead Turtle (*Caretta caretta*) & Green Turtle (*Chelonia mydas*)	Reptiles	MMED

Annex 10 Summaries of each case study carried out under this contract

The case study summaries included below are in alphabetical order (relating to their Member States code and number), as indicated in the table below.

MS & no.	Habitat / species included	Habitat type / taxa	BGR
AT-1	*Myosotis rehsteineri*	Higher plant	ALP
BE-1	N Atlantic wet heaths (4010) + other habitats and associated species	Habitat - heath & scrub	CON
BE-2	Freshwater Pearl Mussel (*Margaritifera margaritifera*)	Invertebrate - mollusc	CON
BG-1	Pygmy Cormorant (*Phalacrocorax pygmeus*) & Ferruginous Duck (*Aythya nyroca*)	Bird	-
CY-1	Loggerhead Turtle (*Caretta caretta*) & Green Turtle (*Chelonia mydas*)	Reptiles	MMED
DE-1	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260], European bitterling (*Rhodeus amarus),* Barbel (*Barbus barbus*), Eurasian Otter (*Lutra lutra*), European River Lamprey (*Lampetra fluviatilis*), Atlantic Salmon (*Salmo salar*)	Habitat - river, fish & mammal	ATL
DE-2	Eurasian Beaver (*Castor fiber*)	Mammal	ATL
DK-1	Green Gomphid (*Ophiogomphus cecilia*)	Invertebrate - dragonfly	CON
DK-2	North Sea Houting (*Coregonus oxyrhynchus*)	Fish	ATL
EE-1	Active raised bogs* [7110]	Habitat - bog	BOR
EE-2	Nordic alvar and precambrian calcareous flatrocks * [6280]	Habitat - grassland	BOR
EE-3	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]	Habitat - river	BOR
EE-4	Common Spadefoot Toad (*Pelobates fuscus*)	Amphibian	BOR
EE-5	European Mink (*Mustela lutreola*)	Mammal	BOR
ES-1	White-clawed Crayfish (*Austropotamobius pallipes*)	Invertebrate - crustacean	ATL & ALP
ES-2	Spanish Imperial Eagle (*Aquila adalberti*)	Bird	-
ES-3	Lesser Kestrel (*Falco naumanni*)	Bird	-
ES-4	Iberian Lynx (*Lynx pardinus*)	Mammal	MED
FI-1	Boreal Baltic coastal meadows [1630]	Habitat – coastal & halophytic	BOR
FR-1	*Biscutella neustriaca*	Higher plant	ATL
FR-2	Egyptian Vulture (*Neophron percnopterus*), Cinerous Vulture (*Aegypius monachus*), Bearded Vulture (*Gypaetus barbatus*) & Griffon Vulture (*Gyps fulvus*)	Birds	-
FR-3	Eurasian Spoonbill (*Platalea leucorodia*)	Bird	-
HU-1	Long-lasting Pink (*Dianthus diutinus*)	Higher plant	PAN
HU-2	Hungarian Meadow Viper / Orsini's Viper *(Vipera ursinii rakosiensis)*	Reptile	PAN
HU-3	Black Stork (*Ciconia nigra*)	Bird	-
IE-1	Sandbanks which are slightly covered by sea water all the time [1110], Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Large shallow inlets and bays [1160]	Habitat – coastal & halophytic	ATL MAR
IE-2	*Taxus baccata* woods (91J0)	Habitat - forest	ATL
IT-1	Brown Bear (*Ursus arctos*)	Mammal	ALP
LT-1	European Pond Turtle (*Emys orbicularis*)	Reptile	BOR
LU-1	Violet Copper (*Lycaena helle*)	Invertebrate - butterfly	CON
LV-1	Dry sand heaths (2320)	Habitat - dunes	BOR
LV-2	Corncrake (*Crex crex*)	Bird	-
MT-1	Yelkouan Shearwater (*Puffinus yelkouan*) & Mediterranean Storm Petrel (*Hydrobates pelagicus melitensis*)	Bird	-

MS & no.	Habitat / species included	Habitat type / taxa	BGR
NL-1	Humid dune slacks (2190)	Habitat - dunes	ATL
NL-2	European Tree Frog (*Hyla arborea*)	Amphibian	ATL
NL-3	Varnished Hook-moss / Slender Green Feather-moss *(Drepanocladus vernicosus)*	Lower plant	ATL
NL-4	Little Tern (*Sterna albifrons*)	Bird	-
NL-5	Eurasian Otter (*Lutra lutra*)	Mammal	ATL
PL-1	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]	Habitat - grassland	CON
PT-1	Great Bustard (*Otis tarda*)	Bird	-
SI-1	Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation [3150], Raised bogs [7110], Transition mires [7140], Alkaline fens [7230], Bog forest - Sphagnum spruce woods [91D0].	Habitat - bogs, freshwater wetlands & forest	CON / ALP
SI-2	Mediterranean Killifish (*Aphanius fasciatus*)	Fish	CON
SK-1	Inland salt meadows [1340]	Habitat – coastal & halophytic	PAN
SK-2	Saker Falcon (*Falco cherrug*)	Bird	-
SK-3	Eastern Imperial Eagle (*Aquila heliaca*)	Bird	-
SK-4	Northern Chamois (*Rupicapra rupicapra tatrica*)	Mammal	ALP
SK-5	European Bison (*Bison bonasus*)	Mammal	ALP
UK-1	Mudflats and sandflats not covered by seawater at low tide [1140], Salicornia and other annuals colonizing mud and sand [1310], *Spartina* swards (Spartinion maritimae) [1320], Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	Habitat – coastal & halophytic	MATL / ATL
UK-2	Fisher's Estuarine Moth (*Gortyna borelii lunata*)	Invertebrate - moth	ATL
UK-3	Twaite Shad (*Alosa fallax*)	Fish	ATL
UK-4	Eurasian Bittern (*Botaurus stellaris*)	Bird	-
UK-5	Eurasian Stone Curlew / Eurasian Thick-knee (*Burhinus oedicnemus*)	Bird	-
UK-6	Greater Horseshoe Bat (*Rhinolophus ferrumequinum*)	Mammal	ATL

10.1 Bodensee Vergissmeinnicht (*Myosotis rehsteineri*) – Austria

The endemic glacial relic species *Myosotis rehsteineri* occurs on the edges of a glacier-fed lake in Austria, Germany and Switzerland, and is adapted to the annually fluctuating water level. Until recently it was classed as Critically Endangered in these countries, but Austria assessed the EU conservation status in the alpine region as favourable with an improving trend in the 2007-2012 period. This improvement is primarily driven by targeted conservation measures in the designated Natura 2000 areas, combined with the recovery of good water quality in the lake and the ending of gravel and sediment extraction along the lake shore, which had led to beach erosion.

Key targeted conservation measures were beach and river restoration to recreate shallow beaches and river restoration to recreate gravel banks. Over time, German and Austrian projects have had mixed success, which has produced an understanding of the way to restore beaches such that *M. rehsteineri* can colonise. These measures have been accompanied by ex situ cultivation of the plant, which allowed reintroduction into the newly created habitats, and control of visitor pressure through fencing, signage and a summer warden scheme. These measures were initiated with LIFE funding by the federal state and the local authority, who subsequently increased funding allocations to continue the measures. A network of local experts (consultants and researchers) carries out monitoring and research.

Key drivers of wider improvements in the lake and river environment were the EU Water Framework Directive and the Urban Waste Water Treatment Directive, with international coordination by the International Water Protection Commission for Lake Constance and the International Commission for Protection of the Rhine.

Author: Evelyn Underwood, Institute for European Environmental Policy.

10.2 Northern Atlantic wet heaths with Erica tetralix (4010) – Belgium (CON)

Wet heath includes humid, peaty or semi-peaty heaths, other than blanket bogs, of the Atlantic and sub-Atlantic domains. They have been traditionally managed by grazing and controlled burning or cutting, which prevents their succession into forest. However, such practices have declined widely, and the habitat is also often impacted by nitrogen deposition, desiccation, acidification, overgrazing, uncontrolled burning, artificial drainage, afforestation, invasive species and recreation. As a result the conservation status of the habitat remains unfavourable in all biogeographic regions. Only in the continental biogeographical region of Belgium has a genuine increase been reported of the area occupied by this habitat.

The most important conservation measures that have contributed to the improvement in Wallonia have firstly been the establishment of protected areas to ensure long term conservation and management through land purchase or the establishment of long term agreements with private landowners. The majority of measures have taken place on public lands with a nature reserve status. This has then been followed by restoration measures, including the removal of trees, top soil removal and restoring hydrological conditions. Management of the habitat includes grazing and mowing in order to prevent its succession into forest. Long term management and protection of the area is a key factor in the conservation of this habitat type. This has been facilitated by informing all stakeholders of the benefits of the conservation measures for them and communicating plans and actions with the general public to ensure their long lasting support. Secondly, the restoration has been planned in a long-term broad landscape perspective which raised the interest of various stakeholders.

Authors: A. van Hinsberg, M. Hendriks and O. Knol of PBL.

