EEA Technical report | No 2/2015

State of nature in the EU

Results from reporting under the nature directives 2007–2012

ISSN 1725-2237

European Environment Agency

State of nature in the EU

Results from reporting under the nature directives 2007–2012

European Environment Agency

Cover design: EEA
Cover photo: © Carlos Romao
Layout: EEA/Pia Schmidt

Legal notice
The contents of this publication do not necessarily reflect the official opinions of the European Commission or other institutions of the European Union. Neither the European Environment Agency nor any person or company acting on behalf of the Agency is responsible for the use that may be made of the information contained in this report.

Copyright notice
© European Environment Agency, 2015
Reproduction is authorised provided the source is acknowledged.

More information on the European Union is available on the Internet (http://europa.eu).

Luxembourg: Publications Office of the European Union, 2015

ISBN 978-92-9213-586-7
ISSN 1725-2237
doi:10.2800/603862

European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark

Tel.: +45 33 36 71 00
Web: eea.europa.eu
Enquiries: eea.europa.eu/enquiries

Contents

Authors and acknowledgements **5**

Summary **6**

1 Introduction **10**

1.1 Reporting under the Birds and the Habitats directives 11

1.2 Previous reporting under the Birds and Habitats directives 12

1.3 Article 12 and Article 17 reports (2007–2012) 12

2 Overall results from Article 12 reporting (Birds Directive) **15**

2.1 Population trends at Member State level 17

2.2 Population status at EU level 22

2.3 Pressures and threats 34

2.4 Data quality and completeness 36

3 Overall results from Article 17 reporting (Habitats Directive) **38**

3.1 Conservation status at Member State biogeographical and marine level 39

3.2 Conservation status at EU biogeographical and marine level 49

3.3 Pressures and threats 58

3.4 Data quality and completeness 62

4 Results by ecosystem **65**

4.1 Introduction 65

4.2 Terrestrial ecosystems 70

4.3 Freshwater ecosystems 96

4.4 Marine ecosystems 101

4.4. Open ocean ecosystem 114

5 Natura 2000 and conservation status **119**

5.1 Site classification, coverage, management and the evolution of the Natura 2000 network 119

5.2 Proportion of population/habitat area covered by the network 124

5.3 Trends and conservation status of species and habitat types 126

5.4 Conservation measures and their results 130

5.5 Land cover and the Natura 2000 network 135

5.6 Literature review 137

6 Measuring progress in implementing the EU 2020 Biodiversity Strategy 144

6.1 Measuring progress to Target 1 144

6.2 Target 3 — agriculture and forestry 151

Acronyms and abbreviations 167

References 169

Annexes A–F are available in a separate document on http://www.eea.europa.eu/publications/state-of-nature-in-the-eu

Authors and acknowledgements

EEA lead author

Carlos Romão

ETC/BD lead authors

Andreas Graf, Sandra Naumann, McKenna Davis, Holger Gerdes (Ecologic Institute);

Douglas Evans, Dominique Richard, Jérôme Bailly Maitre and Zelmira Gaudillat-Sipkova (Muséum National d'Histoire Naturelle).

European Red List of Birds Consortium authors (under contract with the European Commission)

Christina Ieronymidou (BirdLife International) and Wouter Langhout (Stichting BirdLife Europe).

Acknowledgements

Contributions from the European Topic Centre on Biological Diversity (ETC/BD)

Manuel Loehnertz (Geoville);

Marita Arvela, Mikael Baudet, Sabine Roscher, (Muséum National d'Histoire Naturelle);

Thomas Ellmauer and Dietmar Moser (Umweltbundesamt, Environment Agency Austria).

Many experts from the Nature Conservation Agency of the Czech Republic (AOPK), Institute of Landscape Ecology (Slovak Academy of Sciences) and the Swedish Species Information Centre who assisted with the Article 17 EU biogeographical and marine regional assessments.

Contributions from the European Red List of Birds Consortium

Ian Burfield, Rob Pople, Iván Ramírez and Andy Symes (BirdLife International).

Feedback from consultation

Eionet: National Reference Centres for Biodiversity.

Expert Group on Reporting under the Nature Directives (Directorate-General for the Environment, European Commission).

Summary

Introduction

This report describing the state of nature in the EU is based on reports from Member States under the Birds (2009/147/EC) and the Habitats (92/43/EEC) directives and on subsequent assessments at EU or EU biogeographical levels. This is the first time that the Member States' reports required by the Birds Directive have included information on population sizes and trends of birds; it is the second report under the Habitats Directive to provide information on the conservation status of habitats and species listed in the annexes to the directive. Although the bird reports cover all species of naturally occurring wild birds in the EU, reports under the Habitats Directive only cover a selection of habitats and species that were considered rare and/or endangered; therefore, it should not be surprising that the proportion of species with an unfavourable conservation status is higher for the Habitats Directive than for the Birds Directive.

In addition to an overview on species and habitats status, both at national and EU levels, this report analyses the situation per main ecosystem type. It also addresses the status of the Natura 2000 network and its possible contribution to the status of species and habitats. Finally, the report provides results on progress towards Targets 1 and 3 of the EU 2020 Biodiversity Strategy.

Therefore, this report provides, for the first time, comprehensive facts and figures on the status and trends of the species and habitats covered by the two EU nature directives, fully underpinned by the numerous reports submitted by Member States in 2013. However, there are still deficiencies in the quality and completeness of the data reported by Member States; these were communicated to Member States who, subsequently, submitted improved reports. In addition, further streamlining and harmonisation are needed at EU level to reduce differences in methodologies used by Member States that difficult aggregation and interpretation of data at the EU level. The quality of the data reported (often based on simple expert judgement) also indicates that Member States need to further develop or complement their inventories and monitoring schemes.

Birds Directive (Chapter 2)

This chapter provides an overview of bird population sizes and trends at national level (under Article 12) and EU population statuses for all bird species naturally occurring in Europe. Over half of the bird species in the EU (52%) are considered to be 'secure' (no foreseeable risk of extinction), and in general, wintering birds (mostly waterbirds) show increasing populations.

Many of the birds listed in Annex I of the Birds Directive, for which Special Protection Areas (SPAs) must be designated, have populations which are increasing, although often these species are not considered secure. This suggests that setting Natura 2000 sites is an effective conservation measure which also benefits non-target species, as illustrated in Chapter 4. Additionally, birds for which a Species Action Plan (SPA) has been agreed have a slightly higher proportion, with increasing populations. Unfortunately, many of the species listed in Annex II (species which may be hunted) are decreasing; the reasons for this are not clear.

The most frequently reported threats and pressures on EU birds are agriculture (including both intensification and abandonment), changes in hydrology (especially for wetlands) and exploitation (including hunting).

Member States reported for all naturally occurring breeding bird species, usually at species level, but sometimes for subspecies or populations (e.g. flyway populations), using a checklist agreed in advance. The number of breeding species and other taxa reported by the countries ranges from 27 (Malta) to 340 (Spain), with a considerable variation in bird statuses and trends reported. The countries also reported winter and passage populations for a selection of species, mostly waterbirds.

Habitats Directive (Chapter 3)

This chapter provides an overview of data and assessments reported by Member States (under Article 17) as well as of conservation status assessments at the EU biogeographical level. Assessments of EU

conservation status were made for all habitats and taxa (mostly species but also some subspecies or other taxonomic levels) which are listed in Annexes I, II, IV and V of the Habitats Directive, based on the reports received from Member States. A separate assessment was made for each biogeographical or marine region in which the habitat or species occurs. The conservation status can be favourable, unfavourable-inadequate and unfavourable-bad, or unknown, where data are not sufficient to allow an assessment. Additionally, trend of the conservation status was evaluated for unfavourable assessments and classified as unfavourable-improving, unfavourable-stable, unfavourable-declining, and unfavourable-unknown.

Species (Annexes II, IV and V)

Under a quarter of EU biogeographical species assessments (23%) are favourable, while more than half are unfavourable. Of the species assessments which are unfavourable, approximately a quarter (26%) are improving or stable, but 22% are deteriorating. More than one sixth (17%) of species assessments overall are unknown, with data on marine species being particularly incomplete, as over 50% of assessments are unknown for cetaceans and turtles.

There is considerable variation across biogeographical and marine regions. The biogeographical regions with the highest proportion of favourable assessments are the Alpine and the Black Sea regions; the Atlantic and the Boreal regions have the largest proportion of unfavourable-bad assessments. There is less variation across the taxonomic groups, with the proportion of assessments as favourable ranging between 29% for vascular plants and 17% for fish.

The two most frequently reported pressures and threats for species are associated with modification of natural conditions (mostly changes to hydrology) and agriculture, followed by natural processes. 'Modification of natural conditions', for example, is credited with over two-thirds of the reported pressures on fish, a third of the pressure on molluscs and a quarter of the pressure on amphibians. Pressures due to agriculture include both intensification and abandonment. 'Disturbances due to human activities', on the other hand, comprise less than a tenth of the high-ranked pressures, but account for a fifth of the pressures on mammals.

There is considerable variation across Member States, in both reported conservation status and trends. For example, the proportion of Member State assessments as favourable ranges from 16% (Austria) to 69% (Cyprus). The proportion of unfavourable assessments which are improving is particularly high in the Netherlands (41%), while the proportion those deteriorating is highest in Italy (40%).

Habitats (Annex I)

Of the EU assessments of Annex I habitats, 16% are favourable, with most being either unfavourable-inadequate (47%) or unfavourable-bad (30%). One-third of the unfavourable assessments are stable, with only 4% improving.

For the terrestrial biogeographical regions, the Alpine, Macaronesian and Steppic regions have the largest proportion of habitat assessments as favourable. The Atlantic biogeographical region has the lowest proportion of favourable assessments (9%), although it also has the highest proportion of unfavourable assessments which are improving (11%). The Boreal region has the highest proportion of unfavourable assessments which are deteriorating (close to 50%). The number of marine habitats listed in Annex I of the directive is very low (6 to 8 per region), and although there is variation between the regions, it is difficult to draw any reliable conclusions.

The two most frequently reported pressures and threats for habitats (both mentioned in 19% of Member State reports) are associated with agriculture (including both intensification and abandonment) and modification of natural conditions of waterbodies, mostly changes to hydrology.

As for species, there is considerable variation across countries, with the proportion of assessments reported as favourable ranging from 4% (the Netherlands) to 98% (Cyprus). The proportion of habitats reported as unfavourable-bad was highest (approximately 70%) in Belgium, Denmark and the United Kingdom, while Bulgaria reported no habitats as unfavourable-bad.

An ecosystem approach (Chapter 4)

This chapter examines the species and habitat assessments by ecosystem, using the typology developed for the Mapping and Assessment of Ecosystems and their Services (MAES) initiative of the European Commission. This typology divides ecosystems into three major groups: terrestrial (seven types), freshwater (one type) and marine (four types).

The statistics provided in the chapter concern the species and habitats associated with each of the ecosystems (although many species occur in more than one ecosystem), but they can be used as a proxy for the ecosystem 'condition'.

The 'sparsely vegetated land' ecosystem has the highest proportion of Habitats Directive assessments as favourable, although its proportion of secure bird assessments is the lowest. Amongst the non-marine ecosystems, 'rivers and lakes' and 'grassland' have the lowest proportion of Habitats Directive assessments as favourable and the highest as unfavourable.

The most frequently reported pressures and threats for terrestrial ecosystems are associated with agriculture and changes to hydrology. For freshwater ecosystems, changes in hydrology are most frequently reported as being important, although 'loss of habitat features or prey availability' is frequently reported for species, as is 'pollution to surface waters' for habitats.

Although marine ecosystems cover approximately half of the EU's area, there are very few Annex I habitats and a relatively small number of species listed in the annexes of the Habitats Directive. In addition, many of these species are considered 'occasional' or are reported as unknown (up to 83% in the open ocean ecosystem). The findings should thus be treated with caution, as they may not be representative of all marine ecosystems. The proportion of birds assessed as secure is relatively high (61%), compared to the other ecosystem groups.

The pressures and threats most frequently reported as important for marine ecosystems are fishing, particularly for species, followed by 'modification of natural conditions' (particularly for habitats) and 'pollution'. The two most commonly reported conservation measures are those to 'establish protected areas/sites' and for 'legal protection of habitats and species'.

Natura 2000 (Chapter 5)

Covering 18% of the EU's land surface and about 4% of its seas, the Natura 2000 network is the world's largest coordinated network of nature conservation areas. The network, formed by SPAs designated under the Birds Directive and Special Areas of Conservation (SACs) under the Habitats Directive, aims to contribute to the maintenance and/or restoration of a favourable conservation status for the target habitats and species. Although almost half the network was in place by 2000, it continued to grow during the reporting period (2007–2012), with the number of sites designated under the Habitats Directive increasing by over 9%, and the number of sites classified under the Birds Directive by near 12%. Some of this increase was attributable to the accession of Bulgaria and Romania in 2007, but there were also important additions from other countries, particularly those who had joined the EU in 2004, such as the Czech Republic, Estonia, Latvia, Lithuania and Poland.

Although the network is considered almost complete on land, its marine component is far from complete, particularly for offshore sites (i.e. those more than 12 nautical miles from the coast). However, there have been significant increases in the number and area of marine sites during the reporting period, particularly from France and the United Kingdom. The network continues to grow, for example with sites from Croatia when they joined the EU in 2013, and additional marine sites from Spain in 2014.

Though there is some variation between regions, coverage by the network of Annex I habitats and Annex II species is generally high for habitats and species with a more restricted area of distribution, but lower for habitats with large total areas and for species with large and widespread populations. No significant differences in coverage were found between biogeographic regions, habitats with different conservation status, or reported population size of Annex II non-bird species. Moreover, no clear pattern was found between coverage of bird species populations by Natura 2000 and EU bird population status, but bird species which have stable or fluctuating population trends at a national level tend to have a higher coverage by the network than those which are deteriorating.

Measuring the ecological effectiveness of a network of protected areas is difficult, as there are rarely baseline data and it is very difficult to find controls. As a result, there have been very few published studies of the effectiveness of international networks. However, a review of literature on Natura 2000 shows that while the network adequately covers most of the targeted terrestrial species and habitats, it could be improved in some areas. The review also demonstrates the role of Natura 2000 in improving the status of birds, including for common bird species, but it can find no similar studies for habitats or non-bird species. Natura 2000 hosts a large number of other species not covered by EU nature legislation, but the proportion of the populations in the network varies across species groups. Many studies highlight the need for improved and more regular monitoring of the habitats and species covered by the two directives.

Progress in implementing the EU 2020 biodiversity strategy (Chapter 6)

The EU 2020 Biodiversity Strategy includes 6 targets and 20 actions. Two of the targets make specific

mention of the status of species and habitats: Target 1 addresses nature conservation objectives through proper implementation of the nature directives, and Target 3 aims at increasing the contribution of agriculture and forestry to maintaining and enhancing biodiversity. Chapter 6 presents an assessment of progress to date.

Target 1 aims at halting the deterioration in the status of all species and habitats covered by the EU nature legislation and achieving a significant and measurable improvement in their status so that, by 2020, and as compared to the baseline (set in the previous Article 17 reporting period), 50% more species assessments of the Habitats Directive be either 'favourable' or 'improving', and 100% more habitat types assessments be 'favourable' or 'improving'. It also calls for a 50% increase in the number of bird species which are 'secure' or 'improving', as compared to the 2004 assessment (BirdLife International, 2004).

At this stage, only 21% of habitat assessments are favourable (over 16%) or improving (over 4%), which means there is still significant progress needed to meet the target (i.e. 34% in 2020). For non-bird species, the target (i.e. 25% in 2020) appears to have already been met, at first glance, with 23% of favourable assessments and a further 5% which are improving; however this is largely attributable to improved data and changes in methodology for the Member State assessments. In particular, many species assessments which were unknown in the 2001–2006 period are now either favourable or unfavourable. Additionally, significant proportions of the unfavourable assessments have further deteriorated (30% for habitats and 22% for species); even higher proportions of unfavourable assessments did not improve, or even deteriorated (42% for habitats and 33% for species).

Similarly there has been little progress towards Target 1 for birds (i.e. 78% in 2020), with no increase in the number of secure assessments (52%) and under 9% of the non-secure assessments improving. More than 16% of the bird species have both short-term and long-term population trends that are declining.

Habitats and species from the Habitats Directive related to 'agricultural ecosystems' ([1]) are doing worse than those related to other terrestrial and freshwater ecosystems, and there is no real improvement in their conservation status since the last reporting period. Almost 40% of habitat assessments and 22% of species assessments have further deteriorated. Nearly half (48%) of the bird species associated with agricultural habitats hold secure status, and 8% are not secure but improved, while 28% are not secure and have deteriorated. This is worse than for birds in other ecosystems. The threats and pressures most frequently reported as important for agricultural habitats and species include both intensification and abandonment.

Habitats and species from the Habitats Directive related to the woodland and forest ecosystems have a similar conservation status to habitats and species in general. From the unfavourable assessments, only 3% of habitats and 6% of species have improved, while 28% of habitats and 17% of species have deteriorated. Near two-thirds (64%) of bird species associated with the woodland and forest ecosystem hold secure status, and among the non-secure species, 7% are improving.

Therefore, the status of species and habitats is in general more positive for those associated with 'woodland and forest' ecosystems than for those associated with 'agricultural' ecosystems.

In short, progress towards Target 1 and Target 3, as measured by the status of species and habitats from the nature directives, has not been substantial; however, there is also a substantial proportion of unfavourable assessments that stabilised (neither improving nor deteriorating). The relatively high proportion of 'deteriorating' assessments indicate that substantial conservation efforts need to be implemented to revert current trends, particularly in common policies like agriculture and other land use policies.

([1]) Cropland and grassland from the MAES ecosystem typology (see Chapter 4).

1 Introduction

Nature and biodiversity policy in the European Union (EU) is largely based on two main pieces of legislation: the 1979 Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds) and the 1992 Habitats Directive (Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, later amended to accommodate EU enlargement) (see Box 1.1). Under Article 10 of the Birds Directive, Member States are asked to encourage research and work in support of the protection, management and use of the population of all species naturally occurring in their European territories (approximately 450 species). Under Article 11 of the Habitats Directive, Member States are requested to undertake surveillance of the 233 habitats and the more than 1 250 species and subspecies considered to be of Community interest, and listed in Annexes I, II, IV and V. Moreover, Article 17 of the Habitats Directive and Article 12 of the Birds Directive call for Member States to regularly prepare and submit national reports on progress made in implementing the directives, and for the European Commission to produce composite reports based on these national reports.

This report, covering the periods from 2008 through 2012 (Birds Directive) and 2007 through 2012 (Habitats Directive), is the first since the accession of Romania

Box 1.1 Further information on EU nature legislation ([2])

The Birds Directive ([3])
The Birds Directive aims to protect all European wild birds throughout their natural range within the EU; it identifies 193 species and subspecies of wild birds naturally occurring in Europe as being in need of special conservation measures. These species, listed in Annex 1 of the directive, are considered to have the following characteristics: to be in danger of extinction, to be vulnerable to specific changes in their habitat, to be rare, or to require specific attention because of their habitats. The Birds Directive bans activities that directly threaten birds, outlaws the practice of mass-scale and non-selective killing of birds, and promotes research for the protection, management and use of species covered by the directive. The Birds Directive also requires Member States to designate Special Protection Areas (SPAs) for the conservation of endangered bird species and for regularly occurring migratory species not listed in Annex I: these areas should provide physical protection for individual specimens, as well as ensure conservation of core breeding, resting and key passage sites.

The Habitats Directive ([4])
The Habitats Directive aims at ensuring the conservation of a variety of rare, threatened, or endemic species, including more than 1 250 species and subspecies ([5]) and 233 habitat types. For those species listed in Annex I and Annex II of the Habitats Directive, Member States must designate and manage appropriate Special Areas of Conservation (SACs). For species listed in Annex IV of the Habitats Directive, a strict protection regime must be applied across their entire natural range, both within the Natura 2000 ecological network and outside it. Moreover, Annex V lists the species for which management measures can be introduced to prohibit the use of non-selective methods of taking, capturing or killing certain animal and plant species of Community interest.

Both directives serve as the EU's instruments for implementing the 1979 Convention on the Conservation of European Wildlife and Habitats (the Bern Convention).

([2]) See http://ec.europa.eu/environment/nature/legislation/index_en.htm.
([3]) See http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm.
([4]) See http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm.
([5]) The number of species is approximate, as the directive includes some genera (e.g. Lycopodium) where the number of species present in the EU is not agreed.

and Bulgaria to the EU in 2007. The accession resulted in the addition of two new biogeographic regions, one marine region and a number of additional habitats and species. As such, this report provides us with the most comprehensive and systematic assessment of the state of nature and biodiversity conservation delivered by the EU to date, and includes all current EU Member States excepting Croatia ([6]).

Article 12 and Article 17 reporting contribute to the further development of EU and international biodiversity policy alike, by providing a reliable measure of the status and trends in nature at both species and habitat levels. The EU 2020 Biodiversity Strategy (EC, 2011) contains six mutually supporting and interdependent targets addressing the objectives of the 2020 biodiversity headline target, and aims at halting biodiversity loss and the degradation of ecosystem services.

Importantly, however, the strategy also aims to improve and streamline monitoring and reporting, and focuses on setting a reliable baseline upon which to measure progress. Frequent and reliable monitoring is needed to adequately address shortcomings in habitats and species protection, and if relevant, necessary actions and measures must be outlined to achieve this. In this context, findings from the assessment of Article 12 and Article 17 reporting, particularly for Target 1 ('Fully implement the Birds and the Habitats Directives') and Target 3 ('Increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity'), provide us with a first indication of EU progress in meeting these targets. Accordingly, they form a key component of the midterm review of progress in implementing the 2020 Biodiversity Strategy, and will be widely used to inform policy (including the EU's Fitness Check of EU nature legislation) in the context of the European Commission's Regulatory Fitness and Performance Programme ([7]).

1.1 Reporting under the Birds and the Habitats directives

Under Article 12 reporting, Member States provide the following: (a) general information about the implementation of the directive, and (b) reporting on the size and trend of individual bird species' populations and distributions, including main threats and pressures affecting species, as well as coverage by the SPA network and conservation measures taken for them (see Chapter 2). Article 17 requires Member States to make assessments of the conservation status of each species and habitat type at national biogeographical level; there is no assessment of conservation status by Member States for Article 12, as the term 'favourable conservation status' is not used in the Birds Directive. However, through a consultant (Red List of Birds Consortium), the European Commission assessed the status of bird populations, based on criteria and thresholds adapted from *Birds in the European Union* (BirdLife International, 2004) and endorsed by Member State representatives of the Ornis Committee.

Under Article 17 reporting, each Member State provides both the following: (a) general information on implementation; and (b) an assessment of the conservation status and trends of all species and habitats covered by the Habitats Directive, as well as supporting data such as species' population sizes and the habitats' surface areas ([8]). Monitoring of conservation status is an obligation arising from Article 11 of the Habitats Directive, and is not limited to Natura 2000 sites. EU regional assessments of conservation status are made by the European Environment Agency (EEA) and its European Topic Centre on Biological Diversity (ETC/BD), based on data and assessments reported by Member States (see Chapter 3).

Although the Birds and Habitats directives initially followed different reporting procedures and frequencies, in 2011 the Member States and the Commission agreed to revise reporting under the Birds Directive, in order to streamline reporting with requirements of the Habitats Directive. Consequently, reporting under Article 12 now takes place every 6 years (the previous reporting cycle was 3 years). This change helps synchronise Article 12 and Article 17 reporting and provide information in policy-relevant cycles. Therefore, this technical report, based on Member State reports as required by Article 12 of the Birds Directive and Article 17 of the Habitats Directive, covers the reporting periods from 2008 to 2012 for the Birds Directive and from 2007 to 2012 for the Habitats Directive.

([6]) Croatia joined the EU in 2013, after the reporting period, and is thus not included in this report; therefore, there are no reports for the 2 habitat types and 13 species added as a consequence of Croatia joining the EU.
([7]) See http://ec.europa.eu/environment/nature/legislation/fitness_check/index_en.htm.
([8]) A more detailed description of the reporting methodologies used for reporting can be found in Chapters 2 and 3: these chapters focus on overall results from Articles 12 and 17 reporting, respectively.

Further information on reporting under both directives is available on two dedicated websites:

- the Reference Portal for Article 17 of the Habitats Directive (see http://bd.eionet.europa.eu/article17/reference_portal);
- the Reference Portal for Article 12 of the Birds Directive (see http://bd.eionet.europa.eu/activities/Reporting/Article_12/reference_portal).

1.2 Previous reporting under the Birds and Habitats directives

Member States have been submitting reports under Article 12 of the Birds Directive since 1981; the last report covered the period from 2005 to 2007. However, Article 12 reports to date have primarily focused on the legal transposition and technical implementation by Member States, and have provided no information on the status of birds.

The first Article 17 reports under the Habitats Directive covered the period from 1994 to 2000 (EC, 2003); they primarily addressed the transposition of the directive into national legislation, and focused on progress made in identifying and designating SACs. The second Article 17 reports (EC, 2009) for the period from 2001 to 2006 included the first reports from the 10 Member States that joined the EU in 2004; they also included, for the first time, assessments of the conservation status of the habitats and species of Community interest. Data and analyses of the 2001–2006 reporting period, including the EU biogeographical assessments of conservation status, the summary of results by the EEA's ETC/BD, and the European Commissions' Composite Report, can be found online ([9]). For more information on past, current and future Article 17 reporting, see Table 1.1 below.

1.3 Article 12 and Article 17 reports (2007–2012)

Under the new streamlined procedures for reporting under the nature directives (i.e. the Birds and Habitats directives), Article 12 national reports were due on 31 December 2013, and Article 17 reports on 30 June 2013. The EEA and the ETC/BD gave Member States feedback based on a quality assessment and control for these data, and asked Member States to make corrections where necessary. Scoreboards on timely delivery and conformity are available online ([10]).

Table 1.2 shows the number of bird species, non-bird species and habitats assessments, as well as the number of Article 12 and Article 17 reports provided by Member States. This number differs from the total number of reports used for analysis in the following chapters, as certain reports were not included in the individual analyses, due to missing data or specific methodological and statistical issues. As such, the number of reports used for analysis is indicated separately for each analysis.

Member States' reports are stored in the EEA's Central Data Repository (CDR). A web tool for Article 12 reporting designed by the ETC/BD and co-developed by the EEA gives access to both EU population status

Table 1.1 Overview of past, current and future Article 17 reporting

Reporting period	National report (EU composite report)	Main focus
1. 1994–2000	2001 (2003)	Progress in legal transposition and implementation of the directive; progress in establishing the Natura 2000 network, administrative aspects.
2. 2001–2006	2007 (2009)	First assessment of conservation status based on best available data.
3. 2007–2012	2013 (2015)	Second assessment of conservation status. Assessment of effectiveness of measures taken for the Natura 2000 network under the directive.
4. 2013–2018	2019 (2020/2021)	Third assessment of conservation status and of effectiveness of measures taken for the Natura 2000 network under the directive.

Source: See http://ec.europa.eu/environment/nature/knowledge/rep_habitats/index_en.htm.