10.3 Freshwater Pearl Mussel (Margaritifera margaritifera) – Belgium CON

The Freshwater Pearl Mussel is a freshwater bivalve that frequently lives for more than 100 years. This species requires very clean well-oxygenated river habitats and has a complex life cycle that includes dependence on salmonid fish as larval hosts. The decline of this species has been attributed mainly to sediment accumulation in river bed gravels, which cuts off the supply of oxygen to juvenile mussels. As a result, most EU populations of adult mussels are no longer reproducing themselves.

Considerable efforts have been made to conserve the remaining populations of the species in eastern Wallonia (Belgium). Practical measures have included removal of fish barriers, construction of barriers to prevent cattle trampling mussels, removal of coniferous trees, restoration of deciduous riverine forests, investment in water treatment plants, restrictions on fishing activities and awareness raising campaigns. Important supporting aspects of the conservation efforts were monitoring actions, careful selection of areas where conservation actions were required, and the purchase of the most important sites. Captive breeding programmes have also been established, but these are slow and have not yet successfully reintroduced mussels into the rivers.

A total of 80 additional young pearl mussels have been found in the Anlier Rivulet as a consequence of improved water quality. Although no measurable improvements in the species have yet been reported elsewhere in Wallonia, the adoption of all actions under one overall long-lasting coherent strategy, supported by clear site targeting and land purchase, and the involvement of a wide range of stakeholders have been crucial to the project's success.

Author: Gustavo Becerra, Institute for European Environmental Policy

10.4 Pygmy Cormorant (Phalacrocorax pygmeus) & Ferruginous Duck (Aythya nyroca) – Bulgaria

The Pygmy Cormorant and Ferruginous Duck are considered priority species due to a recent decline in their population number. Although currently there is an increasing trend observed for the Pygmy Cormorant population and the European status of the Ferruginous Duck is evaluated as Least Concern, both species are susceptible to various threats that could negatively impact their conservation status. Loss of habitats, poaching and unsustainable management practices are considered among the main pressures on both species. The Black Sea coastline of Bulgaria and the Burgas[33] wetlands provide important habitats for both species. The 2010-2013 LIFE+ Project 'Life for the Bourgas Lakes' undoubtedly led to the increases in the populations of the Pygmy Cormorant and Ferruginous Duck by maintaining and enhancing their feeding, breeding and roosting habitats; reducing direct and indirect killing of birds by effective cooperation between all key stakeholders, endorsement of national strategies, and enhancing public understanding of the need conservation measures for the species.

Author: Denitza Pavlova of Denkstatt.

10.5 Loggerhead Turtle (*Caretta caretta*) & Green Turtle (*Chelonia mydas*) – Cyprus

Massive over-exploitation of turtles for turtle soup and meat, on the Levant coast, from the Gulf of Iskenderun to Palestine/Israel, from the end of the First World War to about 1970 led to a virtual collapse of the turtle populations of the region and especially of the Green Turtle population. More recently both turtle species have been under pressure again, mainly from habitat loss and disturbance as well as from fishing bycatch. After 40 years of implementing conservation measures in Cyprus, steady and recently more rapid improvements have been seen in turtle populations. Time was the key

[33] Sometimes transliterated as *Bourgas*.

to seeing results, keeping in mind that turtles need 20-30 years to mature, and more in the case of Green Turtles. Knowledge gained through these efforts has resulted in the designation of protected areas, the identification of harmful activities, and the targeted implementation of effective conservation measures. Joint action between dedicated NGOs, the Government, local authorities, supported by volunteers, ensures the continuation of conservation efforts and the spread of public awareness. Key measures to improve turtle breeding and reduce hatchling mortality have included legal protection, prohibiting cars, sunbeds and parasols on beaches, and caging nests to reduce natural predation by Red Foxes.

Author: Katrina Abhold, Ecologic Institute.

10.6 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation (3260), European bitterling (*Rhodeus amarus*), Barbel (*Barbus barbus*), Eurasian Otter (*Lutra lutra*), European River Lamprey (*Lampetra fluviatilis*), Atlantic Salmon (*Salmo salar*) – Germany

Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the Atlantic regions of the EU were widely assessed over 2007-2012 as having an unfavourable-bad condition. Pressures mainly stem from human-related impacts such as modification of water courses and pollution. The same pressures affect key species of the habitat: the European Bitterling, the Barbel, the Eurasian Otter, River Lamprey and Atlantic Salmon. Measures to improve the status of the water courses and its species included improving and restoring the water quality and the hydrological regime, as well as establishing protected areas. Thus, the positive effects of measures taken to improve the status of the habitat also enabled a growth in population of the associated species across Germany. In addition to reducing habitat related pressures on the species, measures were taken to regulate fishing practices and the management recommendations were formulated by the Federal Agency for Nature Conservation for specific endangered species.

Author: Lina Röschel of the Ecologic Institute.

10.7 Eurasian Beaver (*Castor fiber*) – Germany

The Eurasian Beaver has undergone a history of decline and more recent recovery across Europe, with the species, assessed by the IUCN as near threatened in the mid-nineties as a result of extensive hunting and wetland loss since the beginning of the 20th century, and as ‘least concern’ only fifteen years later. Conservation measures implemented through national and sub-national conservation programmes are the main driver of the species’ recovery in Europe, in effect securing the beaver’s favourable status as long as these mechanisms are in place. Successful conservation measures in Europe contributing to the species' recovery included reintroductions and translocations, hunting restrictions, and habitat protection.

Author: Lina Röschel of the Ecologic Institute.

10.8 Green Gomphid (*Ophiogomphus cecilia*) – Denmark (CON)

Between 1900 and 1975, populations of the Green Gomphid dragonfly (*Ophiogomphus cecilia)* declined strongly due to water pollution and large-scale channelisation of rivers and brooks as well as increased use of river water for irrigation (in southern Europe). Since the 1970s, efforts to improve water quality, restore the natural structure of rivers and manage river systems more naturally, together targeted conservation projects have contributed to population increases in some

regions (e.g. Denmark, Germany and the Netherlands), although it remains threatened in many other areas. Denmark has reported genuine improvements in the species' conservation status within its Continental biogeographical region, which are the result of a combination of broad conservation measures. These include the protection of key habitats within the Natura 2000 network, restoring/improving water quality and hydrological regimes in large river systems, reducing nutrient loads, restoring key habitats, and re-introducing species where needed to restored areas. These measures have been financed in part with the help of LIFE, EAFRD and EFF funds. Of particular importance were the EAFRD funds (ca. 86 million DKK from 2012-2013), which were utilised for the hydrological improvements across Danish Natura 2000 sites, including restoration of their natural hydrology and reducing nutrient loads. This concentrated on restoring natural hydrology and reducing nutrient loads, as more than 80% of the Denmark's terrestrial area is within a river catchment area of an aquatic Natura 2000 site; all measures taken to reduce nutrient loads thus support the improvement of the conservation status of numerous aquatic habitats and species including the Green Gomphid.

Author: McKenna Davis, Ecologic Institute.

10.9 North Sea Houting (*Coregonus oxyrhynchus*) – Denmark

The North Sea Houting was recently considered to be globally extinct, primarily as a result of the loss of nursery habitat and the introduction of obstacles in rivers that prevent its anadromous spawning migration. However, a small population was confirmed as still residing in six Danish rivers. Different measures were taken to reduce mortality, including a full ban on fishing houting and a five-year restocking program. Neither had a lasting positive effect on the populations as they did not address the key pressures. A national action plan was adopted for the species in 2003 and part of its implementation was a significant river restoration project, part-funded by the EU LIFE programme, where physical barriers were removed and areas suitable as houting fry nurseries re-established.

The project took place between 2005 and 2012 and involved collaboration between local and regional authorities, land and fish farm owners, the angling society and owners of hydrological installations. As a result of these measures, although the species' overall conservation status remained as unfavourable-bad, Denmark reported an improving trend in its status over 2007-12. It is noted in the relevant Danish plans that the effects of the substantial restoration measures will take time to fully materialise, and that the houting is currently not exploiting the full range of its distribution. The river restoration measures have also had a positive effect on the ecosystem overall, attracting both public attention and new national projects and funding for river restoration projects.

Author: Mia Pantzar, Institue for European Environmental Policy.

10.10 Active raised bogs* (7110) – Estonia

Active raised bogs are a highly endangered habitat in the EU, with an estimated 90% of the original habitat lost, and the current area in unfavourable condition due to drainage, peat extraction, and afforestation. Estonia, reported an unfavourable-inadequate conservation status for the habitat in both the 2001-06 and 2007-12 periods, but a sub-reporting level improvement in the last period. This improvement resulted from strategic planning and government target setting, protection in Natura 2000 areas, and restoration projects both inside and outside conservation areas. Estonia carried out a comprehensive national inventory of mires, which was used to define the list of disturbed sites where peat extraction and drainage may still be permitted. Since 2012, the national nature conservation plan and the mire action plan set targets for peat bog restoration. Most of the active raised bog habitat is on state land, and the responsible government agency has undertaken an increasing number of large scale restoration projects. ERDF funding was used for 1,916 ha of habitat between 2007-13, and

Cohesion funding has restored 369 ha since 2014, with restoration of another 4,990 ha ongoing. Ditch blocking and dam construction methods have been substantially improved from early projects, and hydrological planning and monitoring has enabled sustainable water table restoration. Exchanges of experience with other Baltic countries and NGO and scientific community leadership were also key supporting factors.

Author: Evelyn Underwood, Institue for European Environmental Policy.

10.11 Nordic alvar and Precambrian calcerous flatrocks* (6280) – Estonia

The Nordic alvar and Precambrian calcareous flatrocks habitat is found around the Baltic Sea. The priority habitat has an unfavourable-bad status with declining trend in the boreal biogeographic region, primarily because of abandonment of traditional low intensity grazing. Estonia, where the alvar is considered to be a different subtype, also reported the trend in status as declining in the 2007 to 2012 period, although most of the habitat is protected in Natura 2000 sites. In 2012 less than 30% of the 9,800 ha of Estonian alvar grasslands were being managed appropriately, but since 2015 a substantial improvement in the area of habitat under active management has been achieved. This large scale restoration has been achieved primarily through a LIFE project and State Forest Management Centre land management agreements. Key factors of success were the efficient and fast large-scale mechanical restoration technique, the improved communication of the local people with the state organisation and with each other (which has facilitated restoration and grazing arrangements), availability of targeted agri-environment support, and the project team's efforts to enable local livestock owners to sign restoration agreements and agri-environment contracts. The habitat improvement has been enabled by the development of integrated coastal zone management, and also by the local population's enhanced awareness of sustainable development and the benefits of nature conservation in the Biosphere Reserve. As the Estonian Nature Conservation Development Plan has set the target of a minimum of 7,500 ha of Nordic alvar grassland habitat area to be under annual grazing by 2020, and funding has been allocated in the Operational Programme for Cohesion Policy Funds, Rural Development Programme, and national funds to 2020, the future prospects of the habitat are improved.

Author: Evelyn Underwood, Institue for European Environmental Policy.

10.12 Water courses of plain to montane levels with the Rununculion fluitantis and Callitricho-Batrachion vegetation (3260) – Estonia

Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the boreal regions of the EU are widespread in the EU. They have been widely assessed as in unfavourable-bad condition, with a favourable range and area, but unfavourable structure and function of habitats as well as unfavourable future prospects (EEA, 2013; EIONET, 2014). Pressures mainly stem from human-related impacts such as modification of water courses through canalisation and pollution through urbanisation and transport (EEA 2013; EIONET, 2014). In Estonia the main pressures have been mostly related to the changes in water bodies' conditions and pollution to surface waters. Conservation measures for the habitat have largely focussed on the restoration or improvement of the river's hydrological regime. This included measures to excavate silted connecting points between oxbow lakes and the main rivers, as well as restoring natural river flows and meanders to pre-canalisation conditions.

Author: Lina Röschel and Katrina Abhold of the Ecologic Institute.

10.13 Common Spadefoot Toad (*Pelobate fuscus*) - Estonia

This species declined across Europe primarily as a result of the loss of breeding ponds and its terrestrial habitat. In Estonia the restoration and creation of breeding ponds and improvement of surrounding habitat has greatly increased the number of breeding sites. This conservation status improvement was achieved through two LIFE projects and is continuing through actions established in an After-LIFE Conservation Plan and the Estonian Species Action Plan. Key drivers to the success of these conservation measures were the detailed scientific analysis of the species and its habitat requirements, the landscape-scale habitat improvements and the supervision of pond creation by experts. The removal of invasive alien species and the level of publicity and dialogue with local people and landowners were also vital to success. In the areas targeted, the number of breeding ponds increased from 25 prior to conservation action to 145 in 2012 and reached 202 at the latest count.

Author: Tom Stuart, Institute for European Environmental Policy.

10.14 European Mink (*Mustela lutreola*) - Estonia

The species became endangered in the 20th Century, as a result of hunting for the fur trade, habitat loss and invasive alien species. American Mink threaten all remaining populations, but their eradication on Hiiumaa island, Estonia, has enabled a reintroduction programme to establish a wild population. A Darwin Initiative project and a LIFE project were important in initiating the programme and led to the development of the first Species Action Plan for the species in Estonia. This and subsequent plans have been instrumental in organising and delivering the reintroduction and conservation activities. Also fundamental to the project's success was the involvement of local stakeholders and local publicity. Key measures have included improving the facilities at Tallinn Zoo and the genetic diversity of their captive population; developing better techniques for the period before, during and after releases; and, habitat restoration across Hiiumaa.

Author: Tom Stuart, Institute for European Environmental Policy.

10.15 White-clawed Crayfish (*Austropotamobius pallipes*) – Spain (ALP and ATL)

The decline of White-Clawed Crayfish in Spain started to be noticeable in the 1960s as a consequence of habitat loss and overexploitation. However, the main pressure that has caused the significant decline since the 1970s and 1980s was the introduction of Red Swamp Crayfish and Signal Crayfish, vectors of the fungus *Aphanomyces astaci* which causes a disease called crayfish plague. Although the species was reported to have an unfavourable-bad conservation status over the 2007-2012 period in Spain, it showed genuine positive trends in the Atlantic and Alpine biogeographical regions. It was estimated that, in 2009, approximately 1,050 White-clawed Crayfish populations existed in the Iberian Peninsula (occupying between 500 and 1,000 km of river habitat), compared to approximately 850 (occupying between 400 and 800 km) in 2007. The key driver of the improvements has been the implementation of regional-level multi-species conservation action plans, with measures that focused on captive breeding and reintroduction of individuals to suitable available locations that remain free from the alien crayfish species.

Author: Gustavo Becerra, Institute for European Environmental Policy.

10.16 Spanish Imperial Eagle (*Aquila adalberti*) – Spain

The Spanish Imperial Eagle is a European endemic species that was close to global extinction in the 1960s, as a result of poisoning, electrocution from electricity towers and habitat degradation. The improvement in its conservation status has been achieved through a concerted programme of LIFE Nature projects. The most important drivers to the success of these conservation measures have been the initial research that was conducted on the main threats to the species, the coordinated action that took place through national and regional action plans, as well as the wide implementation of key measures. These included the modification of electricity structures, legal protection and enforcement to reduce poisoning, and habitat management measures that engaged all key stakeholders. No new measures are urgently required for this species as it is now recovering in all its range states, but continued conservation management is necessary to support its populations in the Iberian Peninsula.

Authors: Graham Tucker and Gustavo Becerra, Institute for European Environmental Policy.

10.17 Lesser Kestrel (*Falco naumanni*) – Spain

The Lesser Kestrel declined across Europe in the 20th Century as a result of changes in the agricultural environment. Less labour intensive farming led to the abandonment and ruin of the agricultural buildings used for nesting, while more input intensive farming reduced the availability of insect prey. Spain, which holds around half the European population, experienced the lowest point (circa 4,700 pairs) in 1988–89, after which, numbers rose until about 2012, when they exceeded 14,000 pairs. The measures driving this recovery were the set-aside requirements of the EU Common Agricultural Policy in the 1990s and 2000s, and, the implementation of national and regional legislation and conservation plans, notably including the widespread provision of artificial nesting sites. Since 2012, the population has declined sharply prompting a renewed focus on the threats to the species.

Author: Tom Stuart, Institute for European Environmental Policy.

10.18 Iberian Lynx (*Lynx pardinus*) – Spain

Iberian Lynx populations collapsed during the 20th century as a result of agricultural and silvicultural intensification, which resulted in the homogenisation of landscapes, as well as illegal hunting. The abandonment of marginal livestock farming and a net loss of rabbit populations were additional pressures. The improvement in the species' conservation status has been achieved through a significant number of LIFE projects. Key drivers of the success of these conservation measures have been the initial research activities and the transfer of knowledge to species conservation managers, as well as the active communication with and involvement of all stakeholders, particularly hunting associations and land owners, in the conservation of the species. The implementation of integrated management of the species in all its existing geographical distribution, as well as the launch of effective campaigns on the cultural value of the species and its critical conservation status, were also vital. Between 2007 and 2012, the global population of the Iberian lynx increased from 167 to 313 individuals. In its stronghold in Andalucía, the species increased from 94 individuals in 2002 to 448 in 2017.

Author: Gustavo Becerra, Institue for European Environmental Policy.

10.19 Boreal Baltic coastal meadows (1630) - Finland

Boreal Baltic coastal meadows are a priority habitat found around the coastlines of the Baltic Sea on areas of land upheaval where livestock have been grazed since prehistoric times. The meadows are now in an unfavourable status due to the abandonment of grazing and overgrowth with reeds and woody vegetation. In Finland, the amount of managed coastal meadows has increased during the past ten years due to targeted restoration actions in the Natura 2000 sites, led by the local and national conservation authorities and with cooperation and voluntary action by farmers. Finnish Rural Development Programme funding through agri-environment and non-productive investments, combined with significant national funding and targeted LIFE and Interreg funded projects, have supported restoration and the reinstatement of grazing on several hundred hectares. Key wins and good practices include the attractive agri-environment payment level for the more valuable areas of habitat, gains in knowledge of efficient reed cutting and utilization strategies, and actions that improve cattle farmers' access to large areas of land for grazing.