([9]) See http://bd.eionet.europa.eu/activities/Reporting/Article_17/Reports_2007.
([10]) See http://bd.eionet.europa.eu/activities/Reporting/Article_17/Reports_2013/Member_State_Deliveries and http://bd.eionet.europa.eu/activities/Reporting/Article_12/Reports_2013/Member_State_Deliveries.

Box 1.2 Further use of monitoring and assessment data

The 2001–2006 national and EU reports represented a tremendous improvement in our general understanding of the conservation status of species and habitats of Community interest. Although European and global Red Lists existed for some species groups, nothing similar had ever been published for habitats. For the first time, these changes were broadly reported and systematically assessed, allowing policymakers, non-governmental organisations (NGOs), experts and the interested public to get a better picture of the state of nature in the EU. As such, they have served as very useful background documents to guide discussions within the recently launched series of biogeographical seminars focused on management of Natura 2000 sites, setting national strategies and determining government commitments on financing and monitoring ([11]).

The release of the EEA ETC/BD online report in 2009 was appropriately timed: preceding the 2010 International Year of Biodiversity and the EU's own assessment of whether it would meet its 2006 Biodiversity Action Plan goal to halt biodiversity loss by 2010. As such, previous reporting has been instrumental in helping EU leaders to recognise that the EU would not reach the 2010 target, and to identify biodiversity loss as 'most critical global environmental threat alongside climate change' (EC, 2011). Moreover, it has helped lead decision-makers to endorse the Commission's long-term vision for biodiversity until 2050 and ambitious headline target to reverse biodiversity loss by 2020, and to shape the new EU 2020 Biodiversity Strategy. More specifically, data from the previous report have provided valuable input in defining Target 1 of the EU 2020 Biodiversity Strategy and setting a quantitative 2010 baseline to further assess progress made in establishing the status of species and habitats towards 2020.

assessments for bird species, and information on breeding populations, breeding ranges and winter populations for EU and Member States ([12]). A similar web tool for Article 17 gives access to both Member State biogeographic assessments and EU biogeographic assessments from the EEA and ETC/BD, either for a single region or for all regions in which the habitat or species occurs ([13]). These web tools also provide a data summary sheet for each species and habitat, and a distribution map.

([11]) See http://ec.europa.eu/environment/nature/natura2000/seminars_en.htm.
([12]) See http://bd.eionet.europa.eu/article12.
([13]) See http://bd.eionet.europa.eu/article17/reports2012.

Table 1.2 Number of reports received under Article 12 and Article 17 reporting

Member State	Art. 12 reports	Art. 17 reports			Total number of reports (both directives)
	Bird species	Habitats	Species	Total	
Austria (AT)	258	124	340	464	722
Belgium (BE)	267	93	137	230	497
Bulgaria (BG)	438	187	440	627	1 065
Cyprus (CY)	150	43	56	99	249
Czech Republic (CZ)	50	93	273	366	416
Germany (DE)	361	192	374	566	927
Denmark (DK)	230	111	130	241	471
Estonia (EE)	266	60	99	159	425
Spain (ES)	485 (*)	244	689	933	1 418 (*)
Finland (FI)	284	92	164	256	540
France (FR)	402	302	707	1 009	1 411
Greece (GR)	0	0	0	0	0
Hungary (HU)	248	46	209	255	503
Ireland (IE)	196	58	69	127	323
Italy (IT)	305	262	561	823	1 128
Lithuania (LT)	252	54	99	153	405
Luxembourg (LU)	175	28	66	94	269
Latvia (LV)	265	57	114	171	436
Malta (MT)	27	30	57	87	114
Netherlands (NL)	260	52	116	168	428
Poland (PL)	317	116	281	397	714
Portugal (PT)	333 (*)	156	462	618	951 (*)
Romania (RO)	361	168	575	743	1 104
Sweden (SE)	320	187	287	474	794
Slovenia (SI)	263	89	330	419	682
Slovakia (SK)	245	101	320	421	666
United Kingdom (UK)	501 (*)	87	147	234	735 (*)
European Union (EU-27)	**7 259 (*)**	**3 032**	**7 102**	**10 134**	**17 393 (*)**

Note: (*) Figures for Portugal include the Azores and Madeira, for Spain, the Canary Islands and for the United Kingdom, Gibraltar.

Greece did not submit reports for Article 12; for Article 17, delivery was well beyond the agreed cut-off dates for the EU assessments and preparation of this report.

This table records the number of reports received, including reports for occasional, vagrant, etc. species which have been excluded from statistics presented elsewhere in this report.

Source: EEA, 2014, Central Data Repository, European Environment Agency, Copenhagen (see http://cdr.eionet.europa.eu).

2 Overall results from Article 12 reporting (Birds Directive)

Article 12 of the Birds Directive requires that Member States regularly prepare and submit reports on progress made in national implementation of the Birds Directive. In 2011, the Commission, in agreement with Member States, revised the reporting procedure and frequency in order to focus reporting obligations on the status and trends of bird populations, thereby streamlining reporting under Article 12 of the Birds Directive with reporting on conservation status under Article 17 of the Habitats Directive. From 2008 to 2012, guidelines for reporting were produced by the N2K Group under contract with the European Commission (N2K Group, 2011) and were endorsed by Member States; reports were submitted in 2013–2014.

Article 12 reports prepared by Member States comprise two sections: (a) general information about the implementation of the Birds Directive, including main achievements, classification of SPAs, SPA management plans and details of any introductions of non-native bird species; and (b) reports on the size and trend of populations and distribution of individual bird taxa, including sections for reporting on the main threats and pressures affecting taxa for which SPAs have been classified (designated 'SPA trigger species'), as well as their coverage by the SPA network and relevant conservation measures taken.

Checklists of the bird taxa covered by the Birds Directive and their occurrence per Member State were prepared in consultation with Member States, and are available on the Article 12 Reference Portal ([14]).

Reporting was by subspecies or other subspecific units where subspecies are listed in Annex I of the Directive, for:

- subspecies for which international Species Action Plans (SAPs), Management Plans (MPs) or Brief Management Statements (BMSs) have been prepared ([15]);
- subspecies or distinct flyway populations listed in Column A of Table 1 of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) 'Status of the Populations of Migratory Waterbirds (2009–2012) ([16]);
- subspecies or distinct populations of species classified as globally threatened or near threated, according to the International Union for Conservation of Nature (IUCN) 2010 Red List.

Member States also reported on the presence status of bird taxa (i.e. present, newly arriving and extinct). The statistics, figures and tables presented in this report are based on taxa that Member States reported as nationally 'present' or 'extinct after 1980', i.e. extinct after the Birds Directive came into force ([17]).

Table 2.1 summarises the Article 12 reports submitted by Member States for the reporting period from 2008 to 2012. No data were received for Greece, and the Czech Republic only reported Annex I breeding bird taxa.

([14]) See http://bd.eionet.europa.eu/activities/Reporting/Article_12/reference_portal.
([15]) For SAPs and Brief Management Statements, see http://ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/index_en.htm. For management plans for huntable species, see http://ec.europa.eu/environment/nature/conservation/wildbirds/hunting/managt_plans_en.htm.
([16]) See http://www.unep-aewa.org/en/documents/agreement-text.
([17]) In practice, the Birds Directive came into effect across a range of different times in Member States, depending on their dates of accession to the EU.

Table 2.1 Number of Article 12 reports delivered by each Member State (2008–2012), with separate figures for subnational units for some countries (Portugal, Spain and the United Kingdom)

Member State	Breeding	Wintering	Passage	BD Annex I	SPA Trigger	Non-native	Total
Austria	219	19	20	81	106	3	258
Belgium	185	56	26	69	93	2	267
Bulgaria	256	71	111	173	285	1	438
Cyprus	95	31	24	54	56	0	150
Czech Republic	40	5	5	44	50	0	50
Germany	250	78	33	119	179	2	361
Denmark	193	37	0	49	66	2	230
Estonia	219	20	27	72	99	0	266
Spain	340	92	53	189	335	1	485
Spain	261	92	53	155	305	1	406
ESIC	79	0	0	34	30	0	79
Finland	250	11	23	80	111	2	284
France	294	61	47	139	210	2	402
Hungary	218	13	17	85	109	1	248
Ireland	136	57	3	38	80	3	196
Italy	268	33	4	100	112	14	305
Lithuania	214	16	22	81	77	0	252
Luxembourg	131	24	20	35	68	3	175
Latvia	218	24	23	77	111	1	265
Malta	24	3	0	4	3	0	27
Netherlands	188	57	15	65	108	3	260
Poland	238	28	51	93	191	4	317
Portugal	272	59	2	101	101	2	333
Portugal	196	59	2	80	78	2	257
PTAC	34	0	0	9	9	0	34
PTMA	42	0	0	12	14	0	42
Romania	253	42	66	145	176	1	361
Sweden	263	26	31	88	141	2	320
Slovania	210	47	6	70	56	1	263
Slovakia	222	16	7	78	91	1	245
United Kingdom	277	97	127	117	278	26	501
United Kingdom	244	68	4	71	129	26	316
GIB	33	29	123	46	149	0	185

Notes: The total number of reports is 7 259. ESIC = Spain/Canary Islands; GIB = United Kingdom/Gibraltar; PTAC = Portugal/Azores and PTMA = Portugal/Madeira. Greece did not provide an Article 12 report.

Source: EEA, 2014, Central Data Repository, European Environment Agency, Copenhagen (see http://cdr.eionet.europa.eu).

2.1 Population trends at Member State level

Member States reported population data including population trends for 2 periods (short term, i.e. 12 years: ideally 2001–2012; and long term, i.e. 32 years: ideally since 1980) for all regularly occurring breeding species. Information was also reported for regularly occurring wintering waterbirds and for species whose passage populations trigger the designation of SPAs.

No data were received for Greece for the reporting period from 2008 to 2012, while the Czech Republic only reported on Annex I breeding bird taxa. Croatia did not join the EU until 2013, and so did not report for the 2008-to-2012 period.

The avifauna of the EU is extremely variable and the number and type of species occurring in different Member States reflects this variability. Therefore, part of the differences between Member States in terms of population sizes and trends is due to that variability.

2.1.1 Results of assessing population trends of breeding birds at Member State level

This section presents the results of assessments of naturally occurring wild breeding bird taxa. Details on individual country assessments are provided in the national summaries, available on the Article 12 web pages (see http://bd.eionet.europa.eu/activities/Reporting/Article_12/Reports_2013). In total, Member States provided 5 473 reports for breeding birds, covering 455 wild breeding bird taxa.

The short-term trends in Member States indicate a high degree of change in the breeding bird populations. France, Malta, the Netherlands, Poland and the United Kingdom reported more than 30% of short-term trends as increasing ([18]), while Denmark, Estonia, Germany, Luxembourg, the Netherlands, Slovakia and the United Kingdom reported more than 30% of short-term trends as decreasing (see Figure 2.1). There is no clear geographic pattern discernible in these trends.

It is difficult to compare long-term breeding population trends between Member States, as many Member States have a high share of unknown trends. Austria, Hungary, Ireland, Poland, Portugal and Romania reported more than 50% of long-term trends as unknown. Romania also reported more than 50% of short-term trends as unknown (see Figure 2.2).

2.1.2 Results of assessing population trends of wintering bird taxa at Member State level

This section presents the results of assessments of some regularly occurring wintering birds. Although the guidelines request information on wintering waterbirds, some countries also reported other species such as *Tetrax tetrax, Sturnus vulgaris* and *Pyrrhocorax pyrrhocorax*. Details on individual country assessments are provided in national summaries, available on the Article 12 web pages (see http://bd.eionet.europa.eu/activities/Reporting/Article_12/Reports_2013 online). In total, Member States produced 1 023 winter bird reports, covering 190 wintering bird taxa.

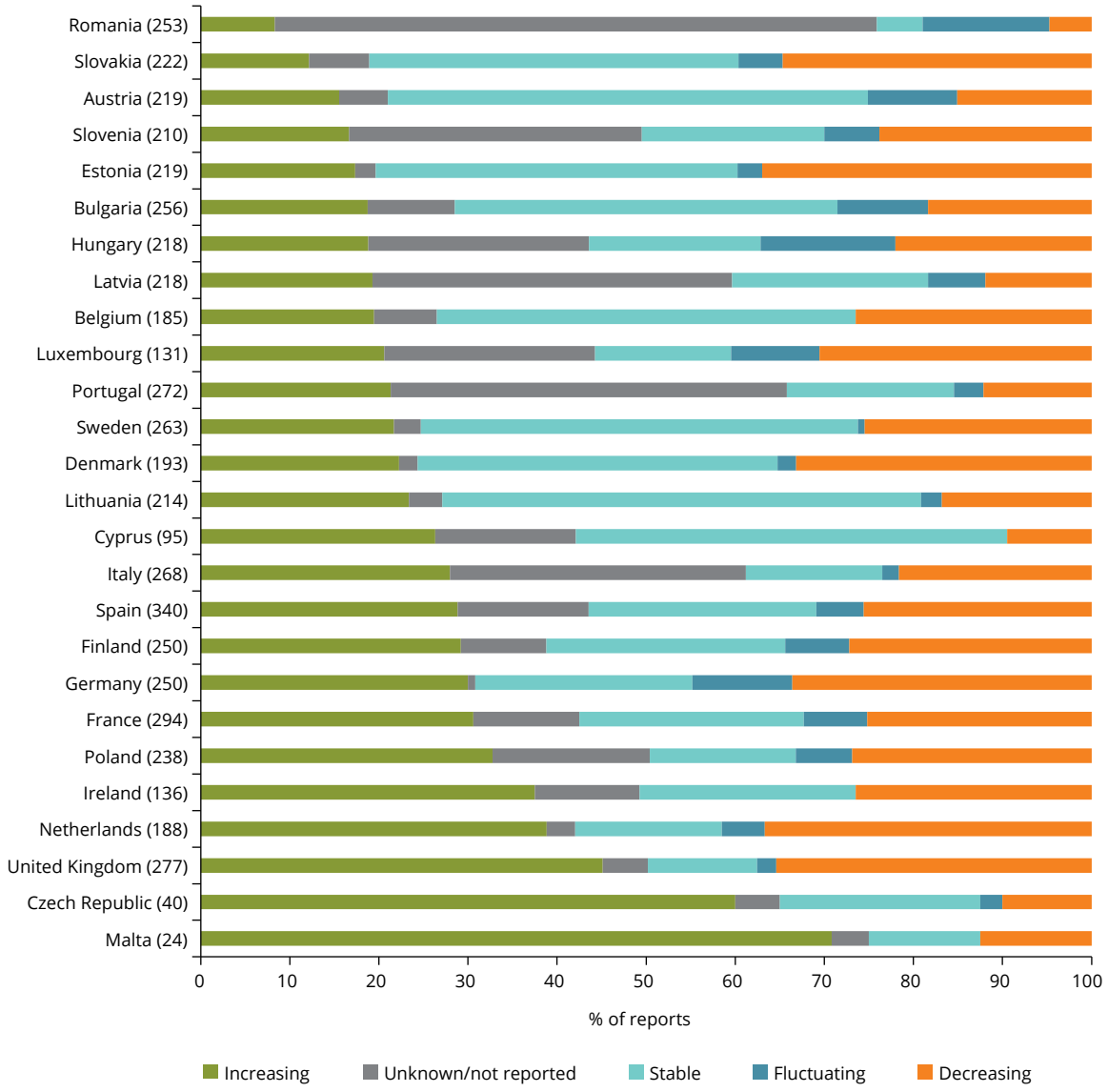
Short-term trends in the Member States show an increasing trend for a relatively high proportion of the wintering populations. Austria, Cyprus, Denmark, Finland, France, Italy, the Netherlands, Portugal, Slovakia, Spain and Sweden reported more than 30% of short-term trends as increasing. Only Belgium and the United Kingdom reported more than 30% of short-term trends as decreasing (see Figure 2.3). There is no clear geographic pattern discernible in these trends.

Long-term trends in the Member States also show an increasing trend for a relatively large number of the wintering populations. Austria, Cyprus, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Luxembourg, Malta, the Netherlands, Slovakia, Spain, Sweden and the United Kingdom reported more than 30% of long-term trends as increasing. Only Slovenia reported more than 30% of long-term trends as decreasing (see Figure 2.4). There is no clear geographic pattern discernible in these trends.

Some Member States have a high share of unknown trends. Belgium, Ireland, Lithuania and Romania reported more than 50% of long-term trends as unknown. Belgium, Malta and Poland reported more than 50% of short-term trends as unknown.

([18]) The Czech Republic was excluded from this assessment, as no reports were submitted on non-Annex I breeding bird taxa.

Figure 2.1 Short-term trends of breeding bird populations, by Member State

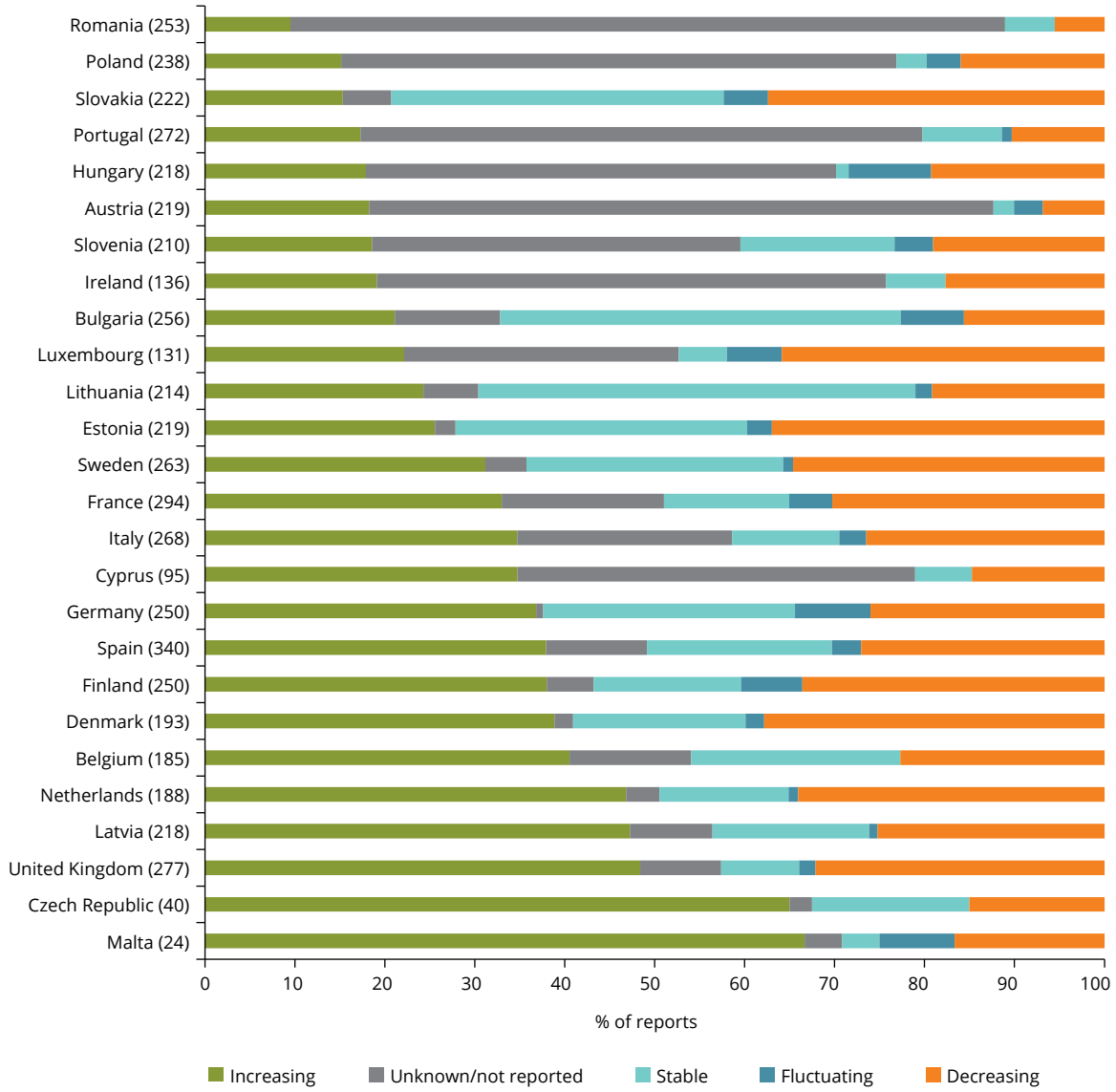


Notes: The number of assessments is indicated in parentheses. The total number of assessments is 5 473.

Data for the Czech Republic only cover Annex I species. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 2.2 Long-term trends of breeding bird populations, by Member State

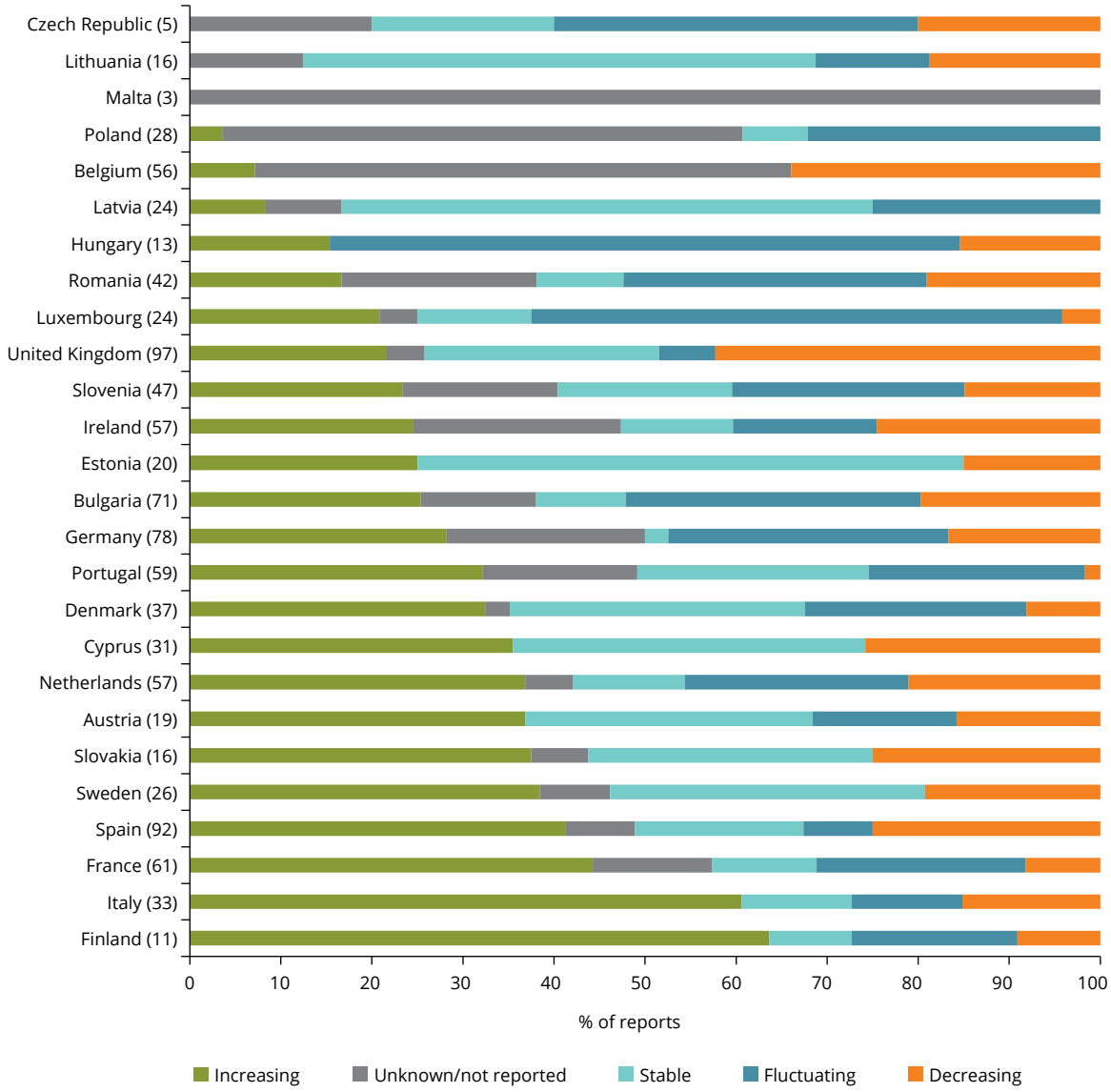


Notes: The number of assessments is indicated in parentheses. The total number of assessments is 5 473.

Data for the Czech Republic only cover Annex I species. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 2.3 Short-term trends of some wintering bird populations, by Member State

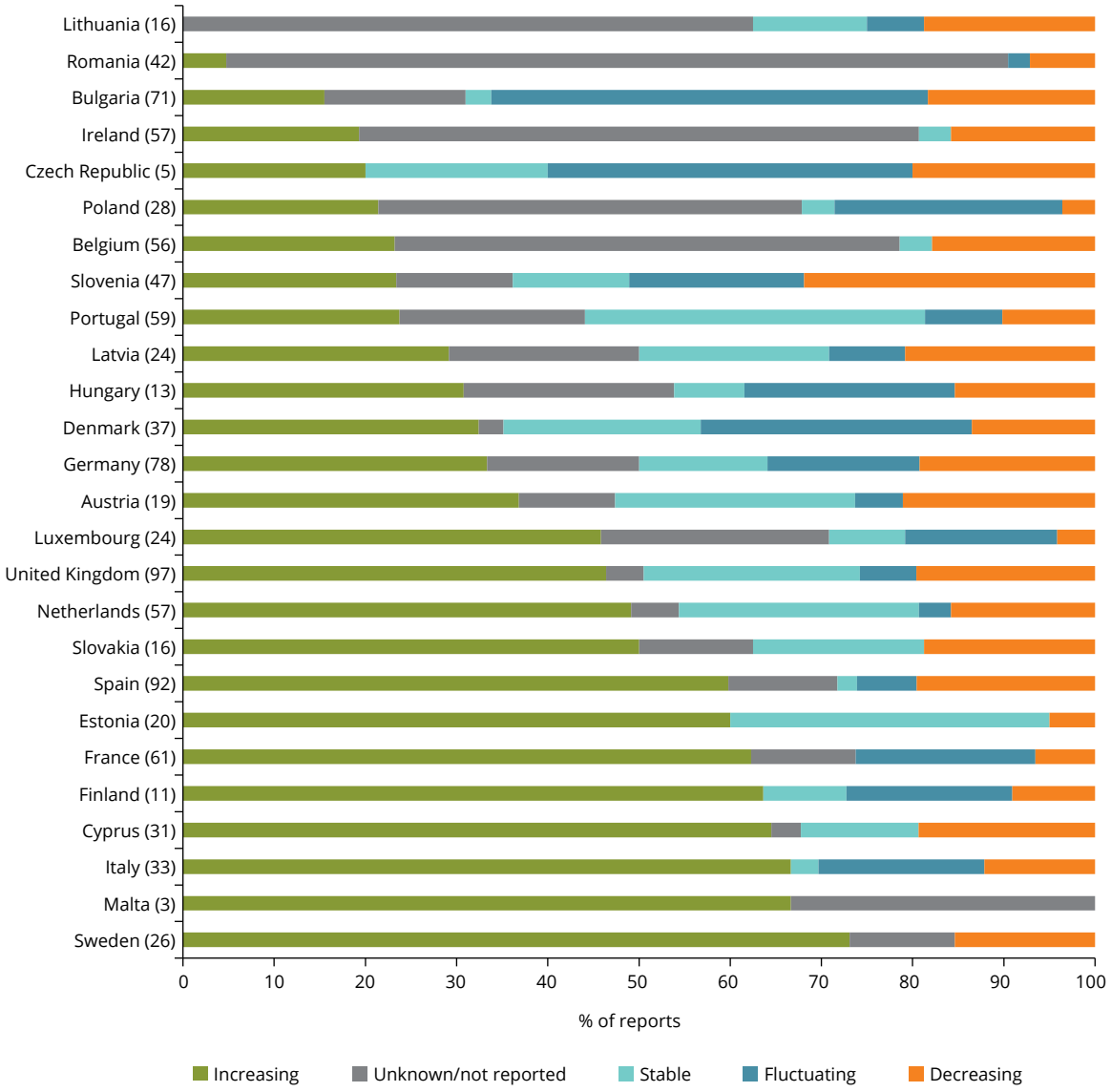


Notes: The number of assessments is indicated in parentheses. The total number of assessments is 1 023.

The Czech Republic only reported Annex I species. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 2.4 Long-term trends of some wintering bird populations, by Member State



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 1 023. The Czech Republic only reported Annex I species. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

2.2 Population status at EU level

2.2.1 Methodology to assess population status at EU level

National data were combined to produce overall EU population sizes and trends for each taxon. A degree of caution must be taken into consideration when combining data, as different Member States used different methodologies for estimating population sizes and trends, and potentially adopted differing interpretations of some aspects of the guidance on reporting (e.g. stable trend direction was not explicitly defined). For population size, the reported minimum and maximum population size data across all Member States were summed to calculate the overall EU minimum and maximum population size of each bird taxon.

To allow total EU population species sizes to be calculated, all Member States were requested to report their national data using a common population unit. Population units for most breeding birds were breeding pairs (excepting a minority of taxa with unusual or complex breeding biology or cryptic behaviour, for which other units, such as calling or lekking males, were used); for wintering birds, units were individuals. These population units were agreed during the consultation for the Member State species checklists. In cases where population size data were reported in population size units different to those specified for Article 12 reporting, the reported values were converted to the appropriate units based on expert opinion and with reference to any relevant national sources.

For population trends, data from all Member States were combined, weighting each Member State's contribution according to the size of its population. With the agreement of the European Commission, population data from NGOs were used for all species in Greece, and for non-Annex I species in the Czech Republic. Weightings were based on the geometric mean of the Member State's minimum and maximum population size compared to the geometric mean of the equivalent totals for the overall EU population. This analysis was carried out using a dedicated tool developed by the IUCN to estimate overall trends based on data from multiple (national) subpopulations ([19]).

Trend information reported as unknown and missing information (e.g. trend magnitude not reported) was problematic for the analysis and evaluation of the EU trends and status (see Section 2.4). Where trend directions were reported as unknown for more than half the total EU population (based on geometric means), the overall EU trend was classified as unknown, as the true actual trend of the unknown populations could plausibly have driven the overall EU trend in the opposite direction to that of the reported populations. Where trend directions were reported as unknown for less than half of EU populations, but allocating a trend category with confidence was not possible due to conflicting trend information or lack of trend magnitudes, the overall EU trend was classified as uncertain. Where possible, the robustness of trend categories in terms of the effects of missing data were tested using plausible 'good' and 'bad' scenarios, based on other sources of information, such as any other trend information reported by the Member State, or recent national Red Lists.

EU population status was assessed using an agreed standardised methodology ([20]). The methodology aims to maintain as much comparability as possible with that used to calculate the baseline for Target 1(ii) for birds under the EU's Biodiversity Strategy for 2020 (BirdLife International, 2004), and to maximise use of the data reported by Member States under Article 12. Table 2.2 summarises the criteria and thresholds used to assess the population status of birds in the EU.

Table 2.2 Criteria and thresholds used to assess EU population status

EU population status category	Brief description of criteria and thresholds
Threatened	Meets any of the IUCN Red List criteria for threatened, at EU-27 scale.
Near threatened	Close to meeting IUCN Red List criteria for threatened, at EU-27 scale.
Declining	EU-27 population or range declined by ≥ 20% since 1980, with continuing decline since 2001.
Depleted	EU-27 population or range declined by ≥ 20% since 1980, but no longer declining since 2001.
Secure	Does not currently meet any of the criteria above in EU-27.
Unknown	Inadequate information available to assess EU-27 status.

([19]) Available at http://goo.gl/yZLATv from http://www.iucnredlist.org/technical-documents/red-list-documents.
([20]) See https://circabc.europa.eu/sd/a/4b101339-6e13-4379-ada5-400e5d1ec8ac/Point%203%20-%20Background-Paper-%2021%20Nov%20 2013%20.pdf.

The first step in the EU population status assessment process is assessing whether taxa are regionally threatened or near threatened, i.e. if they meet or are close to meeting any of the IUCN Red List criteria at the EU-27 scale ([21]), ([22]), ([23]). This process feeds directly into the EU Red List of Birds that is being prepared in parallel, as a core deliverable of the European Commission–funded contract led by BirdLife International to support Article 12 reporting. For this reason, overall regional population status assessments at EU level were carried out at species level, following BirdLife International's current taxonomy ([24]).

Population size and trend data for any bird taxa which Member States reported at subspecific or flyway level were aggregated to species level. In the few cases where a taxon had been 'split' into two species since the production of the Article 12 reporting checklist, Member State–reported data were assigned to the appropriate species, in consultation with relevant experts.

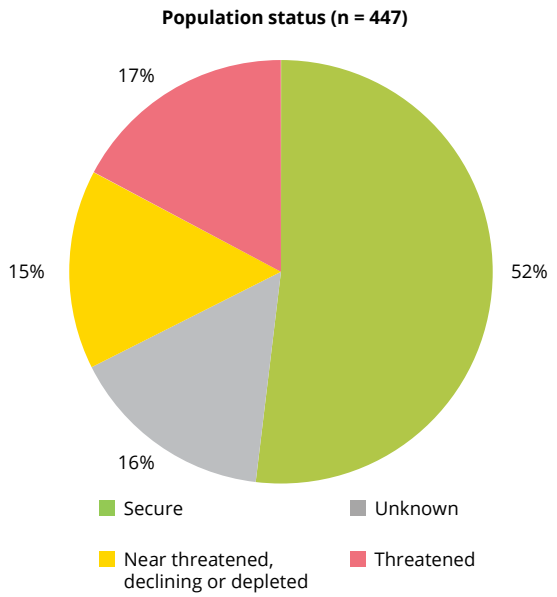
For the majority of species, EU population status assessments were based on data from the breeding season, but for a minority of species, winter data were (also) used. Winter reports were only required for a subset of species, mainly wintering waterbirds, and especially migratory wildfowl and waders, whose populations are often best monitored in the winter when they congregate in large numbers. In certain cases, Member States reported on taxa not required in winter; for some taxa, winter reports were not provided by all relevant Member States. Therefore, it was only possible to assess overall trends for 81 taxa for which Member State coverage of reported data was representative of the overall EU population (see Table B.1 in Annex B). The EU population status of species that do not breed (regularly) within the EU was based solely on winter data (13 taxa), while for species that occur in both seasons, the assessment process was carried out independently on data for both breeding and wintering populations. During winter, individuals can be much more mobile, which could potentially complicate the aggregation of the Member States data. However, most of the species for which winter data were requested are covered by coordinated international schemes, such as the African-Eurasian Waterbird Census (coordinated by Wetlands International), that take this into account. Furthermore, for some species in winter, underlying population trends can be obscured by demographic factors, often related to inter-annual variations in weather conditions. In some years, for example, birds that usually winter in the EU may be forced to move elsewhere to escape harsh winter conditions; in others, birds that usually winter outside the EU may show marked influxes into the region.

Consequently, EU population status assessments were carried out principally on the basis of breeding data, provided that the resulting status category was the same as or higher than (i.e. more threatened) that obtained using winter data. The reported EU population status was based on winter data for three species which also breed in the EU (*Calidris maritima, Calidris minuta,* and *Clangula hyemalis*)

2.2.2 Results of assessing population status of birds at EU level

In total, EU countries produced population status assessments for 447 bird species. Results of the assessment (see Figure 2.5) of population status indicate that 52% of bird species assessed have a secure population in the EU, 17% a threatened population, and 15% a near threatened, declining or depleted population. The population status of 16% of the bird species in the EU is unknown (see Section 2.4).

Figure 2.5 EU population status of bird species



Notes: The total number of assessments is 447 (only species were assessed).

Source: EEA, 2015a, Article 12 reports and assessments.

([21]) See http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria.
([22]) See http://www.iucnredlist.org/documents/reg_guidelines_en.pdf.
([23]) See http://jr.iucnredlist.org/documents/RedListGuidelines.pdf.
([24]) See http://www.birdlife.org/datazone/info/taxonomy.

2.2.3 Results of assessing population trends of breeding bird taxa at EU level

In total, 454 EU-27 short-term and 455 long-term breeding population trends were produced for birds ([25]). Results of the assessments of short-term breeding population trends (see Figure 2.6a) indicate that 30% of the short-term trends are decreasing, 28% are increasing, 21% are stable and 2% are fluctuating. The short-term trends of 19% of breeding bird taxa are unknown (short-term trend direction was reported as unknown for more than 50% the total EU-27 population) or uncertain (could not be assigned to any category with sufficient clarity).

Assessment results of the long-term breeding population trends (see Figure 2.6b) indicate that 27% of the long-term trends are decreasing, 31% are increasing, 11% are stable and 1% are fluctuating. The long-term trends of 30% of the breeding bird taxa are unknown or uncertain.

For short-term and long-term breeding population trends, the following observations were made.

- Slightly more breeding bird taxa in the EU are assessed as having a decreasing short-term population trend than as having a decreasing long-term trend. Conversely, more breeding bird taxa are assessed as having an increasing long-term trend than as having a decreasing short-term trend.
- The long-term trends have a higher share of uncertain and unknown assessments, compared to the short-term trends. In total, 30% of the long-term trends are uncertain or unknown, compared to 19% of the short-term trends. This possibly reflects the lack of monitoring schemes from early years (i.e. 1980s).

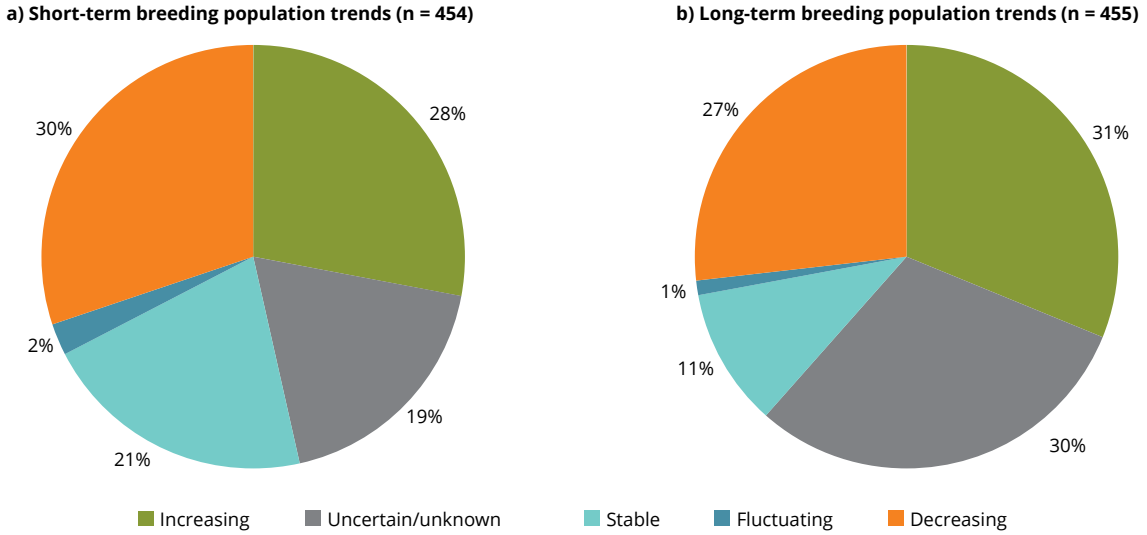
2.2.4 Results of assessing population trends of wintering bird taxa at EU level

Winter reports were requested only for waterbirds, and coverage of the reports for most taxa was not complete. Therefore, EU-level assessments were only carried out for those species for which the data reported were representative of the overall wintering population in the EU.

In total, 81 EU-27 short-term and long-term wintering population trends were produced for birds. Results of the assessments of short-term wintering population trends (see Figure 2.7a) indicate that 46% of the short-term trends are increasing, 27% are decreasing, 4% are stable and 19% are fluctuating. The short-term trends of 5% of the wintering bird taxa are uncertain or unknown.

The results of the long-term wintering population trends (see Figure 2.7b) indicate that 63% of the long-term trends are increasing, 14% are decreasing, 5% are stable

Figure 2.6 Short- and long-term EU breeding population trends of birds

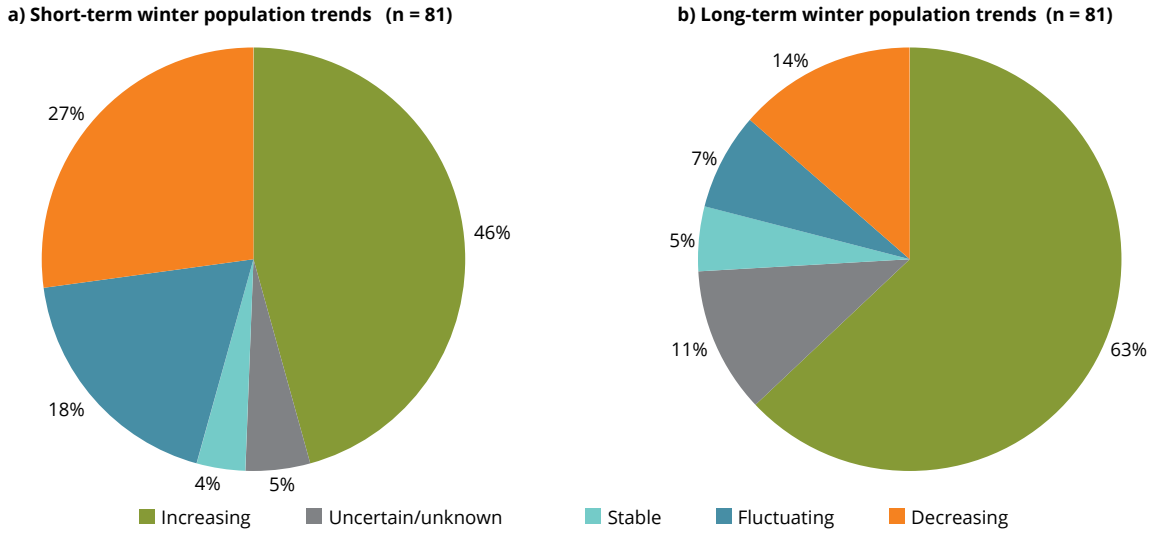


Notes: Includes trends for a limited number of subspecies and other populations. *Perdix perdix italica* is excluded from short-term breeding trends because it became extinct in 2001.

Source: EEA, 2015a, Article 12 reports and assessments.

([25]) *Perdix perdix italica* is excluded from the short-term breeding trends because it became extinct in 2001.

Figure 2.7 Short- and long-term EU winter population trends of waterbirds



Notes: Although data were only requested for waterbirds, some Member States also reported a few other species.

Source: EEA, 2015a, Article 12 reports and assessments.

and 7% are fluctuating. The long-term trends of 11% of the wintering bird taxa are uncertain or unknown.

For the short-term and the long-term wintering population trends, the following observations were made.

- Trends of a relatively low number of wintering taxa could be assessed, compared to breeding taxa.
- The majority of wintering bird taxa assessed have an increasing long-term population trend. More wintering bird taxa in the EU are assessed as having an increasing long-term population trend (63%) than as having an increasing short-term trend (46%). Conversely, more wintering bird taxa are assessed as having a decreasing short-term trend (27%) than as having a decreasing long-term trend (14%).

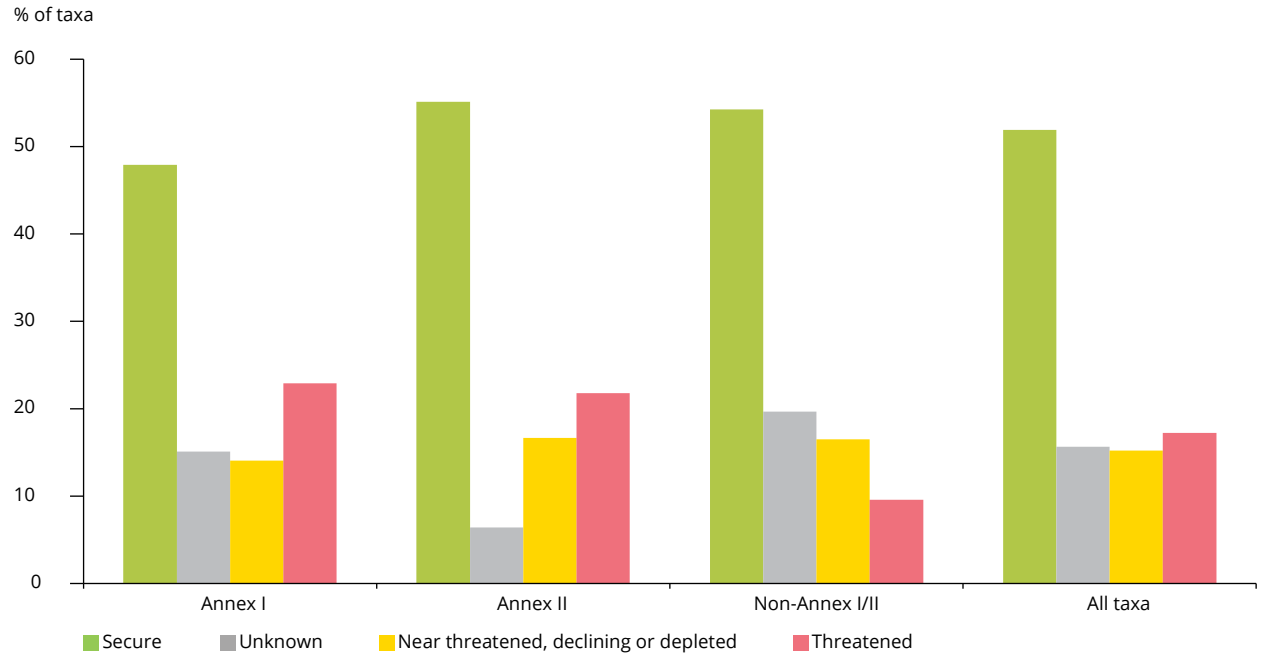
2.2.5 Results of assessing population status and trends of bird taxa listed in Annexes I and II of the Birds Directive at EU level

Figure 2.8 provides an overview of the population status of bird species listed in Annex I (species for which SPAs must be designated) and Annex II (huntable species) of the Birds Directive, and also of species not listed in the annexes. Figures 2.9 through 2.12 provide an overview of the short-term and long-term breeding and wintering population trends of bird taxa listed in Annexes I and II of the Birds Directive and of taxa not listed in the annexes.

For taxa listed in the annexes, the following observations were made.

- A relatively high proportion of species in Annex I hold threatened population status, and a relatively low proportion hold secure status. The EU populations of 23% of the species are threatened, while 48% are secure.
- A relatively high proportion of breeding bird taxa in Annex I indicate an increasing population trend, and a relatively low proportion of taxa indicate a decreasing population trend. This applies to both short-term trends and long-term trends, although it is more pronounced in the former. The long-term population trends of 40% of the breeding bird taxa in Annex I are increasing, compared to 31% of all breeding bird taxa.
- More than 40% of breeding bird taxa in Annex II show a decreasing population trend. This applies to both short-term and long-term trends. The short-term population trends of 46% of the breeding bird taxa in Annex II are decreasing, compared to 30% of all breeding bird taxa.
- There are no major differences between the proportions of wintering bird taxa in Annexes I and II that show an increasing or decreasing population trend, and the proportions of all wintering bird taxa showing these trends. This applies to both short-term trends and long-term trends.

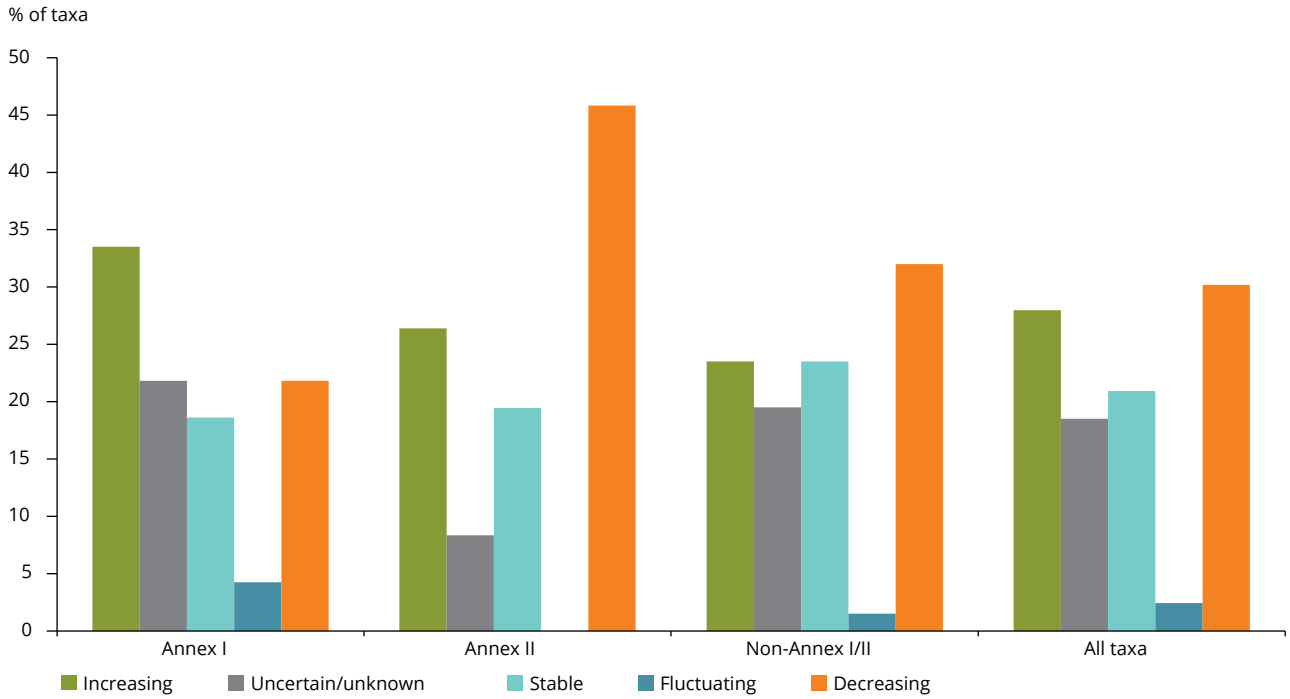
Figure 2.8 **EU population status of birds in Annexes I and II of the Birds Directive, birds not in Annexes I or II of the Birds Directive, and all birds**



Notes: The total number of assessments is 447.

Source: EEA, 2015a, Article 12 reports and assessments.

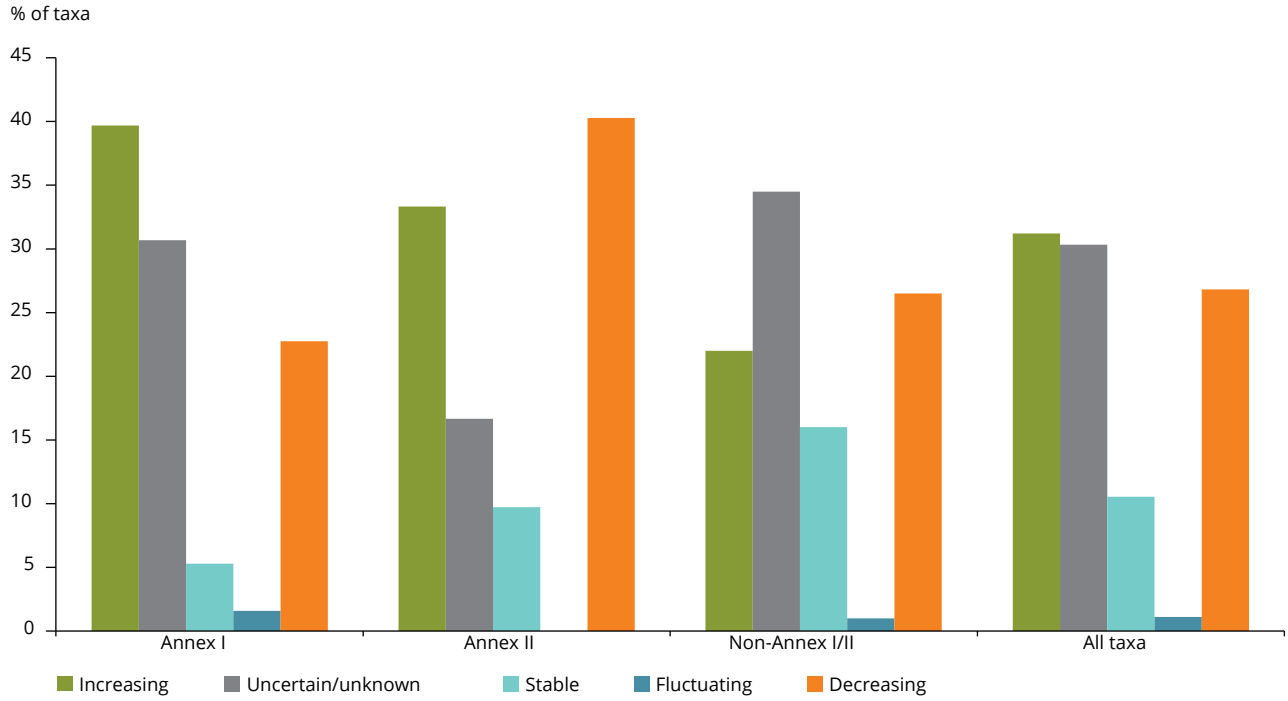
Figure 2.9 **Short-term EU breeding population trends of birds in Annexes I and II of the Birds Directive, birds not in Annexes I or II of the Birds Directive, and all birds**



Notes: *Perdix perdix italica* is excluded from the short-term breeding trends because it became extinct in 2001. The total number of assessments is 454.

Source: EEA, 2015a, Article 12 reports and assessments.