Author: Evelyn Underwood, Institue for European Environmental Policy.

10.20 Biscutelle de Neustrie (*Biscutella neustriaca)* – France

Biscutella neustriaca is a rare and endemic plant of the Atlantic biogeographical region, which inhabits open calcareous grasslands on steep slopes and cliff screes. The species now only exists in small localities in France, around Amfreville-sous-les-Monts and Les Andelys, and is highly endangered due to the abandonment of traditional agricultural practices that help to maintain the suitability of its calcareous grassland habitat.

Two LIFE projects, from 1993 – 2003 and 2006 – 2012, have stopped the species decline through a combination of research into the species' reproductive biology and genetics, habitat restoration and management (vegetation clearance and ongoing grazing) and the reinforcement of small populations and creation of new populations (through ex-situ measures and in-situ seeding and planting) to increase their viability and genetic diversity. As a result the population of *Biscutella neustriaca* increased from >1,580 individuals in 2002 to more than 4,798 in 2012.

Author: Pauline Cristofini, Deloitte.

10.21 Egyptian Vulture (*Neophron percnopterus*), Cinerous Vulture (*Aegypius monachus*), Bearded Vulture (*Gypaetus batbatus*) & Griffon Vulture (*Gyps fulvas*) – France

In the 19th and 20th centuries, the population of all four species of vultures declined drastically in France, as a result of intentional persecution and accidental poisoning as a consequence of the use of synthetic pesticides after World War II. Other causes included food shortages due notably to the abandonment of extensive livestock farming and transhumance, and habitat loss and fragmentation. The most common threats now are electrocution and collision with power lines and wind turbines. Recovery has occurred as a result of research into the key threats followed up by the development of European and national action plans (for all four species) that have been implemented through collaboration between authorities, NGOs, livestock farmers, electricity providers and hunters, including through a number of LIFE Nature projects. Key measures to reduce mortality rates have included modification of electricity structures and experimentation with lead-free ammunition. Supplementary feeding, habitat management and the protection of nesting birds from human disturbances has increased breeding productivity. Targeted reintroduction measures have re-established populations in isolated areas and helped to address the need to increase genetic variability.

Author: Katherine Salès, Deloitte

10.22 Eurasion Spoonbill (*Platalea leucorodia*) – France

The species became endangered in Europe in the mid-20th century mainly due to pollution, shooting, disturbance and loss of breeding sites. Key measures have been taken since early 1980s in order to protect stopover and breeding sites. Recovery has been facilitated by the development of a major international conservation plan including measures such as targeted control of water levels, protecting flood plains and monitoring the development of vegetation and siltation. In France conservation measures have included wetland protection, restoration and management, supported by research, monitoring and awareness raising activities. Of particular importance has been the Grand Lieu LIFE Project, at a key site for the spoonbill, where restoration measures have included desilting and water quality improvements, with agreements reached with farmers to secure appropriate habitat management (e.g. extensive grazing). This has improved the habitat for waterbirds, including the Spoonbill, resulting in its breeding population increasing from some 20 to almost 200 pairs. As a result of such diverse measures in France and elsewhere in Europe, the majority of Eurasian Spoonbill populations are recovering (especially in north-west Europe, Hungary and the Netherlands) but some remain vulnerable.

Author: Pauline Cristofini, Deloitte

10.23 *Dianthus diutinus* – Hungary

Endemic to the Pannonian biogeographical region, *Dianthus diutinus* inhabits open patchworks of grassland and scattered stands of forests, and is nowadays only found in the area between the Danube and Tisza rivers in central Hungary. The majority of its habitat has been afforested and fragmented with large-scale pine tree plantations, and degraded due to the spread of invasive alien species. As a result, the population size of *Dianthus diutinus* had shrunk by 2007 to approximately 20,000 individuals, consisting of 10 small and isolated subpopulations. As part of a LIFE project, LIFE HUNDIDI carried out from 2006 to 2011, the population size and the quality of the habitat of *Dianthus diutinus* was successfully improved. The population reached 97,738 individuals at the end of the LIFE project in 2011, but is likely to have declined now, due to natural factors, to approximately 78,000 individuals.

In addition, the area of interconnected and unbroken habitat for the species has increased to 455 ha. These achievements were driven by the timely and smooth combination of extensive restoration of the habitat of the species (including thinning of non-indigenous forests and removal of invasive species) and research-based ex situ propagation and reintroduction, supported by various enabling factors (intense cooperation with stakeholders, changes in forestry regulations, and successful awareness raising activities). Future action will need to produce a better understanding of the species' population dynamics and fluctuations, in order to secure lasting results.

Author: Constance von Briskorn, Deloitte.

10.24 Hungarian Meadow Viper / Orsini's Viper (*Vipera ursinii rakosiensis*) – Hungary

The Hungarian Meadow Viper is a rare species of snake that has been endangered in Europe since the mid-20th century especially due to the destruction of its habitat. Although conservation measures have been implemented since the 1970s, it now only occurs in small areas in Romania and Hungary. To arrest its decline, strong protection and intensive conservation efforts have been implemented in Hungary, including a national recovery programme and two LIFE projects dedicated to the conservation of the species: HUNVIPURS - Establishing the background of saving the Hungarian Meadow Viper (from 2004-2007) and CONVIPURSRAK - Conservation of Hungarian Meadow Viper in the Carpathian basin (2009-2013). Conservation measures included the purchase of land, habitat re-creation and protection, the implementation of viper-friendly management, the reinforcement of viper numbers through captive breeding and release of young snakes, population monitoring and detailed scientific research, and public awareness activities.

The LIFE projects resulted in the remaining populations of Hungarian Meadow Viper being on state-owned land that is now subject to protection and management for the species, a substantial increase (400 ha) in the area of continuous suitable habitat for the species and a total of 242 Hungarian Meadow Vipers successfully reintroduced into their natural habitats at three sites. In addition, awareness of the conservation status of the species and attitudes towards it have also significantly improved. Consequently, although the assessment of the conservation status of the species for Hungary for 2007-2012 was unfavourable–bad, trends were considered to be positive.

Author: Pauline Cristofini, Deloitte

10.25 Black Stork (*Ciconia nigra*) – Hungary

The Black Stork (*Ciconia nigra*) is a waterbird species that breeds in Europe, with most of its population migrating to Africa in winter. Although it is scarce, its threat status is considered to be Least Concern both globally and within Europe, as its population has been increasing. It predominantly feeds in wetlands, but requires old, undisturbed and open forests with old trees with large canopies for nesting. The main pressures and threats to the species are human-induced habitat degradation caused by deforestation, the rapid development of industry and farming, as well as the construction of dams and drainage of lakes for hydroelectric power production and irrigation. The species is also highly sensitive to human disturbances and will abandon its nests due to the presence of foresters and hunters. The principal conservation measures that have increased the Black Stork's population have included the restoration of wetland and nesting habitats and the construction of artificial pools for feeding. LIFE projects, such as the 'Conservation of endangered bird species populations in natural habitats of the Danube inland delta', have helped restore such areas and raised awareness of the species and its needs with local communities.

Author: Katrina Abhold, Ecologic Institute

10.26 Coastal and halophytic habitats: sandbanks which are slightly covered by sea water all the time (1110), estuaries (1130), mudflats and sandflats not covered by seawater at low tide (1140), and large shallow inlets and bays (1160) – Ireland

The four coastal and halophytic habitat types - *sandbanks which are slightly covered by sea water all the time, estuaries, mudflats and sandflats not covered by seawater at low tide, and large shallow inlets and bays* in the marine Atlantic biogeographical region were widely assessed as in unfavourable-bad condition. In Ireland, the status is better, ranging from unfavourable-inadequate to favourable for sandbanks. Pressures on these habitats mainly stem from human-related impacts such as aquaculture and fisheries, which are an economically vital part of the Irish economy. The positive effects of measures taken to improve the status of these habitats enable their conservation, although there are still a number of key environmental pressures to address. Making aquaculture and fishery licensing subject to prior assessment as well as the introduction of Aquaculture Zone Management Plans and mitigation measures on the fishery sector have been the most effective measures for conserving Irish coastal habitat types. The outcome of the current monitoring programme will provide improved information on Irish marine and coastal Annex I habitats, allowing the improvement of conservation measures.

Author: Ruta Landgrebe-Trinkunaite of the Ecologic Institute.

10.27 *Taxus baccata* woods of the British Isles (91J0) – Ireland

Taxus baccata (Yew) woods of the British Isles, which only occur in the UK and Ireland, are forests composed of Yew trees and are relatively low in species diversity. Grazing by deer and invasive species are the primary pressures and threats to Yew woodlands in Ireland. Improvements in the condition of Yew woodlands have occurred, and further improvements are expected, mainly as a result of conservation measures implemented as part of LIFE projects, the national Millennium Forest Initiative, and through the National Parks Service. Key measures that are driving the improvements are long-term management of Yew woodlands in protected areas, and, more recently deer grazing management, control of invasive species, and the planting of new Yew stands in suitable areas for the habitat.