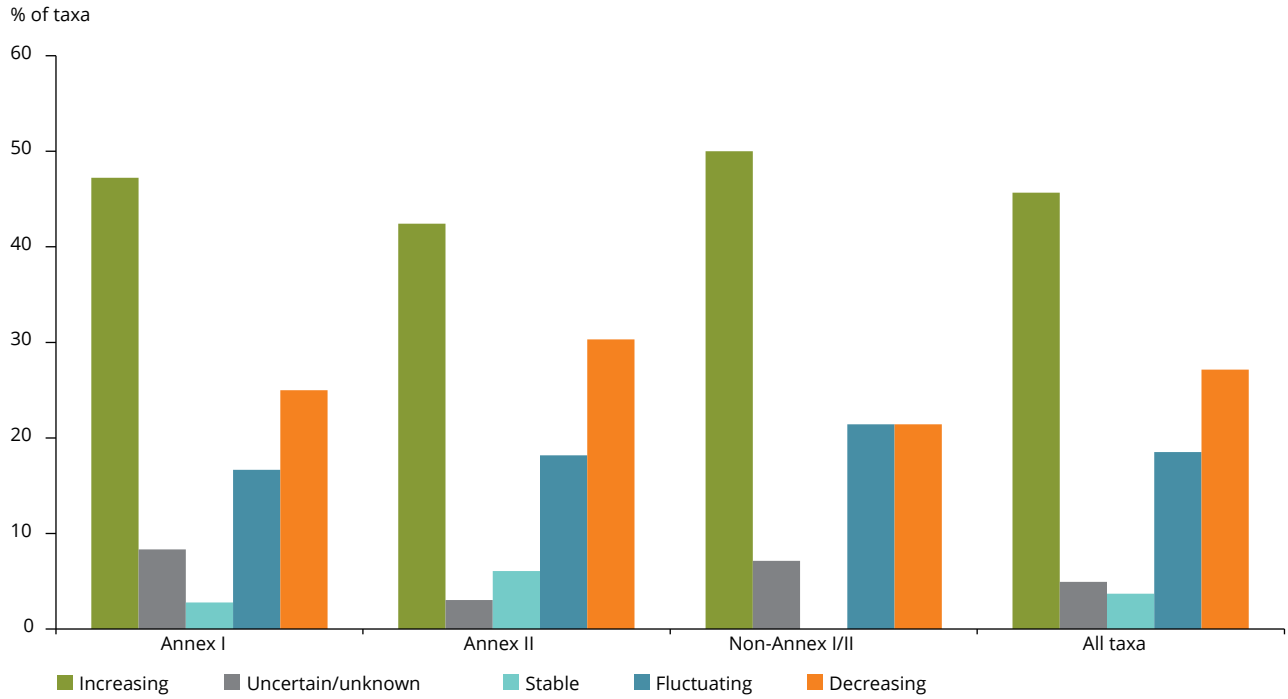
Figure 2.10 Long-term EU breeding population trends of birds in Annexes I and II of the Birds Directive, birds not in Annexes I or II of the Birds Directive, and all birds



Notes: The total number of assessments is 455.

Source: EEA, 2015a, Article 12 reports and assessments.

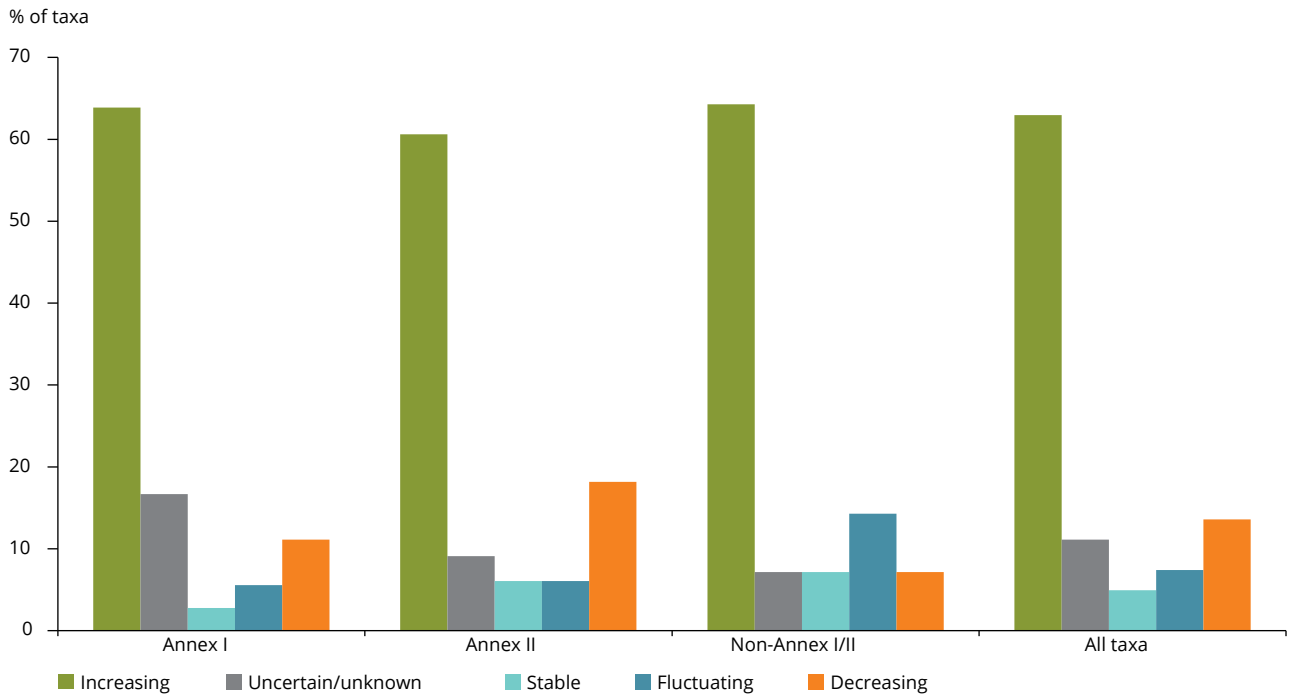
Figure 2.11 Short-term EU winter population trends of birds in Annexes I and II of the Birds Directive, birds not in Annexes I or II of the Birds Directive, and all birds



Notes: The total number of assessments is 81.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 2.12 Long-term EU winter population trends of birds in Annexes I and II of the Birds Directive, birds not in Annexes I or II of the Birds Directive, and all birds



Notes: The total number of assessments is 81.

Source: EEA, 2015a, Article 12 reports and assessments.

2.2.6 Results of assessing population status and trends of bird taxa with EU SAPs and MPs at EU level

In total, 53 bird species and subspecies have an EU SAP (Species Action Plan) ([26]). The plans were either produced by the EU itself, or were produced under international agreements and endorsed by the EU. All species with a SAP are listed in Annex I of the Birds Directive, with the exception of *Limosa limosa*. SAPs have been mostly produced for bird species which were threatened in the EU or globally at the time (BirdLife International, 2012 ([27])).

Comparing the breeding population status and trends of bird taxa with and without SAPs is not straightforward. Simply comparing the status trends of all taxa with and without SAPs would be confused by the fact that taxa listed in Annex I have a relatively high proportion of increasing short- and long-term trends (see Section 2.2.5). This means that only a comparison between taxa listed in Annex I with and without SAPs is meaningful.

Figure 2.13 provides an overview of the population status of species with and without SAPs; the short-term (see Figure 2.14) and long-term (see Figure 2.15) breeding population trends of bird taxa with and without SAPs are provided below.

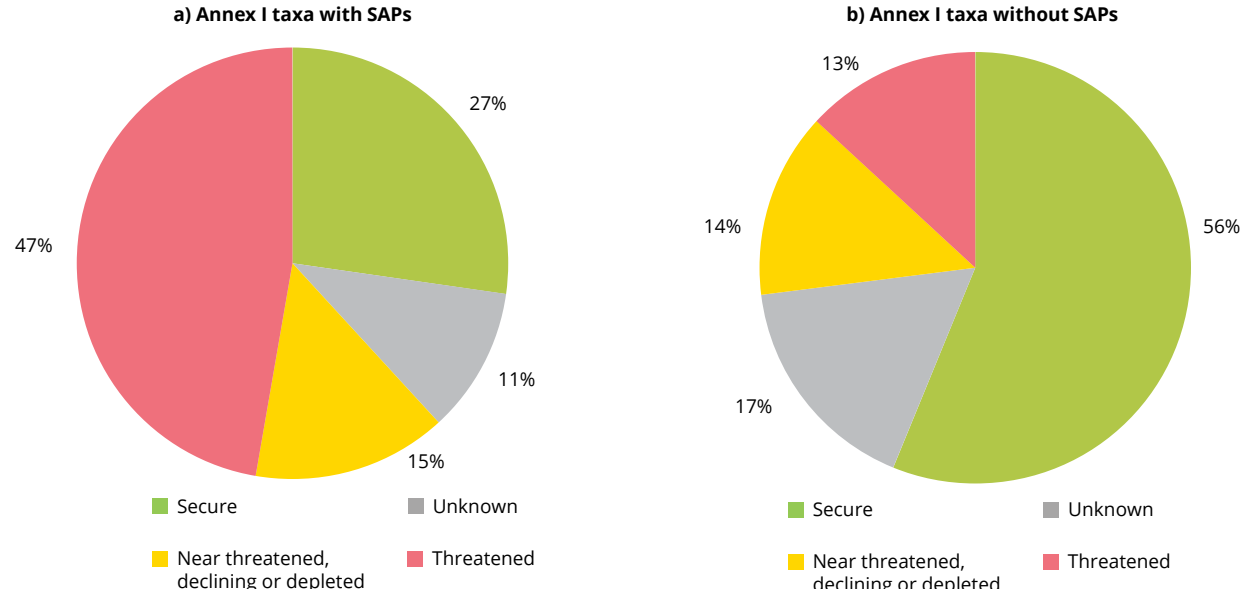
Only a small number of taxa (35) with a SAP listed in Annex I were covered by the winter reports. Consequently, a comparison between wintering bird taxa with or without a SAP would not be very meaningful, and this is not included in this report.

For taxa in Annex I with a SAP, the following observations were made.

- A high proportion of species in Annex I with a SAP are threatened, compared to species in Annex I without a SAP; this is not surprising, since SAPs targeted species assessed as threatened in earlier evaluations. The EU populations of 47% of species in Annex I with a SAP are threatened, compared to 13% of species without SAPs. Only 27% of species

([26]) See http://ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/index_en.htm.
([27]) See http://ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/docs/final_report.pdf.

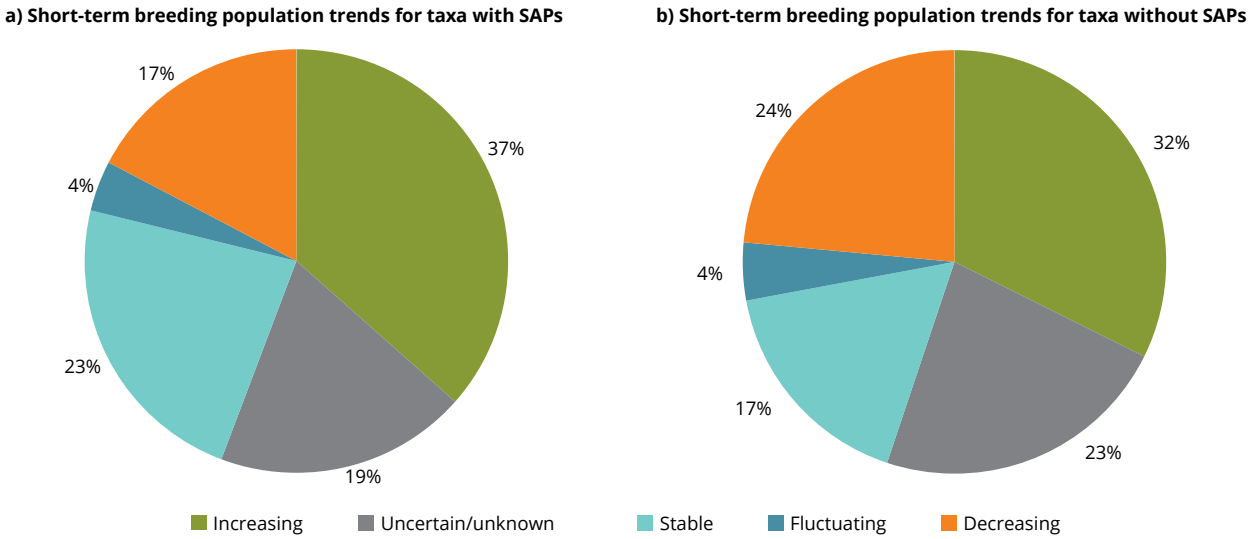
Figure 2.13 EU population status of birds in Annex I of the Birds Directive with and without SAPs



Notes: The total number of assessments is 55 and 137 for taxa with SAPs and without SAPs, respectively.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 2.14 Short-term EU breeding population trends of birds in Annex I of the Birds Directive with and without SAPs



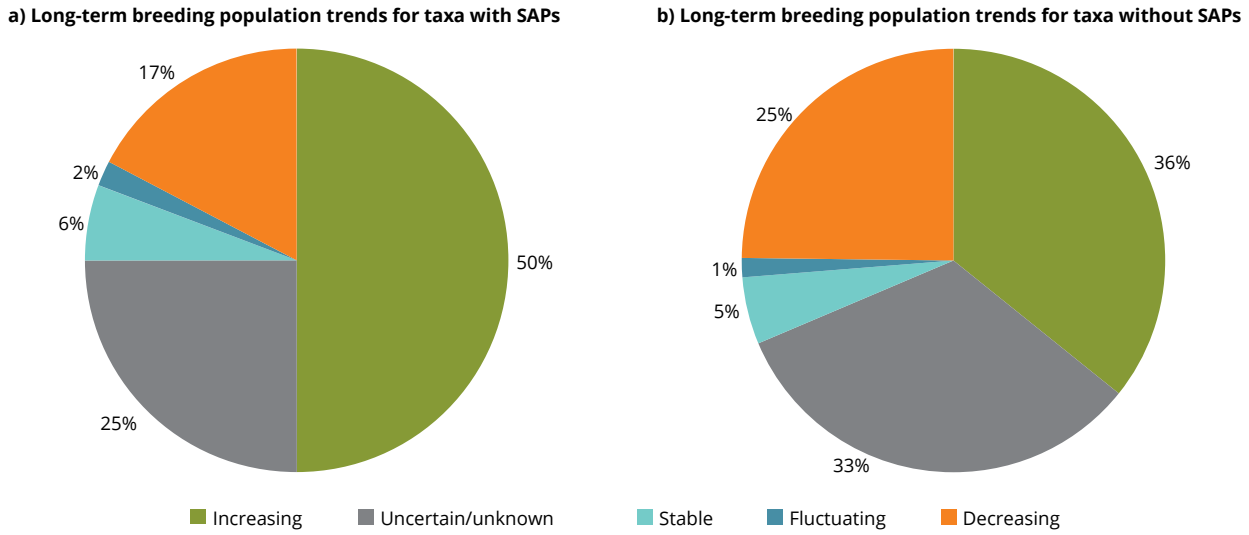
Notes: *Perdix perdix italica* is excluded from the short-term breeding trends for taxa without SAPs, because it became extinct in 2001. The total number of assessments is 52 and 136 for taxa with SAPs and without SAPs, respectively.

Source: EEA, 2015a, Article 12 reports and assessments.

in Annex I with a SAP are secure, compared to 56% of species in Annex I without a SAP.

- A high proportion of breeding bird taxa in Annex I with a SAP are assessed to have an increasing population trend, and a lower proportion are assessed to have a decreasing trend, compared to taxa in Annex I without a SAP. This applies to both short-term trends and long-term trends, although it is more pronounced in long-term trends. This suggests that the plans are effective.
- The long-term trend of 50% of breeding bird taxa in Annex I with a SAP is increasing, compared to 36% of breeding bird taxa in Annex I without a SAP.

Figure 2.15 Long-term EU breeding population trends of birds in Annex I of the Birds Directive with and without SAPs



Notes: *Perdix perdix italica* is excluded from the short-term breeding trends because it became extinct in 2001. The total number of assessments is 52 and 136 for taxa with SAPs and without SAPs, respectively.

Source: EEA 2015a, Article 12 reports and assessments.

In total, 13 bird taxa have an EU Management Plan (MP) ([28]). MPs were produced for huntable species considered to be threatened in the EU. All species with a MP are listed in Annex II of the Birds Directive; however, *Pluvialis apricaria* is listed in Annex I and in Annex II. Of these 13 taxa, four are secure, one is unknown, three are near threatened, declining or depleted and five are threatened. Two had increasing short-term population trends, one was stable, one was fluctuating and nine were decreasing. The proportions of Annex II bird taxa with MPs that were threatened and that had decreasing trends appear high compared to those without MPs (17% and 39%, respectively), but it is not possible to draw conclusions about their effectiveness. However, since several MPs were prepared between 1997 and 2000, it is possible that they did not deliver the expected conservation results.

2.2.7 Results of assessing population status and trends of breeding bird taxa grouped by taxonomic group at EU level

It is difficult to draw conclusions on the breeding population status and trends of birds within larger taxonomic groups. Many taxonomic groups are represented in the EU by only a few taxa, while some groups have a large number of taxa, even at the lowest taxonomic levels. As a result, regardless of the taxonomic level selected, the taxonomic groups will not be of comparable size, and the small size of some groups will make it difficult to draw conclusions on the status or trends of these groups relative to the average.

Figure 2.16 presents an overview of the EU population status of bird species by order ([29]), the taxonomic level that provided the most information, while Figures 2.17 and 2.18 provide an overview of the short-term and long-term breeding population trends, respectively.

For taxa in different orders, the following observations were made.

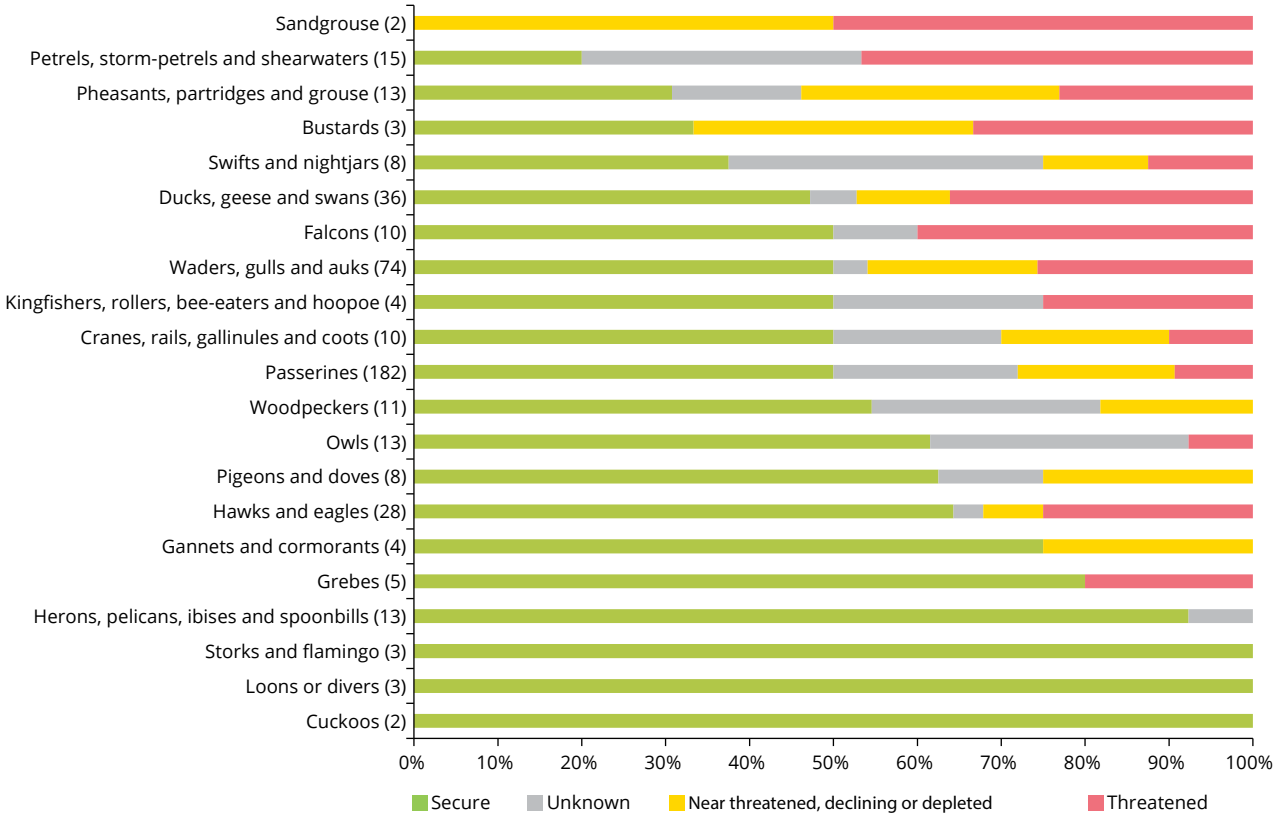
- For the majority of orders, around half or more species are assessed as secure.
- A relatively high proportion of petrels, storm petrels and shearwaters, ducks, geese and swans, waders, gulls and auks are assessed as being threatened.
- A relatively high proportion of breeding waders, gulls and auks and pheasants, partridges and

([28]) See http://ec.europa.eu/environment/nature/conservation/wildbirds/hunting/managt_plans_en.htm.
([29]) Note that for the purposes of presentation, the Common Hoopoe *Upupa epops* was included with the kingfishers, rollers and bee-eaters, and the Greater Flamingo *Phoenicopterus roseus* was included with the storks.

grouse are assessed as having a decreasing population trend. This applies to both short-term trends and long-term trends.

- The long-term trends of breeding populations of the largest group of birds, the passerines, have a relatively high proportion of uncertain and unknown assessments. This group alone accounts for 54% of all uncertain and unknown long-term trend assessments. Passerines also account for 58% of all unknown population status assessments.

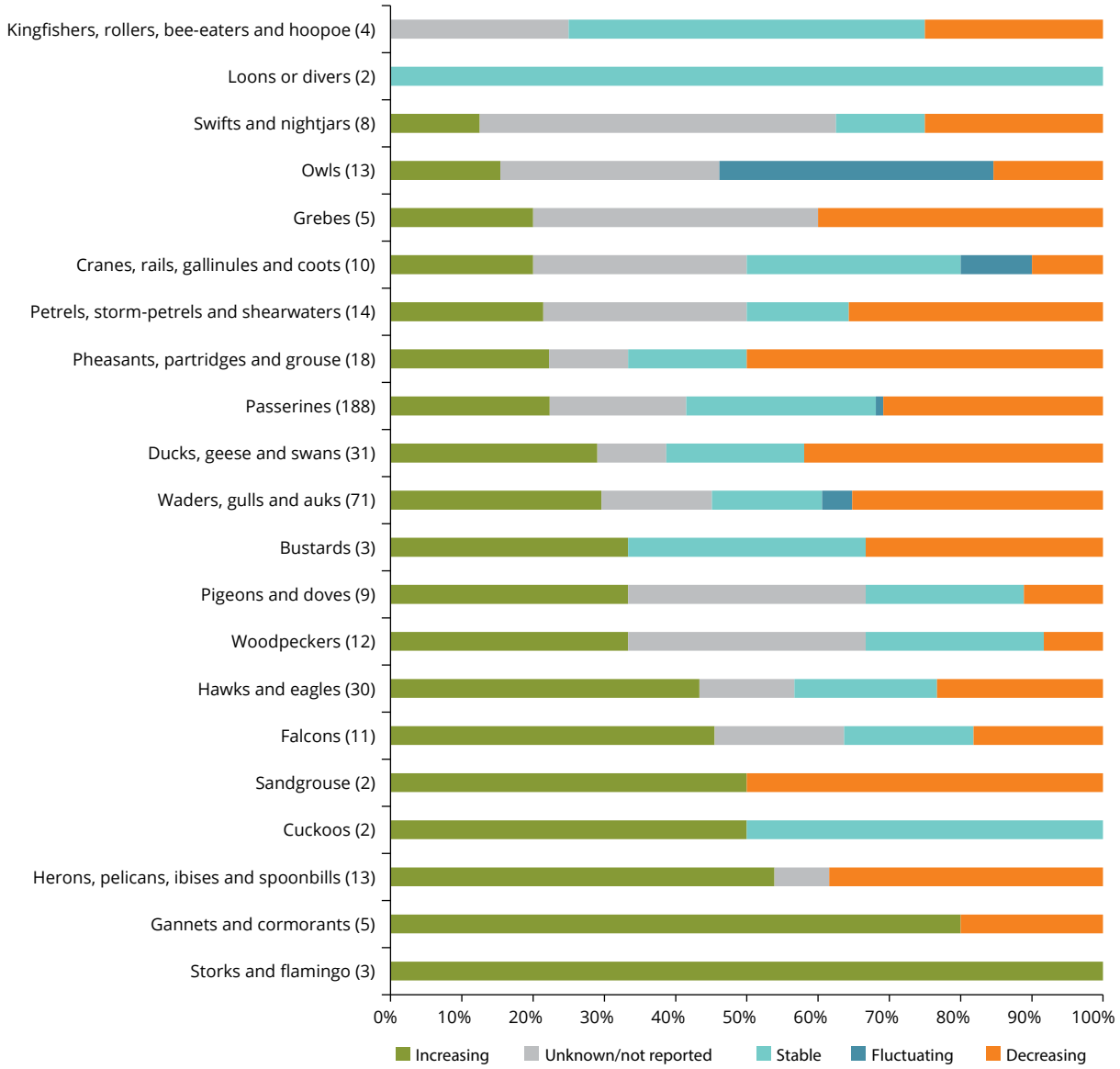
Figure 2.16 Population status of EU birds, by taxonomic order



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 447.

Source: EEA, 2015a, Article 12 reports and assessments.