Author: Keighley McFarland, Ecologic Institute.

10.28 Brown Bear (*Ursus arctos*) – Italy

This case study presents an overview of a successful conservation effort that led to a genuine improvement in the conservation status of the Brown Bear (*Ursus arctos*) in the Italian Alpine region and more specifically the Adamello Brenta national park in the Trentino Province.

Brown Bears are habitat generalists and traditionally occurred in much of the European region. Most of the Brown Bear's former range has lost suitable habitat because of human alteration and presence. Today, Brown Bears mainly remain in mountainous and forested areas where they escaped widespread persecution that in many places only diminished from the 1950s onwards. Within the Alps, after a long history of habitat degradation and persecution, by 1950 the Adamello massif/Brenta group of mountains in the Trentino region of Italy had become the last refuge for Brown Bears in the entire region, and by the late 1990's the remaining population was approaching extinction.

As part of the EU LIFE URSUS project, ten bears from Slovenia were translocated to Adamello Brenta National Park between 1999 and 2002 to reinforce the Alpine bear population. In 2000, a first Action Plan for the conservation of the Brown Bear in Europe was published that provided a specific threat assessment, objectives and measures for the Italian southern Alps Brown Bear population that provided an important basis for further successful management measures and funding. However, with young adult bears dispersing into the Trentino region, the number of bear-human conflicts grew. Consequently, public support for a bear population in the region plummeted, and illegal culling increased. This undermined earlier reintroduction successes, in particular as the Italian Alpine bear population remained genetically isolated from the nearest viable bear population in the Dinaric Alps in Slovenia.

To address this, during the 2007-2013 reporting period, great strides were made to reduce human-bear conflicts, as well as bear mortality, and with support of the LIFE programme a wide range of conservation measures were implemented. Thanks to intensive monitoring and evaluation, the status of the bear population and effectiveness of measures were well-recorded and the bear population doubled during the reporting period. Other particular success factors were a strong legal framework, adequate EU national and regional funding, and a strong coordination across administrative boundaries, stakeholder groups and citizens. Despite the local successes, the co-existence challenge for the wider region remains significant, and continued effort and funding will be required. Only this will ensure a Brown Bear population large enough to restore genetic exchange with the Slovenian population, which remains the critical bottleneck for the species' long-term viability in the Italian Alps.

Author: Erik Gerritsen, Institute for European Environmental Policy.

10.29 European Pond Turtle (*Emys orbicularis*) – Lithuania

The European Pond Turtle is a widely distributed species in Europe. The species has an unfavourable conservation status and a negative population trend over most of its range. In the Boreal region of the EU, the species condition was assessed as unfavourable-bad during the last two reporting periods. The main pressures stem from human-activities such as changes in farming (drainage, annual ploughing, the use of biocides and the abandonment of extensive grazing systems), forest planting on open ground, and landscape fragmentation as well as predation and climate change-related extreme weather events. In view of these challenges, the species conservation measures taken by two LIFE projects helped improve its status regionally and triggered an increase of its population in Lithuania. The most effective measures were the protection of the species' as eggs and juveniles (as this is when they are most vulnerable in their life-cycle), as well as the improvement of habitat extent and quality and its ecological connection. Awareness raising amongst the public contributed to the species' protection but needs to be an ongoing continuous process to conserve the European Pond Turtle in the future.

Author: Ruta Landgrebe-Trinkunaite, Ecologic Institute

10.30 Violet Copper (*Lycaena helle*) – Luxembourg

The Violet Copper butterfly (*Lycaena helle*) has scattered populations from the Pyrenees to northern Europe and east to Central Asia. It requires marshes and wet grassland areas sheltered from strong winds, and the presence of bistort, its only larval food plant. Over most of Europe, its population has declined greatly, becoming extinct in some countries, mainly due to human-induced pressures such as agricultural intensification and the loss of wet grassland habitats. In Luxembourg, the Eislek LIFE project was carried out from 2012 to 2017, to support nationally endangered species such as the Violet Copper, through the restoration of suitable grassland and wetland habitats in eleven Natura 2000 sites. Actions taken under the project included the clearance of shrubs and trees, restoration of meadows, measures to support the mowing and grazing of grasslands (e.g. modified machinery and fencing) and the development of Natura 2000 management plans for key sites. Consultations were also held with farmers and management measures extended for grassland habitats through the development of agri-environment contracts. Overall, the project successfully restored 60.75 ha of land suitable for the butterfly, with additional benefits for other local species.

Author: Katrina Abhold, Ecologic Institute.

10.31 Dry sand heaths with *Calluna* and *Empetrum nigrum* habitat (2320) – Latvia

Dry sand heaths with *Calluna* and *Empetrum nigrum* (2320) occur on nutrient poor sandy soils in the plains of northern Europe. The habitat's conservation status in all Member States, other than Estonia, and all biogeographical regions was assessed as unfavorable for 2007-12 and for previous reporting periods. The main causes of this were human-related impacts, mainly the abandonment of pastoral systems that leads to vegetation succession due to a lack of grazing. However, although its conservation status was assessed as unfavourable-inadequate in Latvia, an overall positive trend was reported as a result of restoration activities. Of these activities, cutting and controlled burning have been most effective, whilst mowing has been only partially effective, due to numerous constraints.

Author: Ruta Landgrebe-Trinkunate, Ecologic Institute

10.32 Corncrake (*Crex crex*) – Latvia

Although the Corncrake (*Crex Crex*) has a stable overall breeding population in the EU27, it is declining in some countries and remains more widely threatened from land-use changes. Agricultural intensification or, conversely, land abandonment, both of which leads to the loss of traditionally managed hay meadows, are the primary threats. But wet grasslands are also at risk from changes in hydrological regimes, such as a result of river reengineering and flood management. Such pressures have occurred in Latvia, but the Corncrake population increased in size between 2007-2012 (and over the longer-term since 1980). This is largely a result of four LIFE projects and agri-environment measures that have conserved the species and restored its original habitat, particularly wet grasslands, in agricultural landscapes within its core areas. This involved the removal of bushes and trees from abandoned and overgrown grasslands, which are then maintained by grazing or hay cutting to avoid re-growth. The natural meandering of some rivers was also restored to create more suitable hydrological regimes and increase grassland habitat quality. Furthermore, the restored areas were reconnected to form continuous areas of open grassland habitat favoured by the Corncrake. Particular success was observed in those LIFE+ projects that greatly involved public stakeholders and had regular meetings with the press, public authorities, unions, and other associations.

Author: Ruta Landgrebe-Trinkunaite, Ecologic Institute.

10.33 Yelkouan Shearwater (*Puffinus yelkouan*) & Mediterranean Storm Petrel (*Hydrobate pelagicus melitensis*) – Malta

The Yelkouan Shearwater is a seabird that is endemic to the Mediterranean and Black Sea, with a global population of about 19,000-31,000 pairs of which about 1,660 – 1,980 pairs occur in Malta. In the EU its population trends vary amongst countries, but in Malta its short term population trend was last reported as positive. The Mediterranean Storm Petrel is a relatively rare sub-species of the Storm Petrel, with a total known population of 13-17,000 pairs, with the largest population, of some 5-8,000 pairs, occurring on the Maltese Islands, where it is very localised. Its overall EU status is unknown, but in Malta, it has most recently shown stable short term population trends, which is an improvement on its longer term decline.

Both species spend most of their life cycle at sea, only coming ashore to breed, and at night to avoid avian predators. Both species are vulnerable to mammalian predators, and are also threatened by disturbance when breeding, by-catch from fishing, and the effects of artificial lighting / light pollution. In Malta, predation by rats on eggs and chicks is a critical threat to the Yelkouan Shearwater, and restricts the occurrence of the Mediterranean Storm Petrel to rat-free islands and sea caves. Increases in breeding success and population size in the Yelkouan Shearwater were achieved through an initial LIFE project that most importantly eradicated rats from its main colony, and for a while reduced other threats from disturbance, dumping and light pollution. It also appears to have enabled Mediterranean Storm Petrel to start breeding at the site. The project also had a wider catalytic effect, starting research using ground breaking methods to identify the areas of most importance for the Yelkouan Shearwater when at sea. This was followed up by a project that prepared a more comprehensive inventory of marine Important Bird Areas for the Yelkouan Shearwater and Mediterranean Storm Petrel that were subsequently designated as SPAs. Currently, conservation measures for the Yelkouan Shearwater are being further developed through a third LIFE project, which is taking further measures to tackle threats such as light pollution and rat predation, as well as investigating the possible impacts of disturbance from vessels close to colonies, and continuing awareness activities.

In summary the conservation of these species has been dependent on a strong partnership between nature conservation NGOs and authorities, that have carried out a concerted programme of LIFE funded research and targeted practical conservation actions, which initially focussed on species-

specific urgent issues and then expanded to more comprehensive and strategic measures that aim to maintain the species over the long term.

Author: Graham Tucker, Institute for European Environmental Policy.

10.34 Humid dune slacks [2190] – The Netherlands

Humid Dune Slacks have an unfavourable Conservation Status in the majority of EU Member States, principally due to changes in water conditions and natural succession. In the Netherlands these problems are aggravated by desiccation, eutrophication and soil acidification due to nitrogen deposition. Several restoration programmes for the habitat and other dune habitats have been carried out, including through LIFE projects, initiated by various authorities. The main conservation measures taken have been the removal of vegetation, hydrological restoration (e.g. reducing water abstraction, ditch filling), creating wind funnels and the removal of topsoil. These efforts have improved habitat quality, but to ensure a long-term favourable conservation status, further measures will be required to reduce nitrogen emissions and to ensure recolonisation of the habitat's characteristic plant and insect species.

Authors: Arjen van Hinsberg, Marjon Hendriks and Onno Knol, PBL.

10.35 European Tree Frog (*Hyla arborea*) – The Netherlands and Belgium

The European Tree Frog is a widespread species with an unfavourable-inadequate conservation status in the majority of its EU range. Populations in the Netherlands and Belgium, amongst other countries, are increasing. The species prefers a mosaic of habitats in landscapes including habitats of early successional stages, such as recently created waters. The species is quite sensitive to changes in habitat, including loss and fragmentation of forests, shrublands and meadows (with the isolation of populations) and the drainage and pollution of wetlands; and the presence of predatory fish species. The most important measures in the Netherlands and Belgium which contributed to the strong increase of the species are the development of connected, large, high quality habitats which facilitate meta-population structures in the landscape. Moreover, an active role of private landowners and the contributions of the project to the local economy and education proved to be essential for a successful implementation of the conservation measures, resulting in long-term involvement of the private and public partners and persistent socio-economic benefits. Factors hampering the conservation of the tree frog are a lack of sufficient funding, and a loss of high-quality habitat due to house- and roadbuilding, which is often compensated with lower quality habitat. As a pioneer species it can settle relatively quickly in high quality habitat, but high connectivity between habitats, monitoring and long-term conservation measures are essential for a sustainable population in the future.

Author: Marjon Hendriks, PBL.

10.36 Varnished Hook-moss / Slender Green Feather-moss (*Drepanocladus vernicosus*) – The Netherlands

Drepanocladus vernicosus is a rare wetland moss, which has declined in numbers drastically over the past century. Only in the Netherlands, and to some extent Belgium, has the species recently shown a positive trend, due to local improvements at the few sites where the species survives. In the Meppelerdieplanden, one of the two sites for the species in the Netherlands, numbers have tripled over the last ten years. Here a combination of factors appears to have been responsible for this

improvement. Increased inputs of clean, nutrient-poor water into the area improved both the wetness and nutrient status of the species' habitat. Also, during summer the water level is lowered temporarily and the area is mowed and litter is removed, which not only contributes to lower nutrient levels, but also helps the species to colonise new parts of the site, by spreading vegetative growth modules. The improved management was enabled and funded by the 2006 National Plan for Survival of Nature.

Author: Onno Knol, PBL.

10.37 Little Tern (*Sterna albifrons*) – The Netherlands

The Little Tern is a widespread migratory bird species with breeding populations in the large majority of EU Member States, mostly in coastal areas and along larger rivers. Despite its wide range, in most places it is not a common species because of its requirements for barren or sparsely vegetated sand, shingle or gravel banks in which to nest, in combination with productive and shallow waters to feed. Many of such places, are naturally mostly present in dynamic river deltas, but they have greatly reduced in area and quality as a result of human infrastructure development for flood risk management, navigation and land reclamation for residential or commercial purposes. In addition, water pollution decimated remaining European Little Tern populations in the 1960's, causing the Dutch Little Tern population to fall from 800-900 pairs in the 1950's to only 100 pairs by 1967. Since then, the Dutch population has gradually recovered, and although over the short-term its population size has fluctuated, it range has increased. An important limiting factor to further Little Tern recovery in the Netherlands is disturbance from recreational pressures, which prevents successful breeding in otherwise suitable sites. In addition, ongoing erosion and the lack of new natural sediment deposition in the regulated delta of the Rhine, Meuse and Scheldt rivers slowly reduces the availability of nesting sites.

A dedicated species protection plan for coastal bird species in the Netherlands in 2008 therefore prioritised the development of artificial breeding islands. In various places, combinations of NGO's, national- and regional policy makers and water/land managers have taken this recommendation to heart and developed or restored such islands. Monitoring results have demonstrated that at sites with a diversity of small alternative breeding locations Little Tern breeding success has been more stable and higher than before. However, pilot projects demonstrated that, in the absence of dynamic sand and shell sedimentation processes, the required removal of natural re-vegetation to maintain the open ground for breeding Little Terns will represent a significant ongoing running cost in most locations. Disturbance from recreational activities also continues to be a major challenge, although in recent years low-cost measures such as information panels in combination with basic fencing and zoning seem to have yielded positive results. Lastly, important scientific questions remain in particular in relation to the factors affecting regional exchanges between sub-populations, its breeding success and the availability of food resources.

Despite these remaining challenges, the case study demonstrates how a combination of critical drivers has resulted in a measurable improvement in the conservation status of the Little Tern in the Netherlands. The most important of these were the legal commitment to protect the species, the presence of a clear and articulated scientific basis for management measures, the availability of funding for both running costs as well as investments, and the cooperation and exchange of experiences between key stakeholders from the scientific community, public authorities and NGOs.

Author: Erik Gerritsen, Institute for European Environmental Policy.

10.38 Eurasian otter (*Lutra lutra*) – The Netherlands

The Eurasian Otter became extinct in the Netherlands, due to habitat loss, poor water quality and traffic kills. In 1988 an Otter Recovery Plan came into action, through cooperation of national and local governments, water boards and nature management organisations. The plan included measures on habitat restoration and water quality improvement, a breeding program combined with reintroduction/repopulation of the species, connecting habitats and creating safe routes for movement and dispersal, as well as scientific research and educational activities. Improved water quality resulted mainly from more general international and national policy, but in otter habitats water pollution was more strictly prohibited. As the otter is considered to be a good indicator species for overall environmental quality, and also an iconic species for the river delta, a large budget was provided for these measures. The combination of measures has resulted in a population of about 200 individuals which is still spreading and increasing. However, ongoing road kills and the limited genetic diversity of the population are problems to be dealt with.

Author: Onno Knol and Pim Vugteveen, PBL.

10.39 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco- Brometalia) (* important orchid sites) [6210] – Poland (CON)

Calcareous *Festuco-Brometalia* grasslands and scrubland facies are among the most species-rich plant communities in Europe and contain a large number of rare and endangered plant species. Their conservation status in the EU is assessed as unfavourable-bad and deteriorating, mainly because of the abandonment of low intensity grazing and succession of the habitat into scrub and woodland. Poland, however, reported an improving trend for the 2007 to 2012 period for the estimated 30 km^2 of habitat in the Continental biogeographic region of that country. This is due to restoration of the condition of several hundred hectares of the grassland, together with uptake of agri-environment agreements for extensive grazing on a much larger proportion of the habitat area since 2014. The restoration was primarily organised by NGOs in collaboration with managers of landscape parks and national parks or a number of Regional Directorates for Environmental Protection who are active in protection of Natura 2000 sites. Funding for restoration has come mainly from the LIFE Nature programme and from national and regional funds for environmental protection. Management is being supported by agri-environment schemes tailored to semi-natural habitats inside and outside Natura 2000. The key restoration methods were removal of shrubs and trees and reinstatement of extensive grazing, but other innovative methods have also been successfully trialled including top soil removal, sowing seeds and transplanting pieces of sod; and recovery of grasslands overgrown by expansive bushes using black foil lining. These practices could now be expanded to other areas of unmanaged habitat. A successful measure has been the establishment of mobile sheep pasturage for small, highly isolated patches of grasslands; the animals are transported from patch to patch throughout the growing season. The preparation of the Habitat Action Plan was a useful process that gathered and summarised the state of knowledge on protection of xerothermic grasslands in Poland, and involved stakeholders in defining the actions required to protect and manage xerothermic grasslands in the whole of Poland, and discussing the problems. Some necessary conservation measures for xerothermic grasslands have been described in Natura 2000 management plans. These prescriptions are, at least in theory, binding for nature conservation authorities, but implementation in practice depends on funding and organisational capacity.

Author: Evelyn Underwood, Institute for European Environmental Policy.