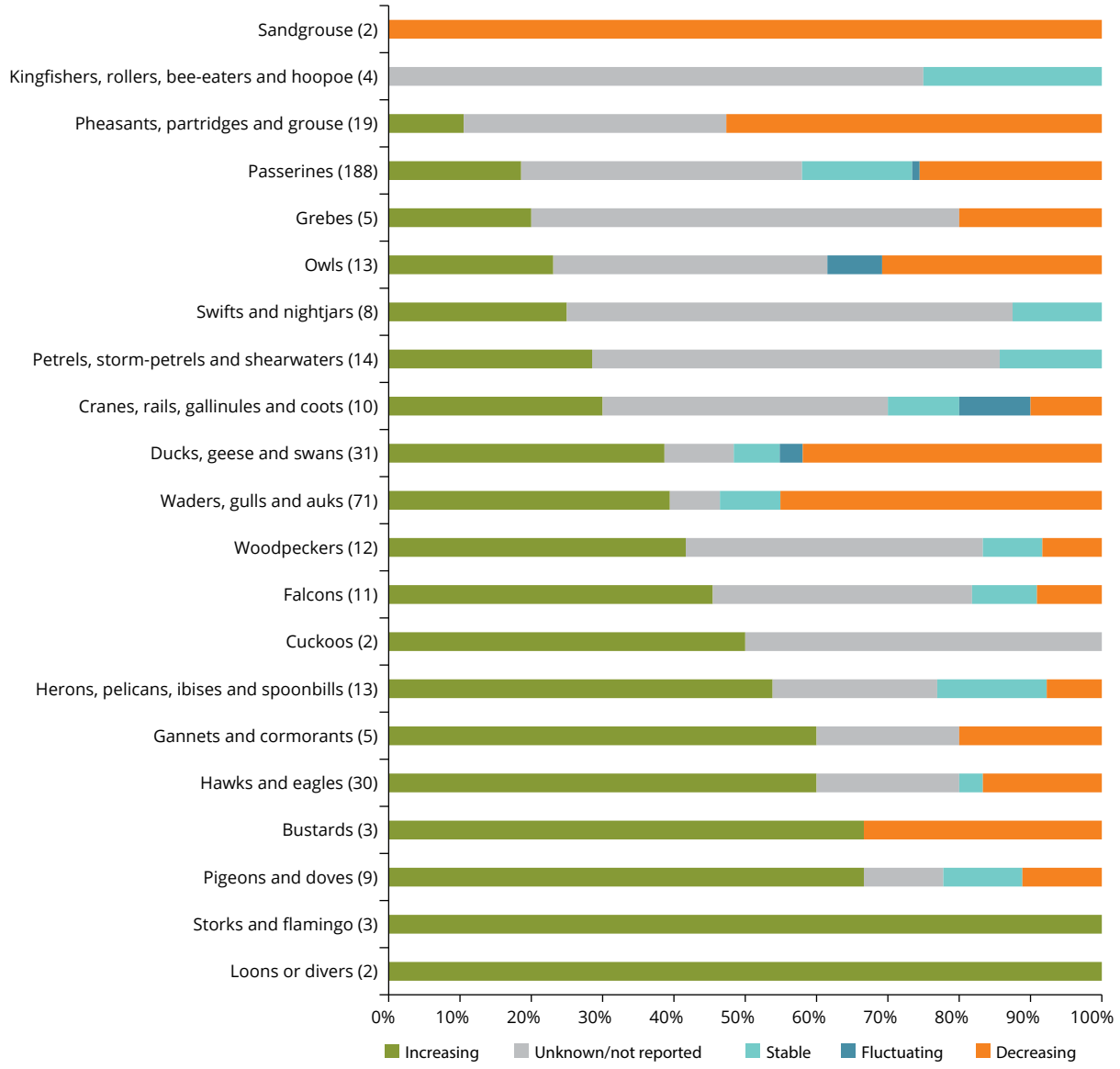
Figure 2.17 Short-term EU breeding population trends of birds, by taxonomic order



Notes: *Perdix perdix italica* is excluded from the short-term breeding trends because it became extinct in 2001. The number of assessments is indicated in parentheses. The total number of assessments is 454.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 2.18 Long-term EU breeding population trends of birds, by taxonomic order



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 455.

Source: EEA, 2015a, Article 12 reports and assessments.

2.3 Pressures and threats

2.3.1 Methodology to assess pressures and threats

Information on pressures and threats is required for a more detailed assessment of the factors influencing the status and trends of individual species. Under Article 12 reporting, pressures and threats were only required to be reported for birds triggering SPA classifications, i.e. species and subspecies listed in Annex I of the Birds Directive, and a selection of regularly occurring migratory species not listed in Annex I. The list of relevant taxa can be found in the 'Checklist of SPA trigger species' on the Article 12 Reference Portal ([30]). Pressures are defined as factors acting now or during the reporting period (i.e. 6 years) to threaten the long-term viability of species, whereas threats are factors expected to be acting in the near future (i.e. 12 years into the future). Under Article 12 reporting, no distinction was made between pressures and threats; under Article 17, reporting pressures and threats were assessed separately (see Section 3.3.1).

The list of pressures and threats used for the assessment can be found on the Article 12 Reference Portal ([30]). The same list is used for the Standard Data Form for Natura 2000 reporting and Article 17 reporting. Following the new additions and changes, the updated version of the list groups threats and pressures into several hierarchical levels with increasingly narrow categorisation: the 1st hierarchical level contains 17 headings, the 2nd hierarchical level contains 75 categories, the 3rd hierarchical level contains 209 categories and the 4th hierarchical level contains 112 categories. The first hierarchical level includes the headings 'no threats or pressures' and 'unknown threat or pressure', and also two headings that Member States were requested not to use: 'threats and pressures from outside the Member State' and 'threats and pressures from outside the EU territory'. For the Article 12 reports, Member States were requested to report at the second hierarchical level, but were given the option of using more precise categories (i.e. third and fourth level). An example list of Level 1, 2 and 3 headings for pressure and threat categories can be found in Annex A (See Table A.1).

In addition to the type of pressure and threat for each habitat and species, Member States also ranked the relative importance of the pressure or threat as falling under one of three categories, as shown in Table 2.3.

Although Section 2.4 focuses mainly on overall (all rankings of importance) and high-ranked pressures/threats for bird species at Level 1, Chapter 4 (on ecosystems) will provide a more detailed assessment of pressures for bird species at Level 2 for each individual ecosystem.

2.3.2 Results of assessing pressures on and threats to birds

At Level 1, 'agriculture' and 'modification of natural conditions' are the two most frequently reported high-ranked pressures/threats to birds (comprising 22% and 20% of all reported high-ranked pressures/threats, respectively). 'Use of living resources (other than agriculture and forestry)' is ranked third, at 11%. Pressures/threats reported at Level 2 serve in part to identify the main impacting factors within each of these overarching categories. Agricultural pressures/threats refer predominantly to acts such as modification of cultivation practices, grazing by livestock and — to a lesser degree — mowing or cutting grassland and the use of pesticides in agriculture. The modification of natural conditions includes changes in waterbody conditions and other changes to ecosystems, while the use of living resources most frequently relates to the hunting and collection of birds.

Regarding the overall rankings, 'agriculture' continues to be the most frequently reported pressure/threat at Level 1 (16% of all reported pressures/threats), followed by the 'modification of natural conditions' (13%), 'use of living resources (other than agriculture and forestry)' (12%) and 'disturbances due to human activities' (11%). This latter pressure/threat refers

Table 2.3 Categories for ranking pressures and threats

Code	Meaning	Comment
H	High importance/impact	Important direct or immediate influence and/or acting over large areas.
M	Medium importance/impact	Medium direct or immediate influence, mainly indirect influence and/or acting over moderate part of the area/acting only regionally.
L	Low importance/impact	Low direct or immediate influence, indirect influence and/or acting over small part of the area/acting only regionally.

([30]) See http://bd.eionet.europa.eu/activities/Reporting/Article_12/reference_portal.

predominantly to outdoor sport, leisure and other recreational activities. Other pressures/threats within this category are far less frequently reported: these include sport and leisure infrastructures, military use and civil unrest, and other human intrusions and disturbances. The frequency of both overall and high-ranked Level 1 pressures and threats reported for birds are illustrated in Figure 2.19 below (see also Table B.2 in Annex B).

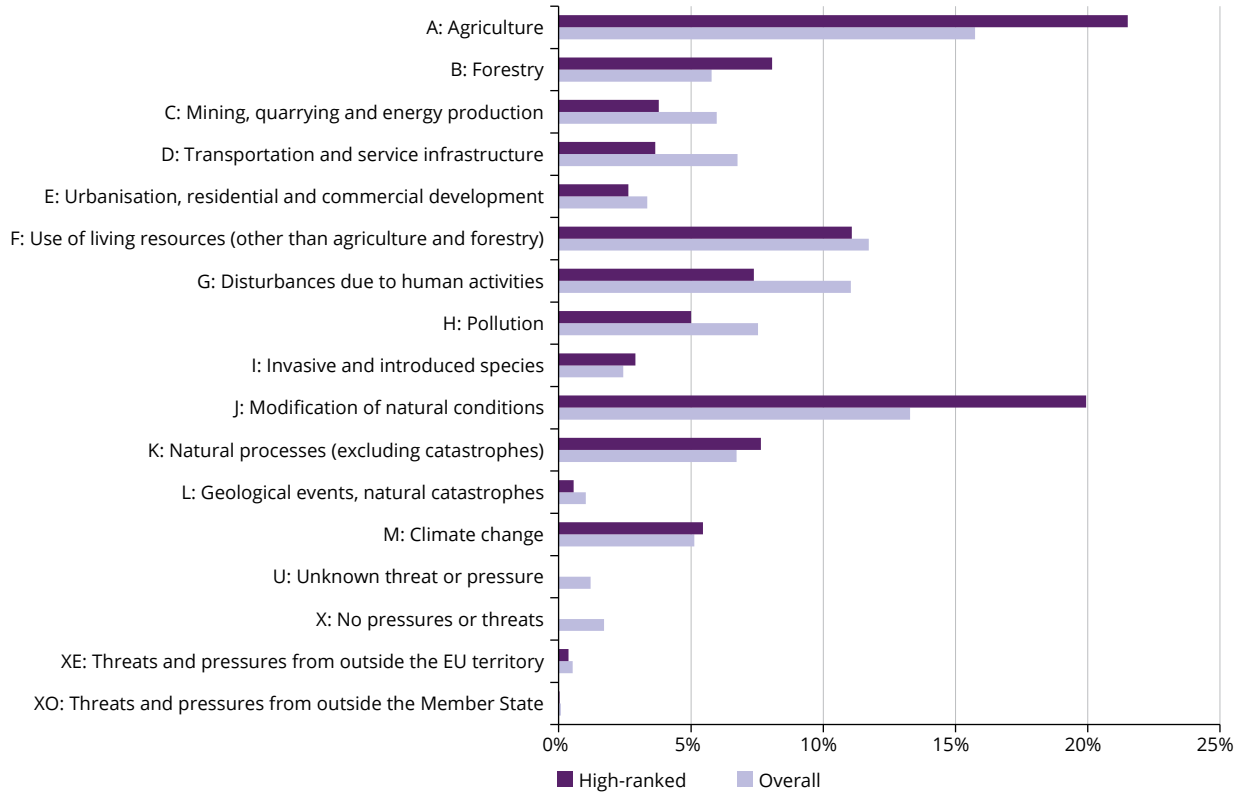
For threatened and near threatened, declining or depleted taxa, the most frequently reported high-impact Level 2 pressures/threats were 'modification of cultivation practices', 'human-induced changes in hydraulic conditions', 'other ecosystem modifications', 'grazing', 'hunting and collection of terrestrial wild animals' and 'interspecific faunal relations'.

'Modification of cultivation practices' was reported as a high-impact pressure/threat in 143 instances for 38 bird taxa, 23 of which are listed in Annex I of the Birds Directive. A diverse group of birds was affected by changing cultivation practices, including intensification of agriculture and the replacement of grassland with arable cultivation. 'Grazing' (both intensification and abandonment of grazing regimes) was reported in 72 instances for 29 taxa, 23 of which are listed in Annex I of the Birds Directive. Various species were affected, including lowland breeding waders and some open habitat species.

'Human-induced changes in hydraulic conditions' arising from interference with hydrological regimes was reported as a high-impact pressure/threat in 118 instances for 34 taxa, largely lowland breeding waders and waterfowl, 21 of which are listed in Annex I of the Birds Directive. 'Other ecosystem modifications', including loss of habitat features, reduction in prey availability and habitat fragmentation, were reported in 105 instances for 60 taxa, 41 of which are listed in Annex I of the Birds Directive. A highly diverse group of birds was reported to be affected by this pressure/threat.

'Hunting and collection' was reported as a high-impact pressure/threat in 71 instances for 29 taxa, mainly birds of prey, gamebirds and waterfowl, 23 of which are listed in Annex I of the Birds Directive. The main Level 3 pressures/threats reported in these instances were hunting, trapping, poisoning and poaching.

Figure 2.19 Frequency (%) of high-ranked and overall Level 1 pressures/threats reported for birds



Notes: The total number of assessments for high-ranked and overall threats and pressures is 3 756 and 13 233, respectively. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

2.4 Data quality and completeness

2.4.1 Information reported as unknown

Compared to other species groups, birds are well studied, and good data are available for most species. The species population size is unknown for only 1% of breeding and 2% of wintering bird species (approximately) (see Figure 2.20). The percentage of breeding birds with unknown range surface area is also relatively low (5%). However, an unexpectedly high proportion of population or range trends were reported as unknown, with the proportion of unknown long-term population trends exceeding 25%.

In contrast to Habitats Directive reporting, the reporting format for birds requires Members States to report both trend direction and trend magnitude, as complete trend information is needed for the European status assessment. This requirement may have discouraged reporters from providing estimates of trend direction without providing trend magnitudes. In general, the proportion of reports with known trend direction but with missing magnitude is relatively low in comparison to the proportion of reports with unknown trend direction (see Figure 2.21).

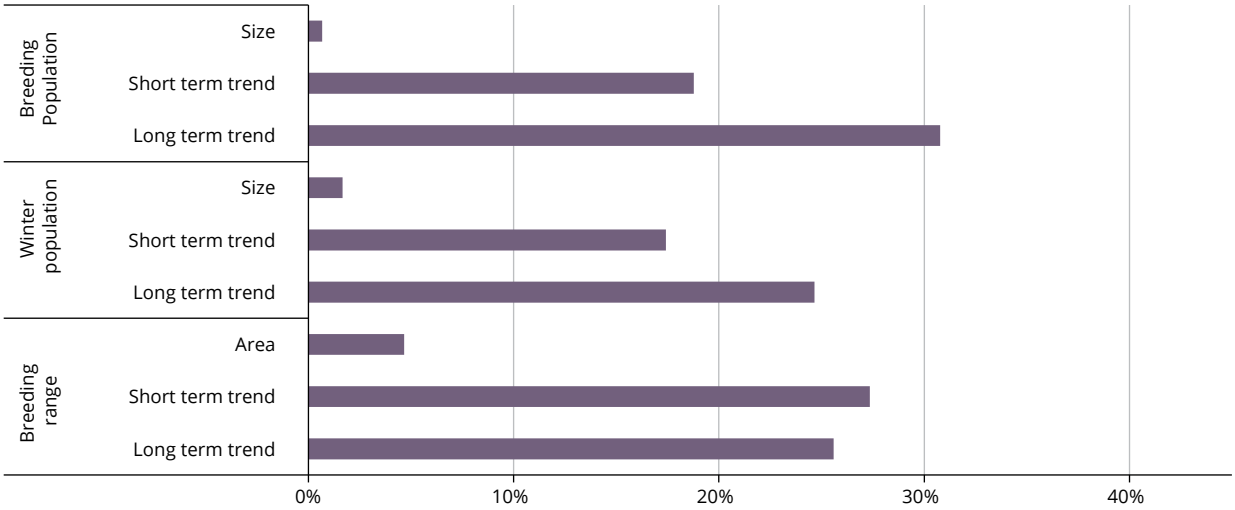
2.4.2 Impact of missing data

The status assessment is based principally on data for species population size and trends. For the majority of species and status categories, the assessment is based on the short-term population trend. The long-term trend is essential in order to distinguish 'declining and depleted' species from 'secure' ones, and is used as the principal criterion for long-lived species. The EU figures for population size and trends should ideally be calculated by combining figures provided by each Member State; this calls for information provided by Member States to not have significant gaps. Although population size is missing in less than 1% of the Member States' reports (approximately), reported information on trends is in many cases incomplete. The short-term population trend or trend magnitude is reported as unknown in more than 50% of the species reports in five countries (see Figure 2.21), while there are 11 countries where this trend information is missing from less than 10% of the species reports. Reported long-term trend information tends to be even more incomplete. The long-term trend or magnitude is reported as unknown in more than 50% of the species reports in 11 countries. More than 80% of the species reports have unknown trend or magnitude in 4 countries.

Because the methodology for assessing birds calls for both population and complete trend information, the proportion of assessments for birds as unknown (16%) is similar to the proportion of non-bird species assessed as unknown (17%), even though birds, as a group, are much better known.

Further information on data quality and associated issues is given in Annex B, and it is recommended that anyone wishing to use the Article 12 data set read this annex.

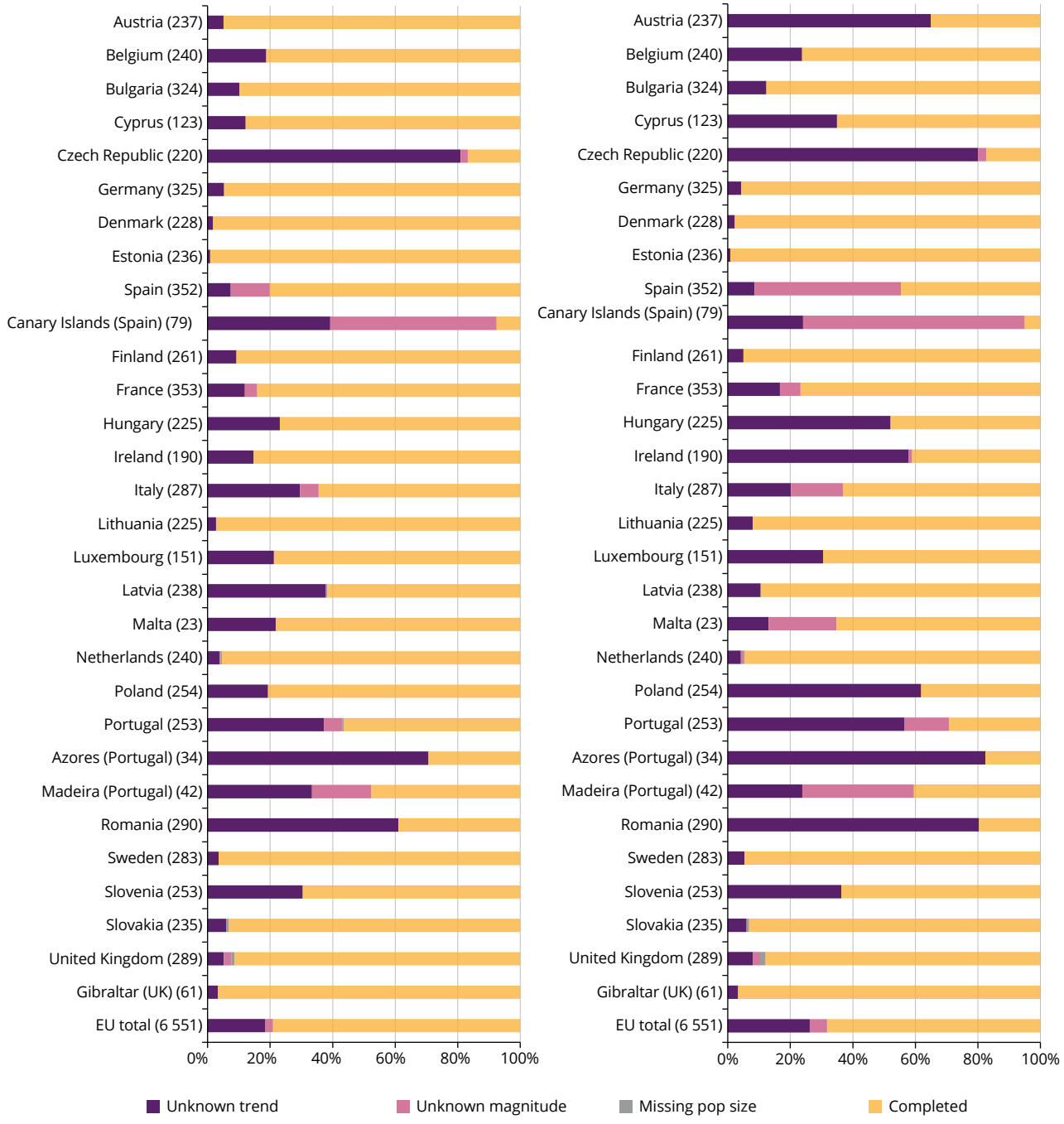
Figure 2.20 Proportion of information reported as unknown



Notes: The total number of reports is 5 346 and 1 022 for breeding and wintering birds, respectively. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 2.21 Completeness of information on short-term population trend (left) and long-term population trend (right): percentage of bird reports with unknown population trend, unknown trend magnitude, missing population size or incomplete population trend information



Notes: Missing reports (183 in number) have been included in the statistics, but reports relating to passage birds, newly arriving species and extinct birds after the directive came into force have been excluded. The number of reports is indicated in parentheses. The total number of reports is 6 551. A mean per category across all Member States is provided on line 'EU total'. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

3 Overall results from Article 17 reporting (Habitats Directive)

Article 17 of the Habitats Directive requires that Member States regularly prepare and submit reports on progress made in implementing the directive, using a format agreed by the Habitats Committee and published in 2005 (EC, 2005). For the period from 2007 to 2012, Habitats Committee guidelines were published, and edited by the ETC/BD (Evans and Arvela, 2011).

The Article 17 reports prepared by Member States have three sections:

(a) general information on directive implementation, including information on the number of sites and their area, the proportion of sites with management plans and measures undertaken;

(b) assessments of the conservation status of species;

(c) assessments of the conservation status of habitats.

Article 17 reporting covers the habitat types and species across the whole territory of the Member State concerned, not only those within Natura 2000 sites.

Checklists of the habitat types and species covered by the Habitats Directive and their occurrence per biogeographical region and Member State are available on the Article 17 Reference Portal ([31]).

The statistics, figures and tables presented in this technical report are based on habitats and species which Member States reported as 'present' or 'recently extinct'.

In addition, Member States also reported on the type of presence status of the species and habitats (see Table C.3 in the Annex), using, for example:

- newly arriving species, i.e. species which do not represent a component of fauna of the biogeographical region, but which started to be observed recently;
- occasionally occurring species, i.e. species which do not have stable and regular occurrence in the biogeographical region, or whose number of specimens is insignificant;
- extinct species, i.e. species which became extinct after the Habitats Directive came into force.

For Article 17 reporting, five marine regions from the Marine Strategy Framework Directive have been added to the nine biogeographical regions mentioned in the directive (see Table 3.1 and Map 3.1). Biogeographical and marine regions are areas which are ecologically and environmentally similar.

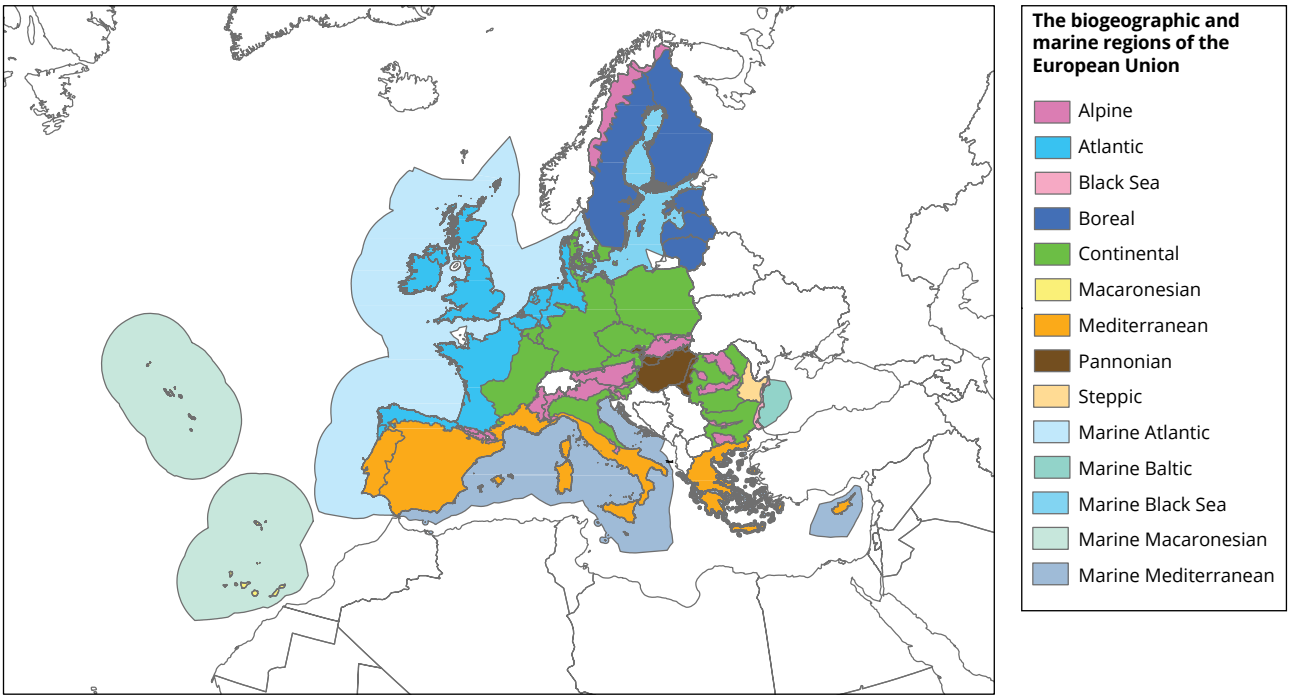
Table 3.1 Biogeographic and marine regions: names and abbreviations

Biogeographic region	Abbreviation
Alpine	ALP
Atlantic	ATL
Black Sea	BLS
Boreal	BOR
Continental	CON
Macaronesian	MAC
Mediterranean	MED
Pannonian	PAN
Steppic	STE

Marine region	Abbreviation
Marine Atlantic	MATL
Marine Baltic	MBAL
Marine Black Sea	MBLS
Marine Macaronesian	MMAC
Marine Mediterranean	MMED

([31]) See http://bd.eionet.europa.eu/activities/Reporting/Article_17/reference_portal.

Map 3.1 Biogeographic and marine regions of the EU ([32])



Source: EEA ETC/BD, February 2013; EEA ETC/BD, October 2012.

Member States are required to separately assess the conservation status for each species and habitat for each of the biogeographical regions in which the species or habitat is found.

When a Member State lies entirely within one region, as with Luxembourg, only one report is required for each habitat type and species present. If a Member State lies across two or more regions, a report is required for each region. For example, *Bombina variegata* (the Yellow-bellied Toad) in Germany occurs in the Alpine, Atlantic and Continental regions: Germany has reported separately for all three regions.

In addition to Member State assessments for each habitat and species present in each biogeographical region (see Section 3.1), EU regional assessments are also produced for the biogeographical regions and marine regions as a whole. For this report, conservation status at Member State and EU biogeographical level are dealt with in separate sections. A more detailed description of the methodologies and results for each level of assessment can be found in Section 3.1 for the former (Conservation status at Member State biogeographical and marine level) and Section 3.2 for the latter (Conservation status at EU biogeographical and marine level).

3.1 Conservation status at Member State biogeographical and marine level

3.1.1 Methodology to assess conservation status at Member State biogeographical and marine level

The assessment, which is based on the 'favourable conservation status' definition provided in Article 1 of the Directive, classifies the conservation status of a particular species or habitat as 'favourable', 'unfavourable-inadequate' or 'unfavourable-bad', based on an evaluation of four parameters for species and habitats (see Table 3.2).

'Favourable conservation status' describes a situation where the habitat or species can be expected to

Table 3.2 The parameters for assessments of conservation status

Species	Habitats
Range	Range
Population	Area
Suitable habitat	Structure and functions
Future prospects	Future prospects

([32]) The same map, with the addition of the Anatolia and Arctic biogeographical regions, is also used by the Council of Europe for its Emerald network.

prosper without any change to existing management or policies. The unfavourable category has been split into two classes to allow improvements or deterioration to be reported. 'Unfavourable-inadequate' is used for situations where a change in management or policy is required to return the habitat type or species to favourable status, but there is no danger of extinction in the foreseeable future. 'Unfavourable-bad' is used for habitats or species in serious danger of becoming extinct (at least regionally) (Evans and Arvela, 2011).

Where there is great uncertainty, the conservation status may also be reported as 'unknown'. A standard set of abbreviations and colours for figures has been adopted, and is shown in Table 3.3.

Table 3.3 Abbreviations and colour codes for conservation status classes

Conservation status	Colour	Abbreviation
Favourable	Green	FV
Unfavourable-inadequate	Amber	U1
Unfavourable-bad	Red	U2
Unknown	Grey	XX

Once the results for each of the four parameters have been determined, they are then combined in an agreed manner in order to produce the overall conservation status. A summary of the different conditions required to assess the conservation status of habitats and species in Annex C (See Tables C.1 and C.2).

Given the definition of favourable conservation status in the Habitats Directive, changes in the overall conservation status (for example, from unfavourable to favourable, or from unfavourable-bad to unfavourable-inadequate) require relatively major changes in the individual conservation status parameters to be apparent. It is clear which assessments are favourable or have changed from unfavourable-bad to unfavourable-inadequate, but other changes can be expressed by the trend of the unfavourable conservation status. This trend (or qualifier) can be defined as improving, stable or declining. The qualifier should be based on trends over the reporting period. Trends in conservation status are given separately for unfavourable-inadequate and unfavourable-bad overall conclusions, as presented in Table 3.4. The use of qualifiers (trend of the overall conservation status) allows the more subtle changes (improvement or deterioration) of the unfavourable categories to be identified.

In order to better understand the nature of any changes in conservation status between reporting periods, Member States were also asked to indicate reasons for changes in the assessments of conservation status since the 2001 to 2006 reports. This information was provided separately by Member States for each habitat and species assessment, using the codes provided in Table 3.5.

Therefore, change in conservation status can be genuine (a), non-genuine (b1, b2, c1, c2, e), or due to unknown reasons (d).

Table 3.4 Qualifier classes for assessing trends in the overall unfavourable conservation status and codes used by Member States

Qualifier classes	Conservation status	Trend in conservation status	Code used by Member States
Improving	Unfavourable-inadequate	Improving	U1+
	Unfavourable-bad	Improving	U2+
Stable	Unfavourable-inadequate	Stable	U1=
	Unfavourable-bad	Stable	U2=
Declining	Unfavourable-inadequate	Declining	U1-
	Unfavourable-bad	Declining	U2-
Unknown	Unfavourable-inadequate	Unknown	U1x
	Unfavourable-bad	Unknown	U2x

Table 3.5 Codes used by Member States to report nature of change in conservation status between two reporting periods

a	There is a genuine change: overall conservation status has improved (or deteriorated) due to natural or non-natural reasons (management, intervention, etc.).
b1	The change observed is due to more accurate data (e.g. better mapping of distribution), or improved knowledge (e.g. of ecology of species or habitat).
b2	The change observed is due to a taxonomic review: one taxon becoming several taxa, or vice versa.
c1	The change observed is due to use of different methods to measure or evaluate individual parameters or the overall conservation status.
c2	The change observed is mainly due to the use of different thresholds, e.g. to fix favourable reference values.
d	No information about the nature of change.
e	The change observed is due to absent data, or less accurate data than those used in the previous reporting period.
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).

3.1.2 Results of assessing conservation status of habitats at Member State biogeographical and marine level

This section presents the results of the assessments of the 233 Annex I habitat types from EU Member States, excluding Croatia (which was not part of the EU at the time of reporting). No data were received for Greece (within the agreed cut-off date for the EU assessments) for the reporting period from 2007 to 2012 ([33]). Details on individual countries' biogeographical assessments are provided in the national summaries, which are available on the Article 17 web pages (see http://bd.eionet.europa.eu/activities/Reporting/Article_17/Reports_2013).

In total, 3 032 habitat reports were received from the Member States, 3 022 of which were used for analysis (the remaining 10 were marginal occurrences). Results for the conservation status of habitats vary considerably between Member States. This can be seen in Figure 3.1, which shows the percentage of habitat assessments which fall into each class in each Member State. The majority of Member States indicate a low level of favourable habitats, with some exceptions: Cyprus, Romania, Estonia, Malta and Slovenia reported more than 40% of favourable habitat assessments. A general observation is that all the Member States reporting over 40% of habitat assessments of favourable conservation status are eastern European or south-eastern Mediterranean countries. However, as outlined above, most overall assessments for habitats hold an unfavourable conservation status. Countries reporting the most habitat assessments with unfavourable status are in northern Europe: Belgium, the United Kingdom, Denmark and the Netherlands. In the case of Bulgaria, no unfavourable-bad assessments have been reported, and Spain has the highest share (at approximately 25%) of unknown assessments among EU Member States (see also Table C.5 in Annex C).

Map 3.2 shows the proportion of habitat assessments in each 10 km x 10 km grid cell which are favourable. In particular, north-west Europe has many unfavourable habitat assessments. Moreover, mountain areas (Alpine region) have a high rate of favourable assessments. This map also illustrates the results presented in Figure 3.1, showing that many Member States reporting a higher share (over 40%) of habitat assessments in favourable conservation status are located in eastern and south-eastern Mediterranean countries. Compared to Map 3.3 (Proportion of species assessments which are 'favourable', by 10 km x 10 km grid), it is evident that the favourable conservation status for habitats is worse than for species. Details on data quality and completeness can be found in Section 3.4.

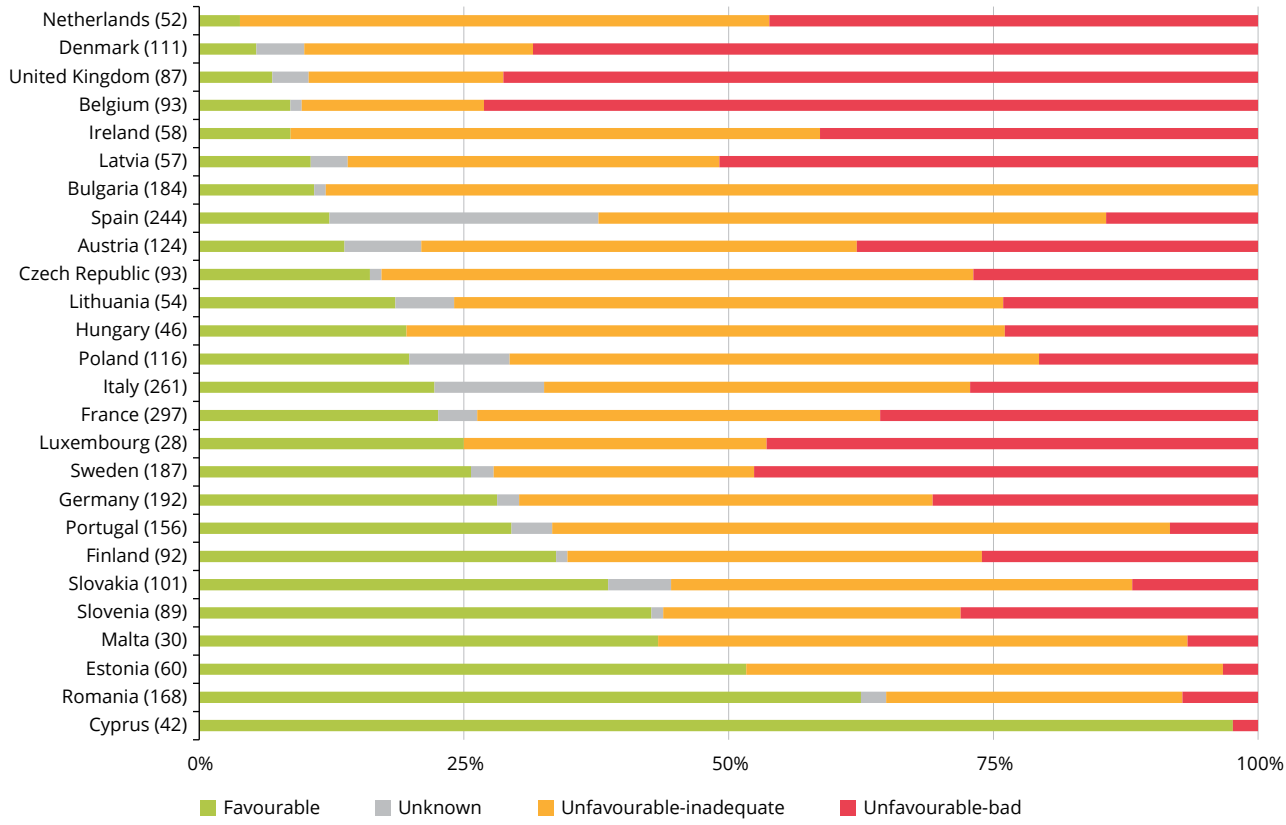
As noted in Section 3.1.1, Member States have reported trends of the overall conservation status over the past 12 years (i.e. 2 reporting cycles).

These trends indicate the following (see Figure 3.2, and Table C.6 in Annex C).

- Almost all Member States report some unfavourable habitat assessments that are improving, ranging from less than 1% (Italy) to almost 31% (United Kingdom); however, no

([33]) Greece delivered its Article 17 report on 9 Januray 2015, i.e. 13 months after the deadline.

Figure 3.1 Proportion of habitat assessments in each conservation class (FV, XX, U1, U2), per Member State, 2007–2012



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 3 022. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

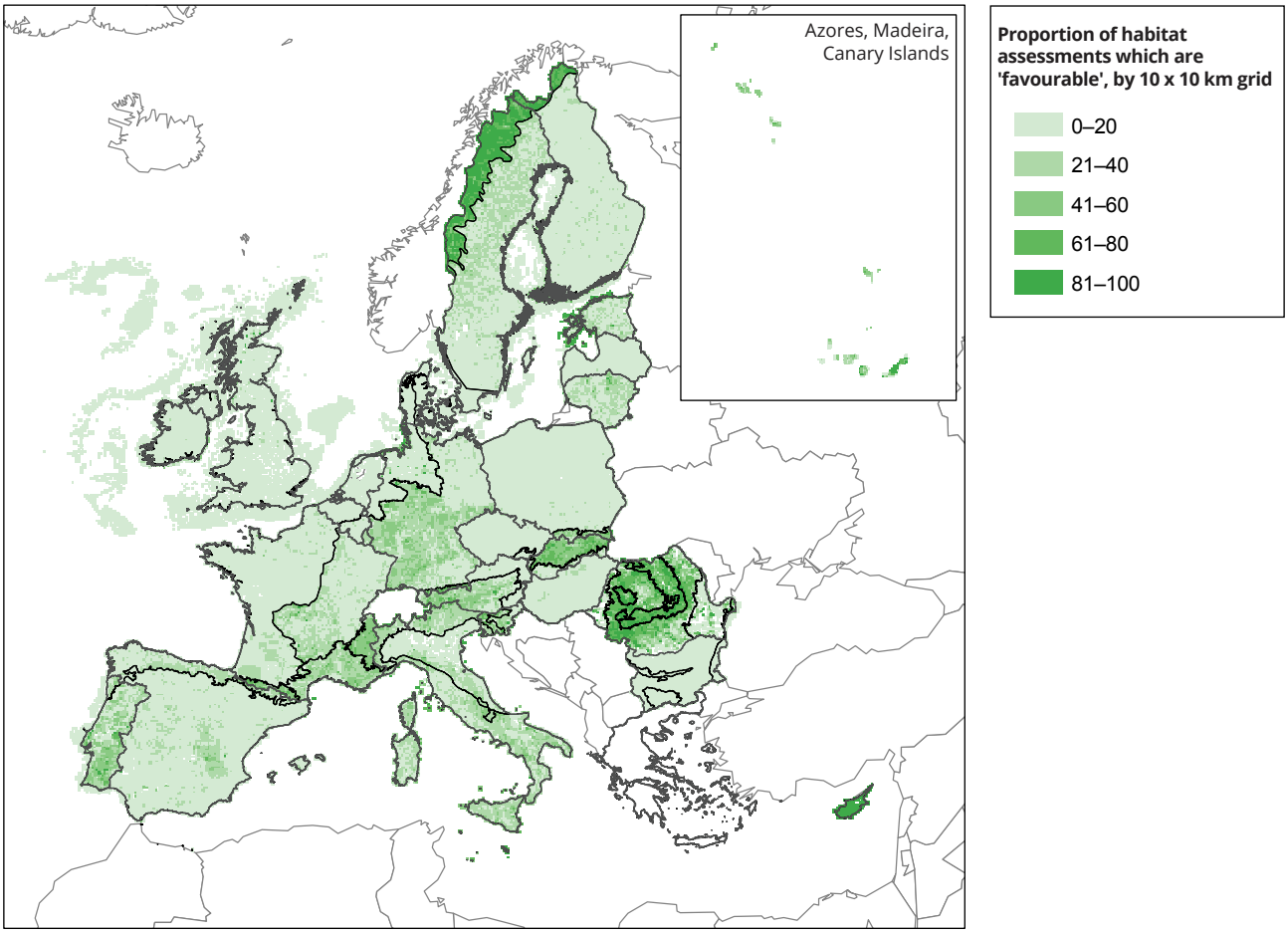
improvements were reported from Romania, Malta, Lithuania and Bulgaria ([34]).

- A major share of the habitat assessments are unfavourable-stable, ranging from approximately 18% (Italy) to almost 100% (Bulgaria); the average rate across Member States is 48%.
- For unfavourable-declining assessments, 6 countries exceed 50% (Lithuania, Italy, Latvia, Sweden, Slovenia and Finland), while Italy has the highest score, with almost 66% of unfavourable-declining assessments.
- Overall, there are more declining than improving habitat assessments.
- The share of unfavourable-unknown habitat assessments is rather small. In total, 17 Member States reported on unfavourable-unknown habitat assessments, ranging from near 6% (Ireland) to approximately 48% (Austria); the average rate across all countries is approximately 20%.

With regard to the number of habitat conservation status assessments classified as unknown, less than half as many habitat conservation status assessments (approximately 6%) are unknown in the current reporting period, as were in the previous monitoring period (approximately 15%). This is largely attributable to Spain where a large number of habitats considered unknown have now been assessed.

([34]) Cyprus also reported no improvements, but for Cyprus, only one habitat was assessed.

Map 3.2 Proportion of habitat assessments which are 'favourable', by 10 x 10 km grid



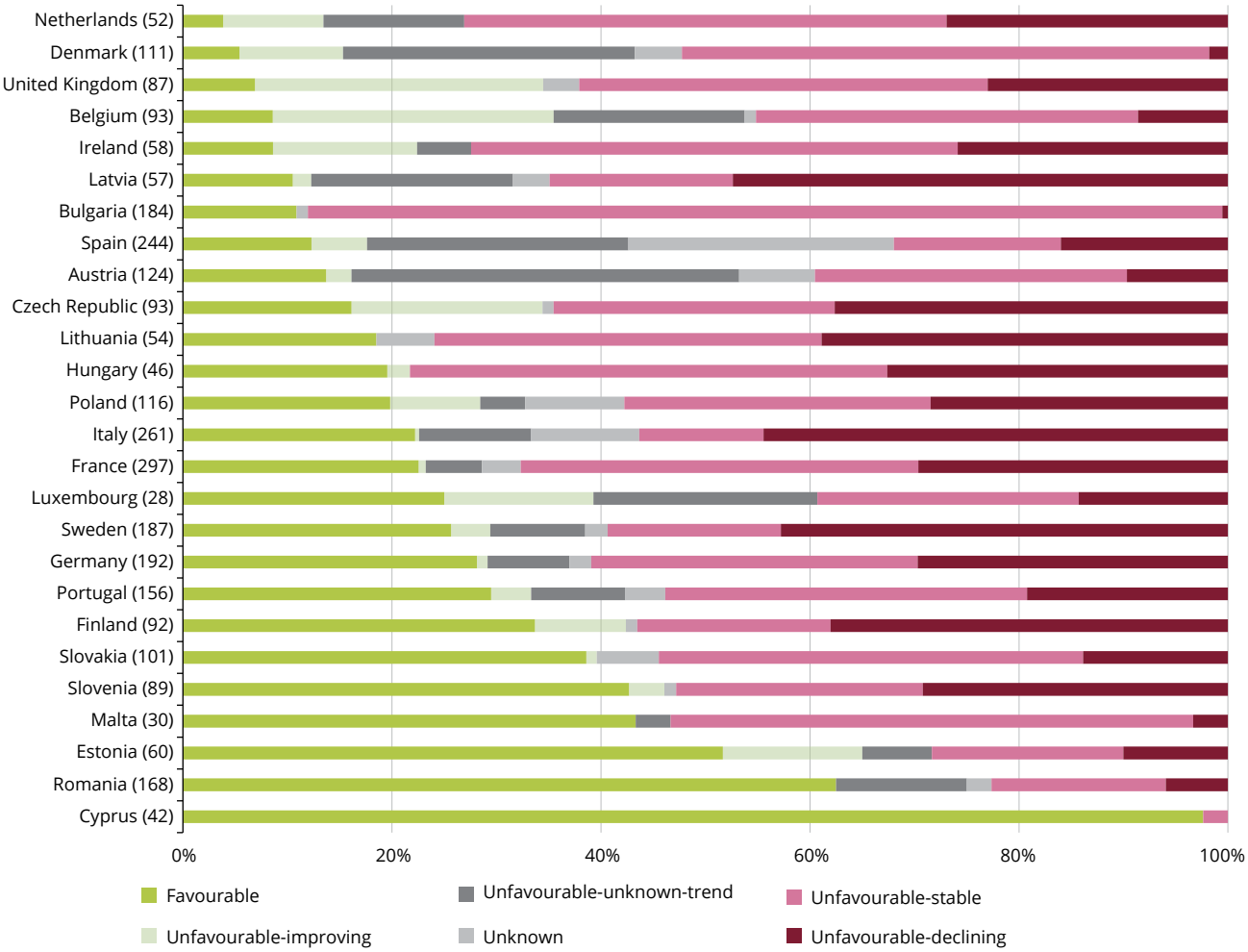
Notes: No colour is reported for the majority of the EU's seas, as no habitats have been reported from these areas.

Source: EEA, 2015b, Article 17 reports and assessments.

Comparing results from the two reporting periods is not straightforward: changes in habitats' conservation status may result from improved data or methodologies, use of different thresholds, or less accurate or absent data, all of which are considered 'non-genuine changes'. 'Genuine changes,' on the other hand, takes place when the overall conservation status improves (or deteriorates) due to natural or non-natural reasons such as management or intervention (see Table 3.5 for the categories of changes used for reporting). The proportion of changes (genuine and non-genuine) make up 38% (2.5% and 35.5%) of the assessments, while approximately 62% of assessments showed no change (see Table C.7 in Annex C).

Genuine changes (improvement or deterioration) of habitats were reported particularly by Ireland, the United Kingdom, Slovenia, Latvia and Germany (ranging from around 12% to 7%). Changes in conservation status due to non-genuine changes were observed in all Member States, ranging from approximately 2% (Latvia) to nearly 79% (Cyprus). However, as already indicated in most Member States, there was no change in habitat assessments (see Figure 3.3). Further information on these changes will be given in Section 3.3.2

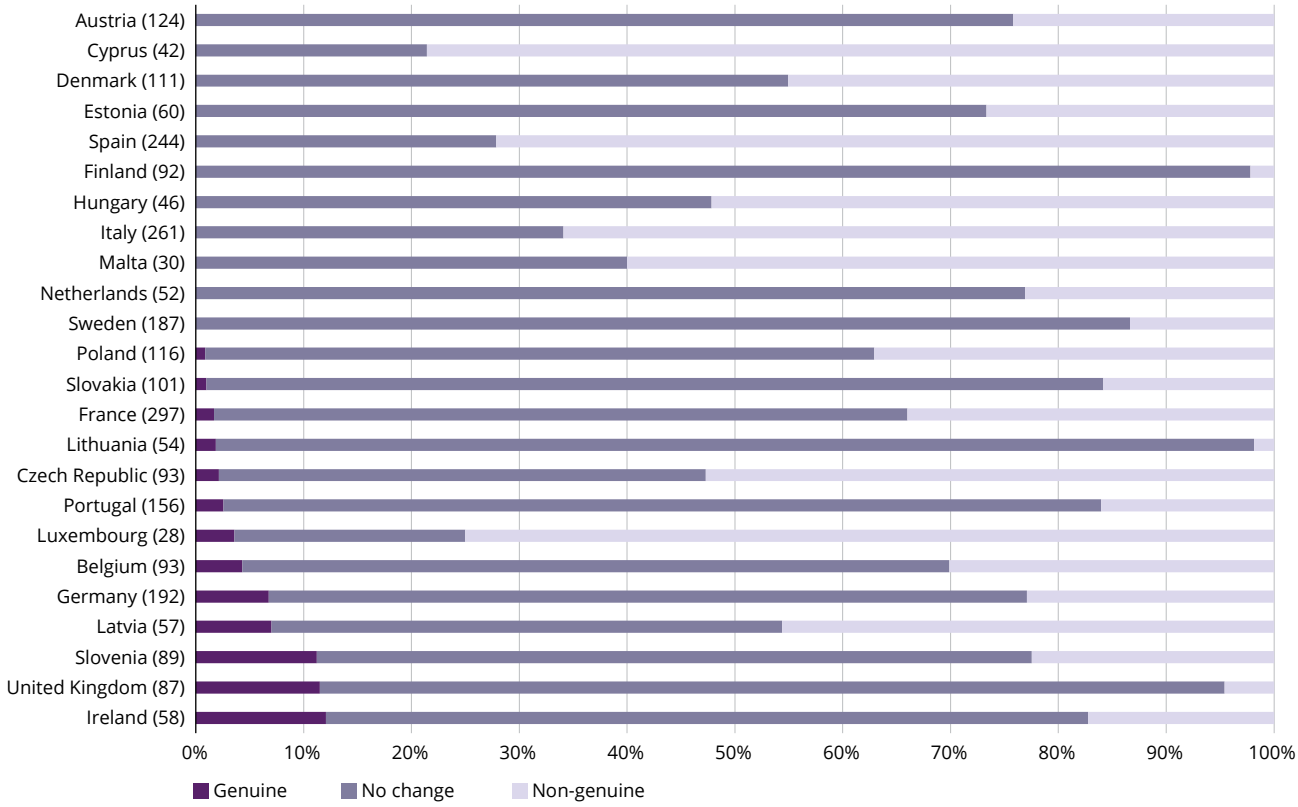
Figure 3.2 Conservation status and trends of habitats assessed as unfavourable at Member State level



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 3 022. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 3.3 Proportion of habitat assessments in each change class (genuine, no change, non-genuine), per Member State, 2007–2012



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 2 670. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

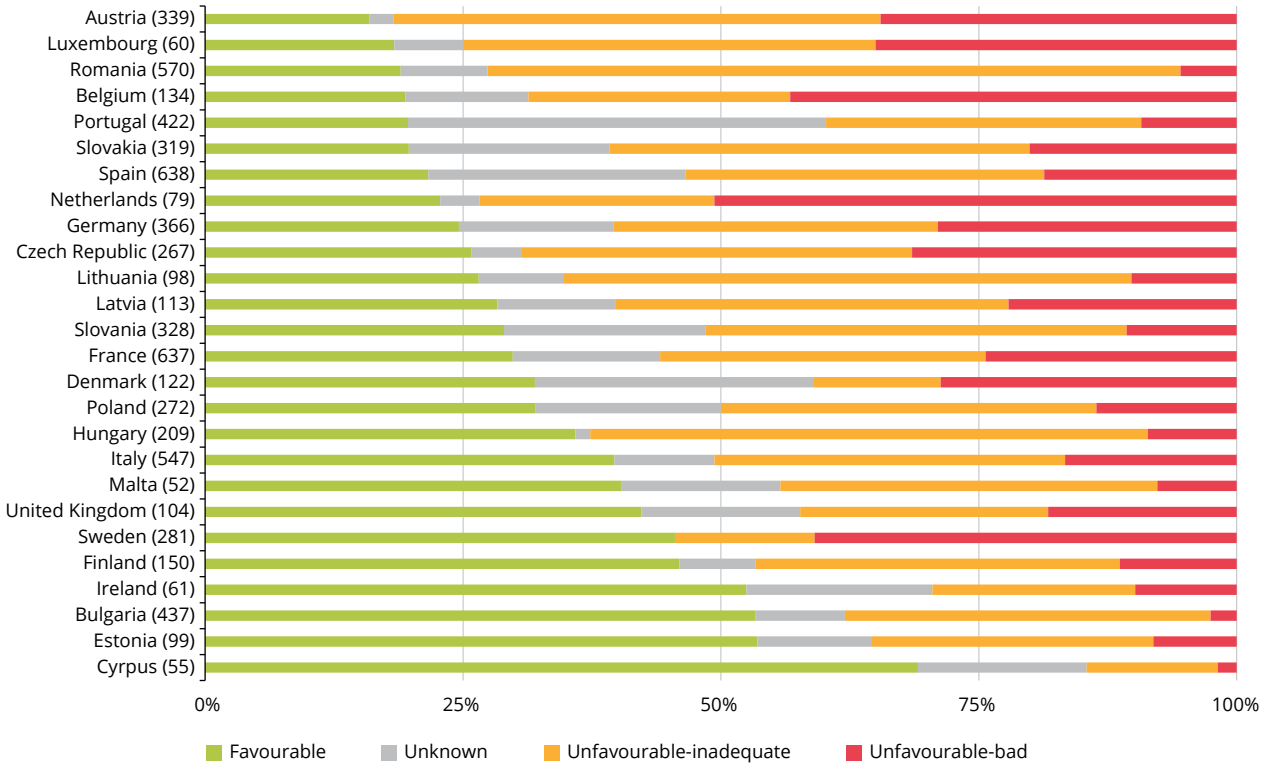
3.1.1 Results of assessing conservation status of species at Member State biogeographical and marine level

This section presents results of the assessments of the more than 1 250 Annex II, IV and V species received from EU Member States, excluding Croatia (which was not part of the EU at the time of reporting). No data were received for Greece for the reporting period from 2007 to 2012 within the cut-off date for the EU assessments. Details on individual countries' biogeographical assessments are provided in the national summaries, available at the Article 17 online information system (http://bd.eionet.europa.eu/activities/Reporting/Article_17/Reports_2013). In total, 7 102 species reports were received from Member States, 6 759 of which were used for statistical analysis.

As shown in Figure 3.4, in almost half of the Member States, about 30% of the species assessments are favourable, and in four Member States (Ireland, Bulgaria, Estonia and Cyprus) more than 50% of species assessments were reported as favourable. The number of unfavourable-bad species assessments exceeds 30% in six countries: the Netherlands, Belgium, Sweden, Luxembourg, Austria and the Czech Republic. A linkage can be observed between Member States reporting high percentages of habitat assessments in favourable status and those with a high percentage of species assessments in favourable status (e.g. Cyprus, Estonia, Finland and Malta). Similar relations can also be observed for countries reporting a high proportion of unfavourable-bad status habitat assessments and unfavourable-bad species assessments (e.g. Austria, Luxembourg, the Netherlands and Belgium). However, this does not hold true in all cases: for example, Romania reported one of the highest percentages of habitat assessments with favourable status, yet had a relatively low percentage of species assessments with favourable status. Some of the variations between Member States' results may also be attributable to differences in data quality and use of methodology (see Section 3.4).