10.40 Great Bustard (*Otis tarda*) – Portugal

This species declined across Europe through agricultural intensification, habitat deterioration and, historically, hunting. In Portugal, agri-environmental programmes and LIFE projects have promoted an expansion of the area of land cultivated by using dry cereal-fallow cycles (Great Bustard's primary habitat) in Castro Verde and Vale do Guadiana SPAs, and, the adoption of measures to reduce human-related mortality across the Natura 2000 network. Key drivers of the success have been LIFE projects involving both conservation organisations and farming associations in the design and promotion of the agri-environmental measures. Legal protection of SPAs through the denial of permits for agricultural development that would be detrimental to steppic birds is important, especially away from the two main areas where conservation has been successful. However, this results in hostility towards nature conservation and the generally speaking, the main concern around the future of the species in Portugal is the situation outside Castro Verde and Vale do Guadiana. On the other hand, these two areas hold over 80% of the national population, and within them numbers rose from 1,249 individuals in 2007 to 1,347 individuals in 2012.

Author: Tom Stuart, Institute for European Environmental Policy.

10.41 Alkaline fens (7230), Transition mires and quaking bogs (7140), Active raised bogs (7110), Bog forest (91D0), Natural eutrophic lakes (3150) – Slovenia

Between 1772 and 1990, more than 100,000 ha of wetlands were lost in Slovenia due to environmental pressures, mainly linked to agricultural intensification in the country, including modification of wetland areas, construction of drainage systems and lowering of water levels, as well as flood control schemes that have lead to the canalisation of natural meandering streams. Additional indirect threats to the natural environment in Slovenia are related to industrialisation, urbanisation, invasive alien species and growth of the national tourism sector. In response, the LIFE project WETMAN was funded for the period of 2011-2015 to re-establish the favourable conservation status of freshwater and wetland habitats, including the six covered in this case study. Management measures included the construction of dykes and barriers, removal of overgrown vegetation in wetlands and restoration of freshwater habitats. The project also secured the longer term sustainable management of pilot areas through establishing conservation guidelines, covering 4,439 ha in total. Although the overall conservation status of the targeted wetlands in Slovenia did not change, regional improvements did occur as a result of the LIFE project, with key drivers being the extensive stakeholder involvement and environmental education of the public.

Author: Lina Röschel, Ecologic Institute

10.42 Mediterranean Killifish (*Aphanius fasciatus*) – Slovenia

Aphanius fasciatus is a fish that lives in brackish and salty coastal waters around the Mediterranean. Its conservation status in 2007-2012 was assessed as unfavourable in the Continental and Mediterranean biogeographical regions, primarily as a result of changes in water salinity, pollution and natural drying out of lagoons. In Slovenia, coastal wetlands and former saltpans are a key habitat for *Aphanius fasciatus*, but these have been mostly abandoned as salt production has become economically unviable. However, its status in Slovenia has undergone a genuine improvement through the establishment of protected areas and maintenance of the fishes' habitats within them. In particular, LIFE funding was used to maintain and improve the quality of pools, ditches, and channels inhabited by the fish resulting in healthier populations and in their current overall favourable conservation status.

Author: Keighley McFarland of Ecologic Institute.

10.43 Inland salt meadows (1340) – Slovakia

Inland salt meadows (priority habitat 1340*) are one of the most endangered habitats in Central Europe. Pannonian saline habitats reach their northern distribution limit in Slovakia, and belong to the most threatened, fragmented and very rare communities. Although almost all remaining areas are included within Natura 2000 sites, they have been heavily pressured by land drainage and cultivation and the abandonment of grazing. The habitat was reported as having an improving status in the 2007-2012 period. Independent habitat monitoring in 2013 – 2015 has shown that there is a genuine improvement in condition from the previous assessment of unfavourable-bad status, but there is little evidence of improvements before 2012 so the case study describes mainly actions that have taken place since 2012, when habitat improvement started. A LIFE-funded project led by independent NGOs together with the responsible national authority restored habitat and reinstated grazing arrangements on ten Natura 2000 sites. Key successes were locally adapted restoration techniques informed by scientific monitoring (including topsoil removal and hydrological restoration); facilitation and motivation for local farmers to apply for the tailored agri-environment option and manage grazing with increasingly popular traditional breeds of livestock. Monitoring has demonstrated recovery and expansion of the characteristic saline plant species.

Author: Evelyn Underwood, Institute for European Environmental Policy.

10.44 Saker Falcon (*Falco cherrug*) – Hungary and Slovakia

The Saker Falcon (*Falco cherrug*), is a widespread bird of prey, occurring in steppe and forest-steppe zones from western China westwards across Russia to central and south-east Europe, where it is a rare species primarily occurring within the Carpathian basin. It is a relatively specialist bird of prey, as it normally requires short sheep-grazed grassland habitats where it mainly feeds on small to medium-size rodents; although it has become more adaptable in some parts of Europe where it now mainly feeds on birds. It is currently considered to be globally endangered, primarily as a result of habitat degradation and trapping for falconry in its main breeding areas in central Asia. In Europe, the Saker Falcon underwent considerable declines in the previous century, primarily as a result of habitat loss and degradation, and nest robbing; but it has subsequently shown population recoveries in Austria, Hungary and Slovakia, in part driven by concerted conservation efforts. Key conservation requirements have been identified and prioritised through action plans, and then implemented through a series of LIFE Nature programme projects. Of particular importance has been the guarding of nests, the provision of artificial nest sites where suitable nest sites are in short supply, the modification of electricity pylons and lines to prevent electrocution, and measures to maintain the

falcon's preferred habitat and increase its key prey (sousliks). Crucially these measures have been guided and facilitated by targeted research and monitoring, stakeholder dialogue and the raising of the public's awareness of the importance of the Saker Falcon and its conservation needs.

Author: Graham Tucker, Institute for European Environmental Policy.

10.45 Eastern Imperial Eagle (*Aquila heliaca*) - Slovakia

The Eastern Imperial Eagle is a resident, or partially migratory, eagle that is rare in Europe and confined to the steppes, plains and foothills of some central and south-eastern countries. Its overall European population declined rapidly in the second half of the 20th Century, mainly as a result of persecution, electrocution, changes in forestry and agriculture, and other causes of declines in its key prey species (i.e. small mammals). However, conservation efforts in central Europe have stabilised total numbers and populations have increased in Austria, Bulgaria, Hungary and Slovakia. The key conservation measures that led to the improvements were identified and encouraged through an EU Species Action Plan and, in Slovakia, a national recovery programme largely funded by the national nature authority and a 2003-07 LIFE Nature Programme project, AQUILA HELIACA. The most effective measures that were carried out included the declaration of SPAs for the species, management measures for the Natura 2000 network, the protection of nesting birds, the insulation of dangerous electricity pylons and development of safer pylons for future use, and awareness-raising and training activities, which raised the profile of the species and the importance of conservation actions for it.

Author: Tom Stuart, Institute for European Environmental Policy.

10.46 Northern Chamois (*Rupicapra rupicapra tatrica*) – Slovakia

The *tatrica* subspecies of Northern Chamois is endemic to the Tatra mountains of Slovakia and Poland, occurring entirely within protected areas. The population declined to a low point in 1999 in response to changes in the management and more disturbing recreational use of national parks, and, poaching. This trend was reversed through the implementation of site and species action plans, and in particular, the employment of 52 park guards (previously 1). As a result, the main population in Slovakia's Tatranský National Park rose from 162 individuals in 1999, to 488 in 2006 and then to 1,096 in 2012.

Author: Tom Stuart, Institute for European Environmental Policy.

10.47 European Bison (*Bison bonasus*) – Slovakia

European Bison was extinct in the wild from 1927 until 1952 when its reintroduction from captive-bred populations began in Poland. In 2004, international efforts to enlarge the wild population reached Poloniny National Park in eastern Slovakia. The Slovakian authorities managed the release programme and implemented a national species rescue plan during 2010–2015. Careful research, monitoring and planning of these actions together with national and European co-financing (especially through the European Regional Development Fund) were instrumental in the success of the projects. The most important specific measure contributing to the success of the reintroduction programme has been the construction and management of racks for supplemental feeding of European Bison in winter. Management of Poloniny National Park generally is also vital, and although somewhat delayed, the adoption of its management plan and budget allocations should secure the conservation of European Bison for the near future. The European Bison population in Slovakia has responded positively to the action taken, with population monitoring results of 0–9 individuals for 2001–06; 5–15 individuals for 2007–12 and the most recent count (2017) reaching 40 individuals.

Author: Tom Stuart, Institute for European Environmental Policy.

10.48 Mudflats and sandflats not covered by seawater at lowtide (1140), Salicornia and other annuals colonizing mud and sand (1310), *Spartina* swards (*Spartinion marritmae*) (1320), Atalantic salt meadows (Glauco-Puccinelletalia maritmae) (1330) – United Kingdom

Mudflats and sand flats are natural intertidal habitats that develop where the geology and topography of a coastline allows sediment to accumulate; with sandflats occurring in exposed high energy environments, and mudflats on sheltered coasts. *Salicornia* habitats, *Spartina* swards and Atlantic salt meadows usually comprise the upper vegetated portions of intertidal mudflats. These habitats mainly occur in sheltered areas of NW Europe, with the UK being particularly important for them and their associated species (e.g. wintering birds). The habitats are subject to a number of pressures, including pollution, shellfish harvesting and invasive alien species, but a particular important threat in the UK is 'coastal squeeze', which is where erosion occurs in front of a fixed sea wall that prevents the natural landward movement of habitats. Coastal squeeze is being exacerbated by sea-level rise and increasing severe storms resulting from climate change.