Map 3.3 shows the proportion of species assessments which are favourable, and illustrates part of the results shown in Figure 3.4. Marine species (distribution area) are not included, as a large percentage is unknown. The highest shares of favourable species assessments are reported from northern and north-eastern countries (in particular, Sweden, Finland, Estonia, Latvia, and partly

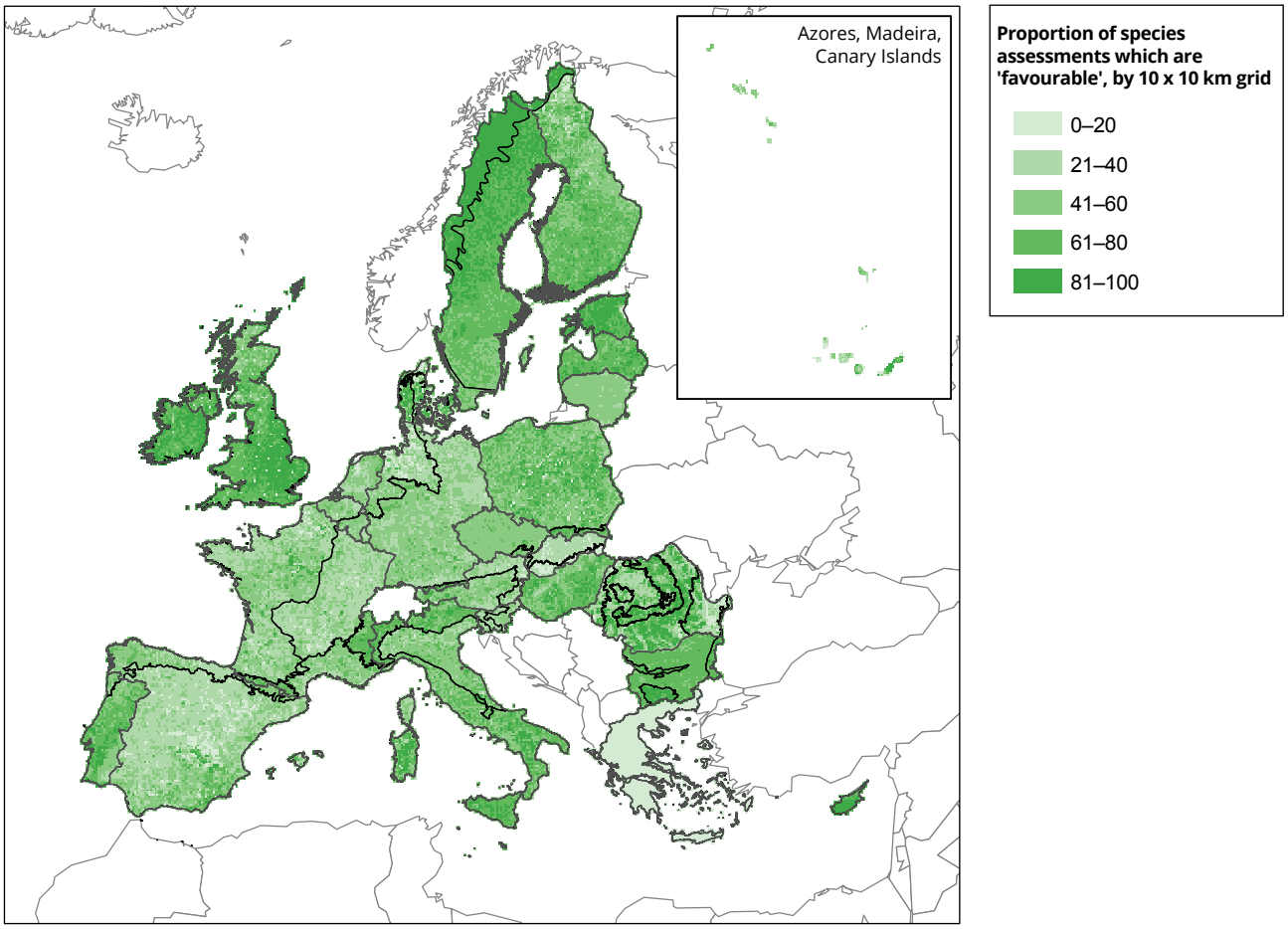
Figure 3.4 Proportion of species assessments in each conservation status class (FV, XX, U1, U2), per Member State (2007–2012)



Notes: These are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 6 759. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Map 3.3 Proportion of species assessments which are 'favourable', by 10 km x 10 km grid (terrestrial only)



Source: EEA, 2015b, Article 17 reports and assessments.

Poland) as well as Ireland and Cyprus. Moreover, higher shares of favourable conservation status are indicated in some Mediterranean countries including Portugal, south Italy and southern France as well as various eastern European countries such as Bulgaria, Hungary and Romania. Overall, higher shares of favourable species assessments can be found in the Alpine and Boreal region, which may result from lower land use pressures or lower population density, respectively, compared to other EU regions. Compared to Map 3.2 (Proportion of habitat assessments which are 'favourable', by 10 km x 10 km grid) and Figures 3.1 and 3.4, it is evident that the favourable conservation status of species is better than for habitats. Details on the data quality and completeness can be found in Section 3.4.

Trends in unfavourable conservation status for species (see Figure 3.5), as reported by Member States, indicate the following.

- Almost all countries (except Romania) show that some of their unfavourable (U1 and U2) assessments are improving. The majority of the countries show between 3% and 20% of their unfavourable assessment to be improving, while the United Kingdom, Denmark, Poland, Belgium and the Netherlands exceed the 20% mark.
- The average share for unfavourable-stable species assessments is 35%; half of the countries fall between 34% (Germany) and 70% (Malta).
- The percentage of countries with unfavourable assessments that are declining ranges from 1.6% (Lithuania) to 79.6% (Italy). Cyprus did not report any of its unfavourable assessments as declining.
- Overall, there are more declining than improving unfavourable assessments.

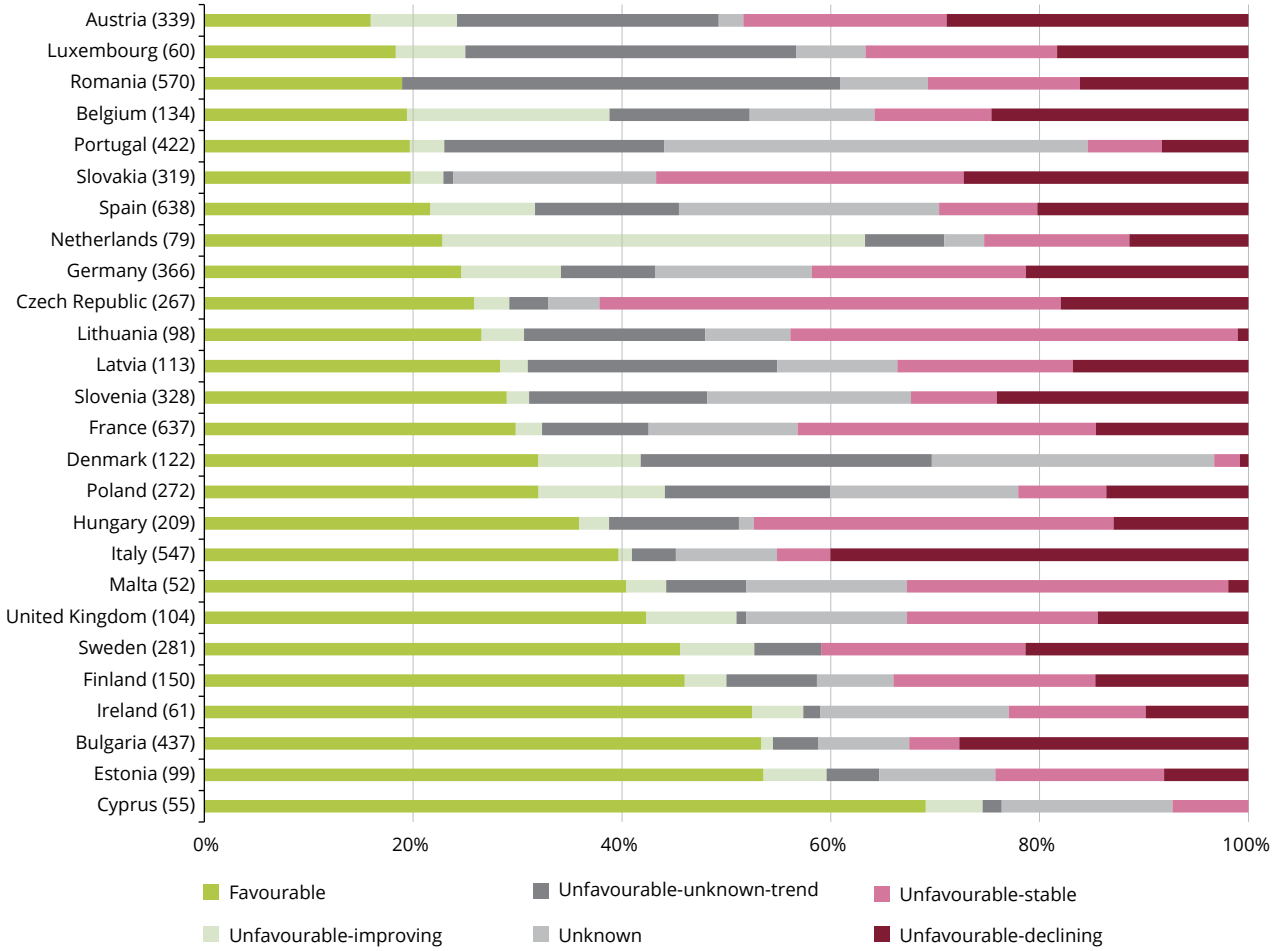
- Overall, there is a high rate of unknown trends in unfavourable assessments (average rate of approximately 22% across countries), which makes it difficult to draw robust conclusions about the trends (see also Table C.10 in Annex C).

There has been an improvement in the completeness of reporting since the last reporting period, where almost 25% of assessments were previously classified as unknown. The number of species conservation status assessments classified as unknown has declined significantly, but is still substantial (nearly 16%).

The majority (58%) of species assessments did not change between reporting periods (see Figure 3.6). Of the remaining 42% where change was recorded, this was only genuine for 4% of assessments. Non-genuine change (37% of assessments) was attributable to improvements in data or changes in methodology. Further details are provided in Table C.7 in Annex C.

Genuine changes (improvement or deterioration) of species were reported particularly by the Czech Republic, Germany and the Netherlands (ranging from 12% to 9%). Changes in conservation status due to non-genuine changes were observed in all Member States, ranging from around 15% in Finland to approximately 70% in Spain. However, in almost all Member States, more than 50% of the species assessments did not change between the 2 reporting periods (except for Cyprus, Spain, Italy and Lithuania). Further information on these changes will be given in Section 3.3.2; see also Table C.11 in Annex C.

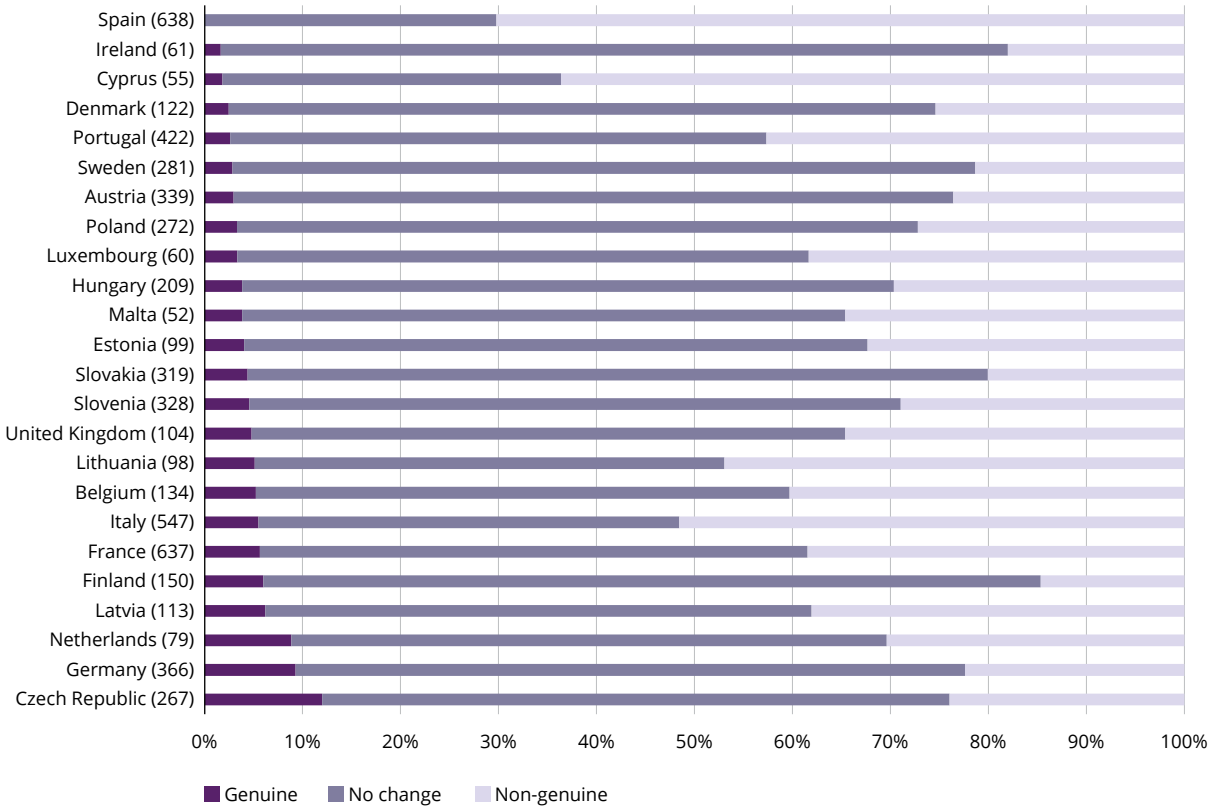
Figure 3.5 Conservation status and trends of species assessed as unfavourable at Member State level



Notes: These are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 6 759. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 3.6 Proportion of species assessments in each change class (genuine, no change, non-genuine), per Member State, 2007–2012



Notes: These are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 5 752. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

3.2 Conservation status at EU biogeographical and marine level

3.2.1 Methodology to assess conservation status at EU biogeographical and marine level

The previous section (Section 3.1) examined conservation status at Member State biogeographical level. This section presents results of the assessment of conservation status at EU regional level, which includes the nine terrestrial biogeographic regions and the five marine regions.

The EU assessment for habitats and species was carried out by combining Member States' data. For parameters such as range, area and population, it is possible, at least in theory, to sum the Member State values and use the conservation status evaluation matrix (see Tables C.1 and C.2 in Annex C). However, this is not possible for qualitative parameters such as future prospects or in cases where data are missing or incompatible (e.g. population sizes reported using different units). Here, Member States' reports are brought together using an agreed, standardised methodology outlining the different parameters and data sources (see Table C.4 in Annex C) ([35]).

Where a habitat or species only occurs in one country within a region (e.g. habitat type '91C0 Caledonian forest' only occurs in the United Kingdom), the EU assessment for the region is the same as the Member State assessment, except in exceptional circumstances where the Member State data do not seem correct. For example, when a national Red Data book suggests a species cannot hold favourable conservation status, the assessor may have used a different evaluation. All such changes are noted in the 'audit trails', available on the Article 17 website. Similarly, when each of the

([35]) See http://forum.eionet.europa.eu/x_habitat-art17report/library/papers_technical/reporting_ver1pdf.

Member States in which a species or habitat is present has reported the same evaluation, this value is also assigned to the EU regional assessment (e.g. the sedge *Carex holostoma* in the Boreal region, assessed as 'favourable'). This is the case for approximately half of the habitats and species.

Where it was not possible to use the countries' background data directly, the overall assessment of the conservation status for each biogeographic or marine region is achieved by weighting the different parameters to reflect the status and proportion of the habitat type or species present in each Member State and biogeographical/marine region, while taking into account the data provided by Member States. Where possible, the four parameters are evaluated individually, and then combined to provide a regional assessment using the same method as that used by the countries. Table 3.6 below indicates the preferred weight for each parameter.

Where a weighting has to be used, the final classification for each region is based on thresholds applied in the same way for all the parameters assessed, and in a set order (see Table 3.7). Although these thresholds are arbitrary, trials showed that changing them made little difference to overall conclusions.

As explained in Section 3.1, the use of qualifiers (the trend of the overall conservation status) allows more subtle changes (improvement or deterioration) of the unfavourable categories to be identified. The use of qualifiers is a new element in comparison to the previous reporting period. This was optional from 2001 to 2006, and was used by only a few countries. The qualifiers reported by the Member States can be weighted using the same methods as used for the assessments of the biogeographic regions (see Figure C.1 and Figure C.2 in Annex C). This time, the methodology called for the qualifiers to be reported more systematically, and can be used for the analysis.

The EU assessments were carried out by the EEA and ETC/BD experts between 7 March and 30 May 2014, followed by a public consultation between 2 June and 7 July 2014 using a web tool, allowing for comments from a wide range of stakeholders. About 24 visitors from 18 network locations across the EU were registered, and nearly 390 comments were received. Of these comments, 60% were considered relevant and were integrated into the online database/information. A variety of comments on the process (e.g. lack of consultation at national level) were also received, either via the web tool or by email/letter.

Final assessments and comments are available on the Eionet website:

- for habitat types, see http://bd.eionet.europa.eu/article17/reports2012/habitat/summary;
- for species, see http://bd.eionet.europa.eu/article17/reports2012/species/summary.

Table 3.6 Weighting of parameters for assessment of overall conservation status

Order of preference	Habitats	Non-bird species
1st	Surface area (from tabular data)	Population (from tabular data)
2nd	Area (from spatial data, 10 km x 10 km grids)	Area (from spatial data, 10 km x 10 km grids)
3rd	Range (from tabular data)	Range (from tabular data)
4th	Range (from spatial data)	Range (from spatial data)

Table 3.7 Criteria for classification of conservation status of habitats and non-bird species

If...	...the habitat/non-bird species is considered...
The proportion of a habitat/non-bird species reported as 'unfavourable–bad' is greater than or equal to 25%	**Unfavourable-bad**
The proportion of a habitat/non-bird species reported as 'favourable' is greater than or equal to 75%	**Favourable**
The proportion of a habitat/non-bird species reported as 'unknown' is greater than or equal to 25%	**Unknown**
Any other combination applies	**Unfavourable-inadequate**

Notes: For more information see ETC/BD (2014).

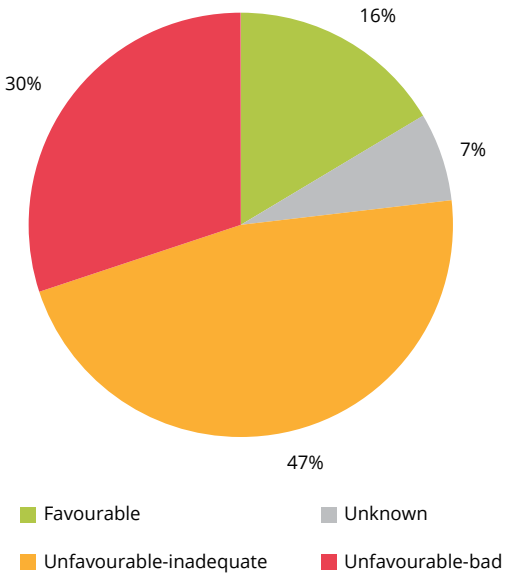
Table 3.8 Number of comments received on assessments of conservation status during the Article 17 (Habitats Directive) public consultation

	Habitats	Species
Member State assessments	110	228
EU assessments	49	114
Total	**159**	**342**

3.2.2 Results of assessing conservation status of habitats at EU biogeographical and marine level

In total, 804 EU regional habitat assessments were produced. Results of the assessments of habitats' conservation status (see Figure 3.7) indicate that in total, 16% of the habitat assessments are favourable; of the 77% of unfavourable assessments, 47% are unfavourable-inadequate and the remaining 30% are unfavourable-bad. Only 7% of the habitat assessments are unknown. Looking at the trends of the unfavourable conservation status, 4% of unfavourable habitat assessments are improving and 33% are stable. By contrast, 30% of unfavourable habitat assessments are declining (see Figure 3.8).

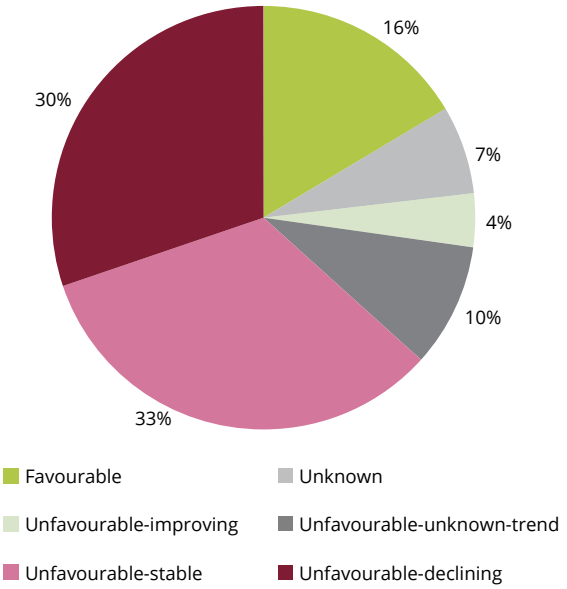
Figure 3.7 Proportion of habitat assessments in each conservation status class (FV, U1, U2, XX) at EU-27 level, 2007–2012



Notes: The total number of assessments is 804.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 3.8 Conservation status and trends in conservation status for habitats assessed as unfavourable at EU-27 level, 2007–2012



Notes: The total number of assessments is 804.

Source: EEA, 2015b, Article 17 reports and assessments.

The number of regional habitat conservation status assessments classified as unknown has decreased significantly from the last reporting period (from 13% to 7%), something which stems mainly from the fact that Spain had reported a high number of unknown conservation status assessments in the previous period.

Figure 3.9 provides an overview of the current conservation status (proportion of assessments, i.e. favourable, unfavourable-inadequate, unfavourable-bad and unknown) of habitats in each of the biogeographical and marine regions for the 2007–2012 reporting period (see also Table C.12 in Annex C).

For the biogeographical and marine regions, the following observations were made.

- the proportion of favourable habitat assessments ranges between 4.5% and 50%. The Alpine, Macaronesian and Steppic regions stand out with comparatively high shares of habitat assessments holding favourable conservation status (from 25.6% to 50%).
- unfavourable-inadequate assessments have been reported more frequently than unfavourable-bad assessments.

- the Atlantic and Boreal habitats show a particularly high proportion of unfavourable-bad assessments; in each of the regions, these comprise over 50% of assessments.

For the marine regions, where only a few habitat types are included in Annex I of the Habitats Directive, the following observations are apparent:

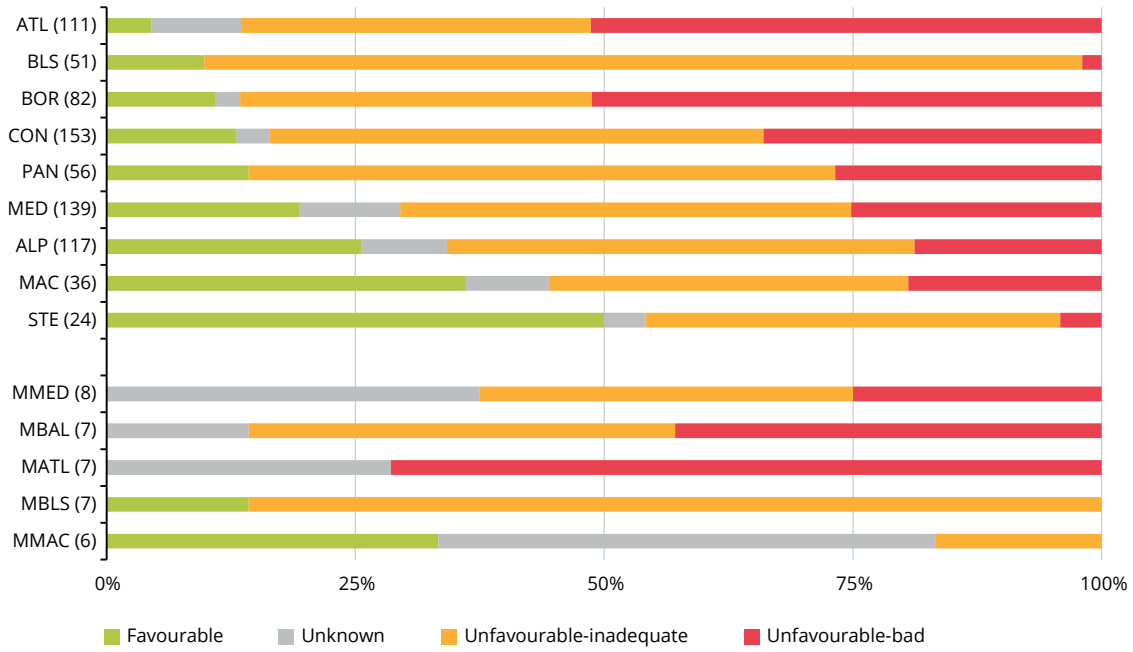
- the only two marine regions reporting favourable habitat assessments are the Marine Macaronesian region (33.3%) and the Marine Black Sea region (14.3%);
- the Marine Atlantic and Marine Baltic regions show a particularly high proportion of unfavourable-bad assessments, with 71.4% and 42.9%, respectively;
- the share of unknown assessments is also higher than for the terrestrial biogeographic regions.

Figure 3.10 provides an overview of the trends in unfavourable conservation status per region. It shows that in the majority of the biogeographic regions, unfavourable assessments are predominantly stable, with the exception of the Boreal region, where almost half the habitats are unfavourable and declining. In total, 5 biogeographic regions reported habitats under improving conditions, ranging from around 1% (Mediterranean) to 11% (Atlantic).

For marine regions, there is a significant share of improving unfavourable habitats for the Marine Atlantic region (43%), followed by the Marine Macaronesian region with almost 17%. By contrast, the share of declining habitats assessments in the Marine Baltic region exceeds 70%, followed by the Marine Black Sea region with 43%. However, these results may also be attributable to the very low number of assessments available for marine regions, as compared to the much higher number of assessments for the biogeographic regions (see also Table C.13 in Annex C).

Figure 3.11 gives an overview of conservation status by habitat group (based on the *Interpretation Manual of European Union Habitats* (EC, 2013)). Dune habitats have the lowest proportion of favourable assessments, while rocky habitats have the highest. Such habitats are predominantly found in mountains, and this is consistent with the high proportion of favourable assessments in the Alpine biogeographical region (compare to Figure 3.9). However, the habitat group with the highest proportion of assessments which are unfavourable and deteriorating is bogs, mires and fens (see Figure 3.12). Dune habitats have the highest proportion of unfavourable-stable trend.