As a result of such pressures, each of the four habitats was also reported as having an unfavourable–bad conservation status in the UK over 2007-12. However, the trend was considered to be positive for mudflats and sand flats, and the other three habitat types had stable trends, all of which represented genuine improvements compared to their 2001-06 assessment. An important driver of these, albeit modest improvements, were two EU LIFE nature projects. The first project (UK marine SACs) developed management plans and schemes for some of the most important sites for the four-intertidal habitats (and others). The second project (Living with the Sea), developed a strategic framework, guidance and practical mechanisms for the management and maintenance of Natura 2000 sites on dynamic coastlines affected by erosion and coastal squeeze. A key component of this was the production of Coastal Habitat Management Plans (CHaMPs), which adopted an approach of working with natural processes, and then identified expected future habitat losses and the need for advance habitat compensation. Their findings were taken into account in the planning system and by environmental authorities, which helped to stimulate and guide managed realignment schemes that address flood defence challenges whilst also providing opportunities for the restoration or creation of inter-tidal habitats.

Author: Graham Tucker, Institute for European Environmental Policy.

10.49 Fisher's Estuarine Moth (Gortyna borelii lunata) – United Kingdom

Fisher's Estuarine Moh (*Gortyna borelii lunata*) was first recorded in Essex in 1968. It became soon apparent that this was its only site in the UK and that only a few adult individuals were present each year. This species relies on *Peucedanum officinale*, its sole larval food plant in the UK, and the distribution of this plant is limited to the north Essex and Kent coasts. The improvement in its conservation status has been achieved through a partnership project with a wide range of organisations, funded through higher tier agri-environment agreements. The targeted conservation actions included scrub clearance and grassland maintenance through rotational mowing to increase the larval plant density (together with planting), and captive breeding and release of egg batches. Key drivers of the success of these conservation measures have been the initial research activities and the transfer of knowledge to species conservation managers, the establishment of partnerships among a wide range of public and private organisations (e.g. Colchester Zoo), NGOs and academic institutions, as well as the active involvement of farmers and landowners with the establishment of financial incentives in exchange of land availability and favourable management practices. Evidence shows that the total current population can be estimated to be around 4,500 adult moths per year, compared with between 2,800 and 3,800 adult moths per year in 2000.

Author: Gustavo Becerra, Institute for European Environmental Policy.

10.50 Twaite Shad (Alosa fallax) – United Kingdom

The Twaite Shad is an anadromous fish species that lives in estuaries and inshore waters and migrates up rivers to spawn. It was once widely distributed across the EU, but is now only very locally distributed and its conservation status in the EU was assessed as unfavourable-bad. The decline of the Twaite Shad in the UK took place in the 19th century, mainly due to the construction of barriers to migration such as weirs. On the Teme and Severn rivers, which hold 57% of the UK potential breeding stock, the dramatic impact of these structures on shad populations was recorded only five years after their construction. Until recently, there were no targeted conservation actions for the species in the UK, which is one of the migratory fish species affected most severely by the presence of barriers. A new project will remove or adapt existing barriers to reopen 253 km of river habitat for the species. It is estimated that this will increase access to favourable spawning and juvenile habitat by almost three times and population increases are expected to occur quickly. This is expected to significantly improve its conservation status. Recent testing of suitable monitoring methods has created a baseline of population data against which the Twaite Shad population will be compared.

Key drivers of the success of Twaite Shad conservation in the UK have been improved monitoring informed by an international exchange of applied scientific knowledge and combined use of different methods, the careful identification and elimination of barriers to migration, and the involvement of the public in the monitoring of fish movements.

Author: Gustavo Becerra, Institute for European Environmental Policy.

10.51 Eurasian Bittern (Botaurus stellaris) – United Kingdom

The Eurasian Bittern is a widespread water bird in Europe, but due to its specialist habitat requirements for large wet reedbeds, it is relatively scarce and only occurs in scattered locations. It declined over much of Europe over the last century, mainly due to wetland loss and degradation (mainly due to natural succession as a result of inadequate habitat management); including in the UK where its population dropped to a low of 11 booming males in 1997. National extinction of the bittern was only averted through a concerted conservation effort involving statutory and NGO nature conservation organisations and local authorities. This started with an intensive research programme

that established the causes of the species' decline, its specific habitat requirements and related habitat management measures. Strategic planning of the location of habitat restoration and creation was then undertaken to increase the species' population and range, to reduce its fragmentation and to address the increasing risks of the loss of key sites as a result of coastal erosion, sea-level rise and climate change. A major programme of reedbed management, enhancement, restoration and creation was then undertaken, along with supporting actions (e.g. fish stocking, monitoring, outreach activities), mainly through two LIFE projects (totalling over €10.2 million) from 1996-2000 and 2002-2006. A significant contribution was also made through a wetland creation scheme that was required to meet planning conditions for a very large-scale gravel extraction site. The bittern population responded well, increasing to 40 booming males by 2006, 80 by 2012 and stood at 164 in 2017. Although the species population has recovered, and is much more resilient, on-going management of its reedbed habitat is required to keep it in the required condition, and further wetland restoration and expansion may be needed to sustain the population in the long-term.

Author: Graham Tucker, Institute for European Environmental Policy.

10.52 Eurasian Stone Curlew (*Burhinus oedicnemus*) – United Kingdom

The Stone Curlew is a wader that occurs on dry, open short-grazed grasslands and heathlands, reaching its northern limit in southern and south-eastern England. Its population declined sharply in the 20th century mainly due the loss and degradation of its semi-natural habitats, down to 150-160 pairs by the 1980's. However, it also adapted to breeding in sparse and short arable crops, but in such areas it has low breeding success due to the high risk of nest destruction due to agricultural operations. Conservation measures that started rated in 1980's led to its recovery through creation of suitable nesting and feeding habitat, including through specifically designed Stone Curlew plots of bare ground, supported by agri-environment schemes, and the protection of nesting birds from farming operations on unsafe areas outside the plots on arable land. This doubled the species population by the early 1990s. Conservation measures were also taken through a LIFE project to improve the suitability of the semi-natural grassland on Salisbury Plain (e.g. scrub clearance and the reinstatement of grazing).

Despite the range of conservation measures taken, in 2005 about 60% of the population was breeding on arable farmland and remained dependent on hands-on nest protection work. It was therefore recognised that this approach was unsustainable in the long term. A second LIFE project then aimed to secure the long-term future of the Stone Curlew through a transition to a more sustainable long term management approach. This primarily involved increasing the amount of safe nesting habitat for Stone Curlews, through the restoration of semi-natural grassland (to provide sufficient new nesting habitat to compensate for the need to reduce nest protection efforts on arable land); increasing and improving Stone Curlew nesting plots through agri-environment schemes. This was supported by community engagement efforts, designed to encourage people to value and appreciate Stone Curlews and participate in their conservation; and working with farmers and volunteers to enable them to take responsibility for Stone Curlew protection and monitoring; and thereby allowing the RSPB to reduce the time spent by its staff on nest protection. These recent conservation measures have been largely successful, with increases in semi-natural habitat and safe nesting habitats on arable farmland, and the breeding population increased to 400 pairs in 2015.

Author: Graham Tucker, Institute for European Environmental Policy.

10.53 Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) – United Kingdom

The Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) has shown marked declines in range in northwest Europe within the last 100 years, with its conservation status assessed as unfavourable-inadequate or bad in most regions. In the UK the species was assessed as favourable in the 2007-2012 reporting period, a genuine improvement from unfavourable-inadequate in the previous period, and the population trend is increasing.

Although recent climate change in the form of higher spring temperatures is likely to have been a key driver of reduced mortality, targeted conservation measures mandated by the UK Species Action Plan from 1998 onwards have also been significant drivers. The larger maternity and hibernation roost sites have been protected in Natura 2000 sites, through legal protection, physical stabilisation provided by building restoration, and barriers to human access to hibernation sites. As the species' specific maternity and hibernation roost site requirements are not provided by modern buildings and mining, it is important to protect all current roosts as roost availability may eventually limit population growth. This has been supported by greater reporting of illegal housing and other developments, increased awareness of pest controllers, and better planning guidance and practice. Foraging areas around the roosts have been improved and protected through targeted long-term higher level agri-environment agreements that have restored and maintained key landscape features such as hedges and maintained cattle-grazed pastures. Although some measures to reduce pesticide use (including avermectins in livestock) are no longer funded, and it is difficult to robustly prove impacts, the quality of the farmed environment in Wales and southwest England has improved since 2000 for the Greater Horseshoe Bat. NGO activities have played a key role in mobilising private funding, raising awareness, building contacts with landowners, and reporting incidents, though the UK government and EU funds continue to be the main source of funding.

Authors: Naomi Davis and Evelyn Underwood, Institute for European Environmental Policy.