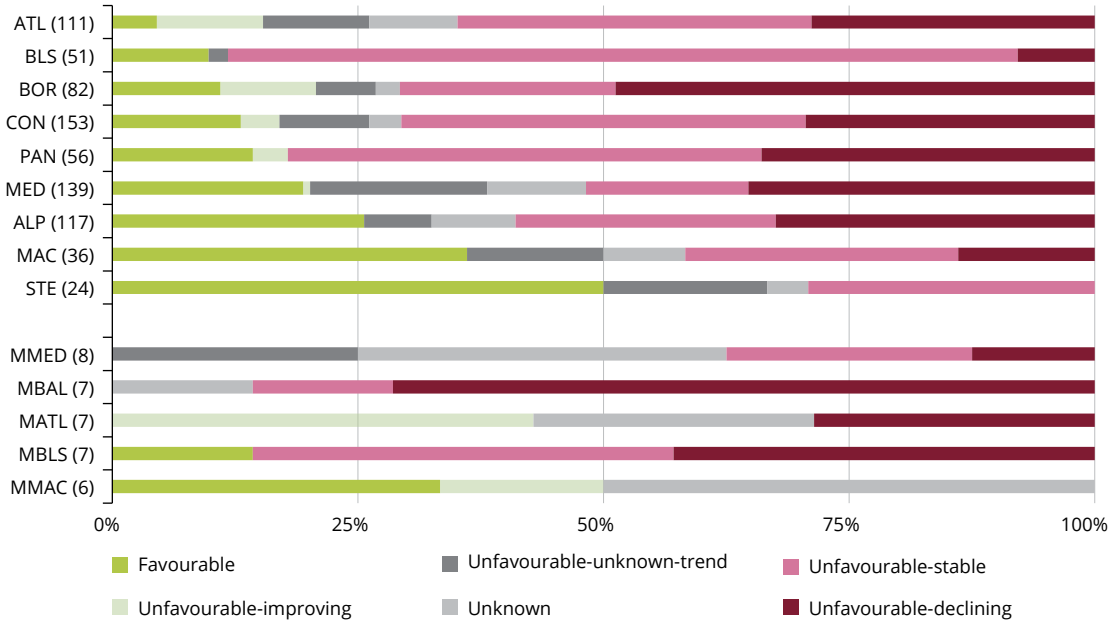
Figure 3.9 Proportion of habitat assessments in each conservation status class (FV, U1, U2, XX), per biogeographic and marine region, 2007–2012



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 804.

Source: EEA, 2015b, Article 17 reports and assessments.

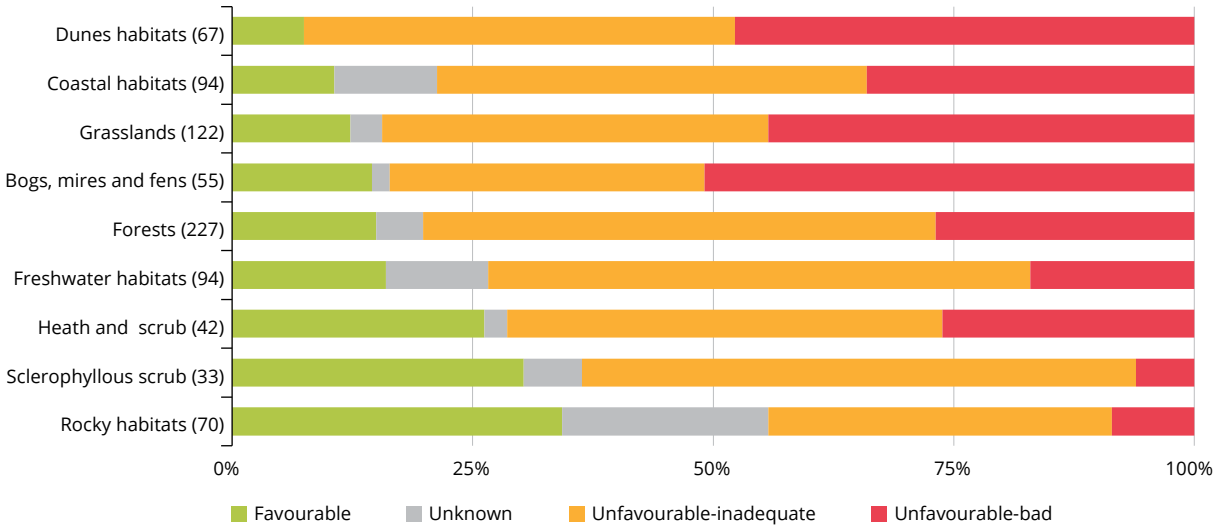
Figure 3.10 Conservation status and trends in conservation status for habitats assessed as unfavourable, per biogeographic and marine region



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 804.

Source: EEA, 2015b, Article 17 reports and assessments.

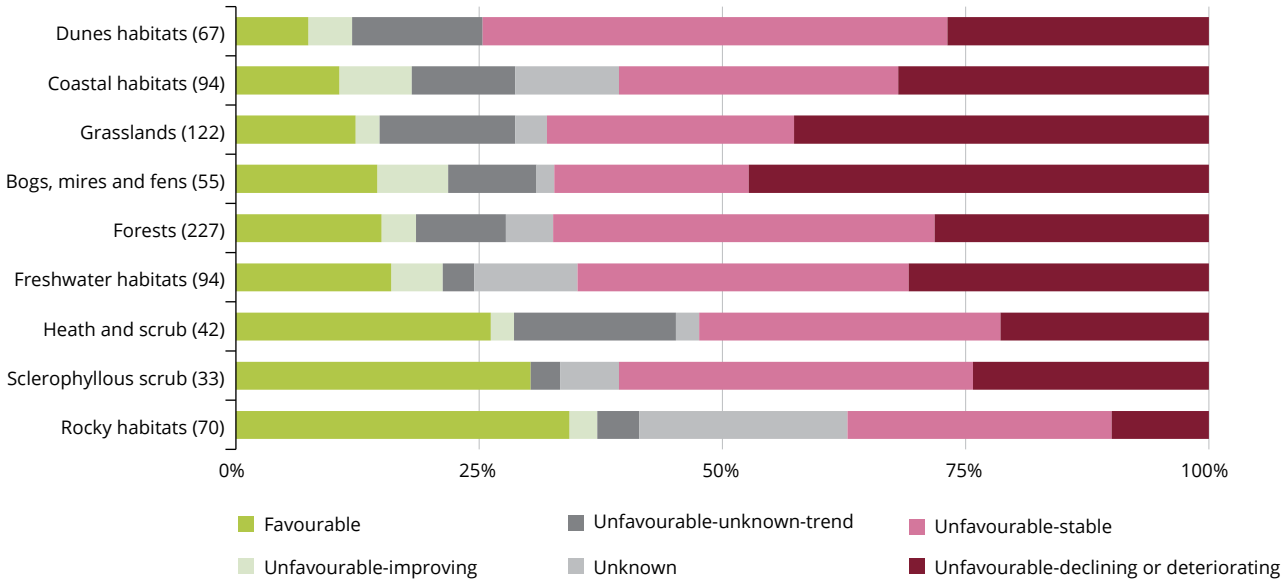
Figure 3.11 Proportion of habitat assessments in each conservation status class, per Annex I category



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 804.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 3.12 Conservation status and trends of habitats assessed as unfavourable, per Annex I category



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 804.

Source: EEA, 2015b, Article 17 reports and assessments.

3.2.3 Results of assessing conservation status of species at EU biogeographical and marine level

In total, 2 665 EU regional species assessments were made. Results of the assessments of conservation status of species (see Figure 3.13) indicate that 23% of species assessments are favourable. The major share (60%) of the assessments reveals an unfavourable conservation status, and 18% of this share has been reported as unfavourable-bad. Around 17% of the assessments are unknown.

The number of regional species conservation status assessments classified as unknown has decreased significantly from the last reporting period (from 26% to 17%), but still remains high.

Looking at the trends of the unfavourable conservation status, as for the habitat assessments, 4% of unfavourable species assessments are improving, but only 20% are stable. In total, 22% of the assessments are declining, and 14% of unfavourable species assessments remain unknown (see Figure 3.14).

Half the species assessments reported a change (3% a genuine change, and 47% a non-genuine change), and half (50%) exhibited no change (see Table C.7 in Annex C). The high proportion of 'non-genuine change' among assessments is largely due to the reduction of unknown species assessments.

Figure 3.15 provides an overview of the current conservation statuses (proportion of assessments, i.e. favourable, unfavourable-inadequate, unfavourable-bad and unknown) of species in each of the biogeographical and marine regions for the period from 2007 to 2012 (see also Table C.14 in Annex C).

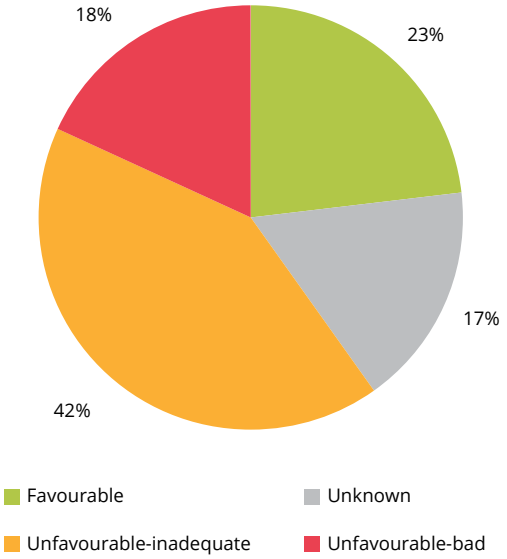
For the biogeographic regions, the following observations were made.

- the proportion of favourable species assessments ranges between 15% and 32%. The highest shares of favourable conservations status were reported from the Black Sea and Alpine regions (exceeding 30%);
- for most of the regions, an unfavourable-inadequate conservation status was reported, ranging from 26% (Macaronesian region) to 71% (Steppic region);
- in the Atlantic (32%) and Boreal regions (29%), the share of unfavourable-bad species assessments are the highest among all regions.

For the marine regions, where the number of species assessed was rather low (around 60, with many occasional) compared to the terrestrial biogeographic regions, the following observations were made:

- all marine regions (except the Marine Black Sea) reported favourable habitat assessments (ranging from 2.4% to 20%);

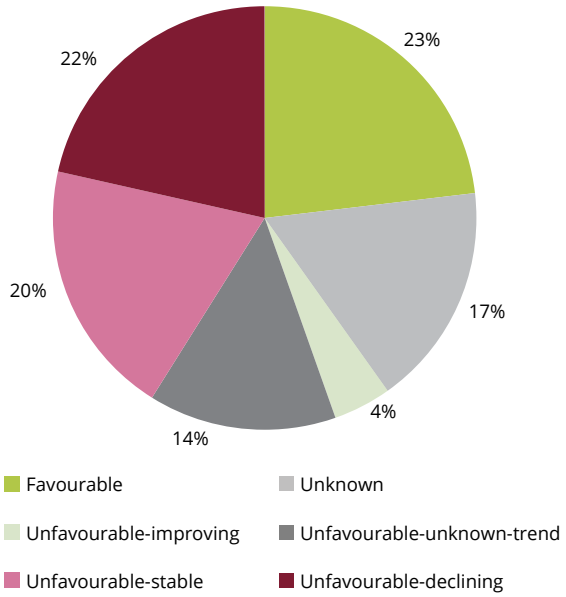
Figure 3.13 Proportion of non-bird species assessments in each conservation status class (FV, U1, U2, XX) at EU-27 level, 2007–2012



Notes: These are species from the Habitats Directive. The total number of assessments is 2 665.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 3.14 Conservation status and trends in conservation status for non-bird species assessed as unfavourable at EU-27 level, 2007–2012



Notes: These are species from the Habitats Directive. The total number of assessments is 2 665.

Source: EEA, 2015b, Article 17 reports and assessments.

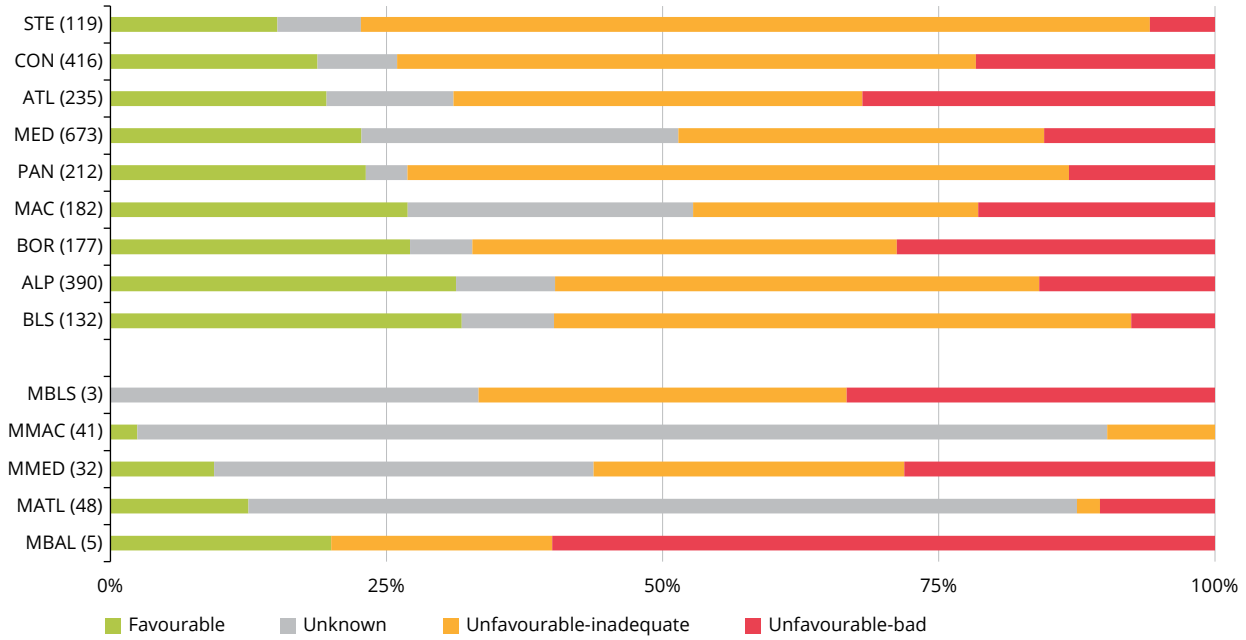
- the Marine Baltic region indicates a rate of 60% of unfavourable-bad species assessments, and is by far the highest, but it only concerns five species;
- the share of unknown assessments is also apparently higher than for the biogeographic regions (ranging between 33% and 88%);
- for the Marine Black Sea region, 100% of the species assessments reported as known are in unfavourable-inadequate or unfavourable-bad conservation status, but they only concern three species.

Figure 3.16 provides an overview of the trends in conservation status of species per region. It shows that unfavourable conditions in the biogeographic regions vary significantly between regions. For example, while the Black Sea and Continental regions show predominantly unfavourable-declining conditions, the Pannonian region is predominantly unfavourable-stable, and the Steppic region is predominantly unfavourable-unknown. The Boreal and Atlantic regions also show higher proportions of unfavourable-improving conditions, at 9.0% and 6.8%, respectively. Only the Macaronesian region exceeds these shares, with 12.1% of unfavourable-improving species assessments.

For marine regions, there is a significant share of improving species for the Marine Baltic region (60%); however, only 5 assessments for this region were available. Moreover, the share of species assessments under improving conditions in marine regions overall is low and only otherwise occurring in Marine Macaronesian and Marine Mediterranean regions. The category 'unknown' predominates in all of the marine regions, with the exception of the Marine Baltic region. The Marine Black Sea shows the highest proportion for unfavourable-declining assessments (33%); however, only 3 assessments for this region were available (see also Table C.15 in Annex C).

Figure 3.17 provides an overview of the current conservation statuses (proportion of assessments, i.e. favourable, unfavourable-inadequate, unfavourable-bad and unknown) of species, by taxonomic group. Excluding 'other invertebrates' which is a small and varied group, fish have the lowest proportion of assessments as favourable, while vascular plants have the highest.

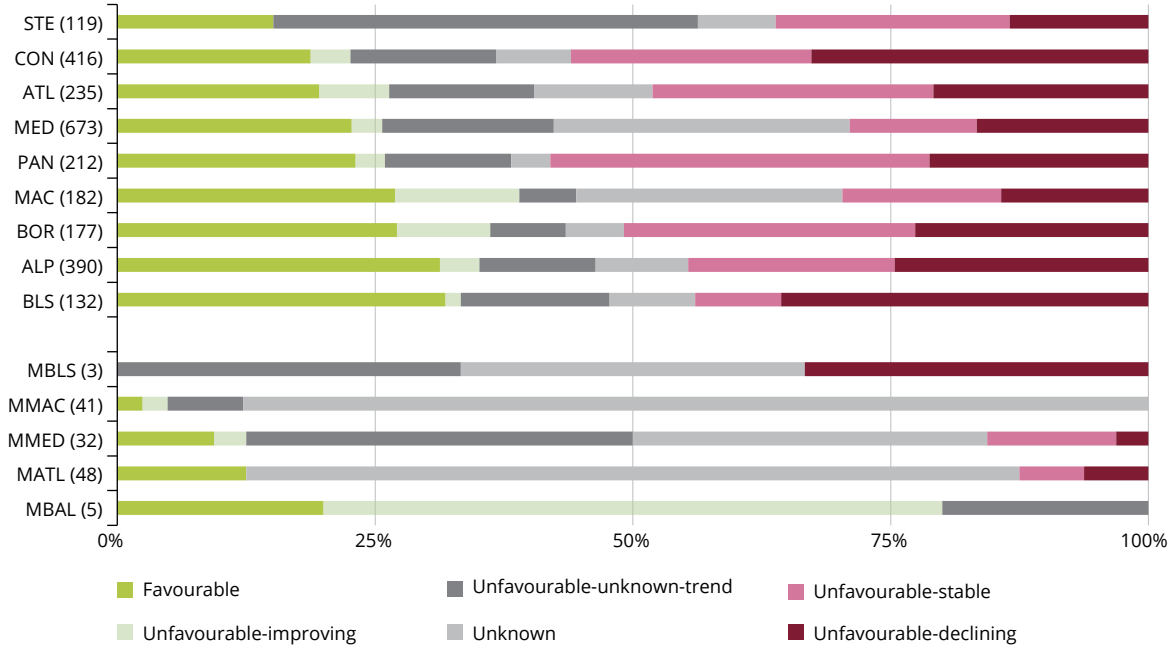
Figure 3.15 Proportion of non-bird species assessments in each conservation status class (FV, U1, U2, XX), per biogeographic and marine region, 2007–2012



Notes: These are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 2 665.

Source: EEA, 2015b, Article 17 reports and assessments.

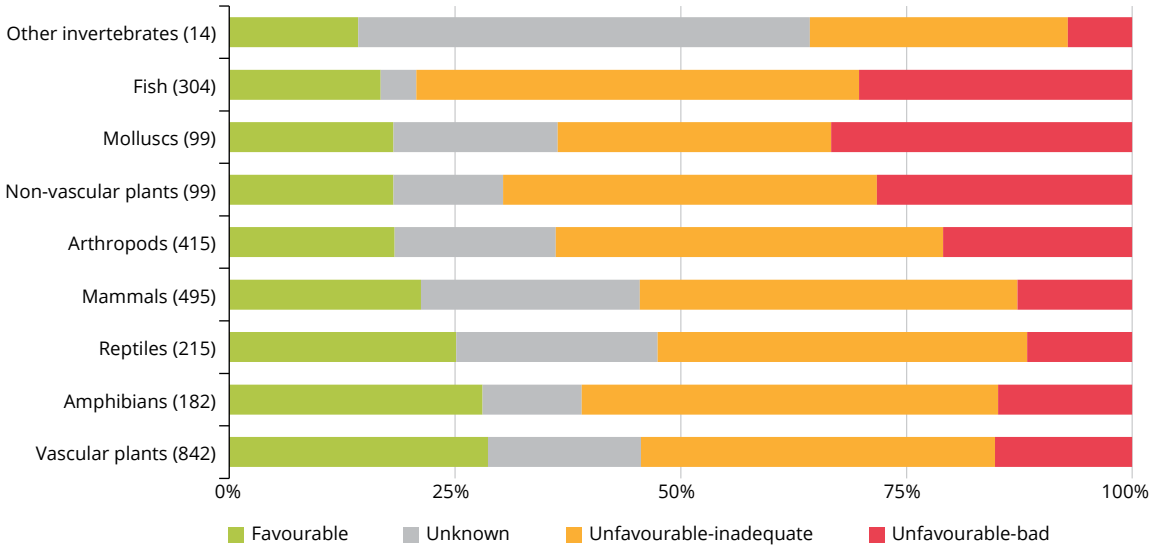
Figure 3.16 Conservation status and trends in conservation status for non-bird species assessed as unfavourable, per biogeographic and marine region



Notes: These are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 2 665.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 3.17 Proportion of non-bird species assessments in each conservation status class (FV, U1, U2, XX), per taxonomic group, 2007–2012

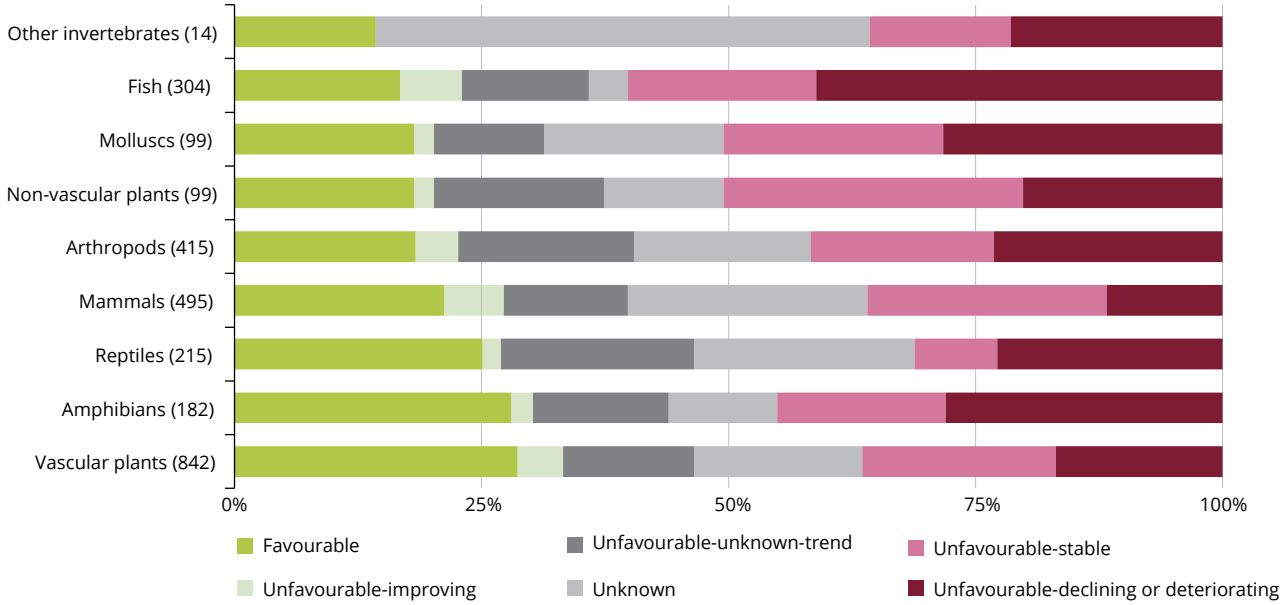


Notes: These are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 2 665.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 3.18 provides an overview of the trends in conservation status of species, per taxonomic group. The proportion assessments which are unfavourable and deteriorating is particularly high for fish, molluscs and amphibians, all associated with wetlands and freshwater.

Figure 3.18 Conservation status and trends of species assessed as unfavourable, per taxonomic group



Notes: These are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 2 665.

Source: EEA, 2015b, Article 17 reports and assessments.

3.3 Pressures and threats

3.3.1 Methodology to assess pressures and threats

As indicated in Section 2.1.2, pressures are considered to be factors acting now or during the reporting period (i.e. 6 years) to hinder the long-term viability of the habitat or species types, whereas threats are factors expected to be acting in the near future (i.e. 12 years into the future). Moreover, these threats should not be considered theoretical, but rather those judged to be reasonably likely to occur.

The list of pressures and threats used for the assessment can be found on the Article 17 Reference Portal ([36]).

The list groups threats and pressures into several hierarchical levels, containing 17 headings on the 1st hierarchical level, 75 categories at the 2nd hierarchical level, 209 categories at the 3rd hierarchical level, and 112 categories at the 4th hierarchical level, representing increasingly narrow categorisation. An exemplary list of Level 1, 2 and 3 headings for pressure and threat categories can be found in Annex A (see Table A.1). The same list is used for the Standard Data Form for Natura 2000 reporting and Article 12 reporting.

In addition to the type of pressure and threat for each habitat and species, Member States also ranked the relative importance of the pressure or threat into one of three categories, as shown in Table 3.9 below.

In contrast to Article 12 reporting, under Article 17 reporting, Member States reported separately on pressures and threats. However, as the differences between reported pressures and threats are generally quite small, for this chapter the data on pressures and threats at Level 1 have been combined, as with the Article 12 reported data on pressures and threats.

Therefore, while Chapter 3 focuses mainly on overall and high-ranked pressures and threats for habitats and species at Level 1, Chapter 4 on ecosystems will provide a more detailed assessment of pressures and threats for species and habitats at Level 2, for each individual ecosystem.

3.3.2 Results of assessing pressures on and threats to habitats

A total of 23 044 habitat pressures and 23 443 threat entries have been reported, encompassing high, medium and low importance/impacts for 15 Level 1 categories. These entries have been aggregated at Level 2 to allow for comparison between Member States, providing a total of 20 137 habitat pressure and 20 505 threat entries. The detailed distribution of entries per category and their respective high-level importance/impact percentages are outlined in Table C.17 in Annex C.

At Level 1, 'agriculture' and the 'modification of natural conditions' are the two most frequently reported **high-ranked** pressures/threats to habitats (accounting for approximately 19% each of all reported high-ranked pressures/threats). It should be noted that many activities reported under 'modification of natural conditions' may also result from agricultural activities such as drainage. Pressures reported at Level 2 serve in part to identify the main impacting factors within each of these overarching categories. Agricultural pressures/threats refer predominantly to fertilisation, grazing by livestock, and the abandonment of pastoral systems/lack of grazing, for instance. The modification of natural conditions includes changes in hydraulic conditions, modifications of hydrographic functioning and water abstraction from groundwater.

Regarding the **overall rankings**, 'agriculture' continues to be the most frequently reported at Level 1 (15% of all reported pressures/threats), followed by 'disturbances due to human activities', the 'modification of natural conditions', and 'natural processes (excluding catastrophes)' (approximately 10% each). 'Disturbances due to human activities' includes, for example, the

Table 3.9 Categories for ranking pressures and threats

Code	Meaning	Comment
H	High importance/impact	Important direct or immediate influence and/or acting over large areas.
M	Medium importance/impact	Medium direct or immediate influence, mainly indirect influence and/or acting over moderate part of the area/acting only regionally.
L	Low importance/impact	Low direct or immediate influence, indirect influence and/or acting over small part of the area/acting only regionally.

([36]) See http://bd.eionet.europa.eu/activities/Reporting/Article_17/reference_portal.

following Level 2 pressures/threats: outdoor sports, leisure and recreational activities, sport and leisure infrastructures, and other human intrusions and disturbances. Finally, 'natural processes (excluding catastrophes)' refers to vegetation succession/ biocenotic evolution, abiotic natural processes and interspecific faunal relations, among other factors. The frequency of **total** Level 1 pressures and threats reported for habitats is illustrated in Figure 3.19.

For the majority of the overall and high-ranked categories, the frequency of pressures is equal to or (slightly) greater than the frequency of threats in the same category. A notable exception is 'climate change', for which the threat was reported almost twice as frequently as the pressure.

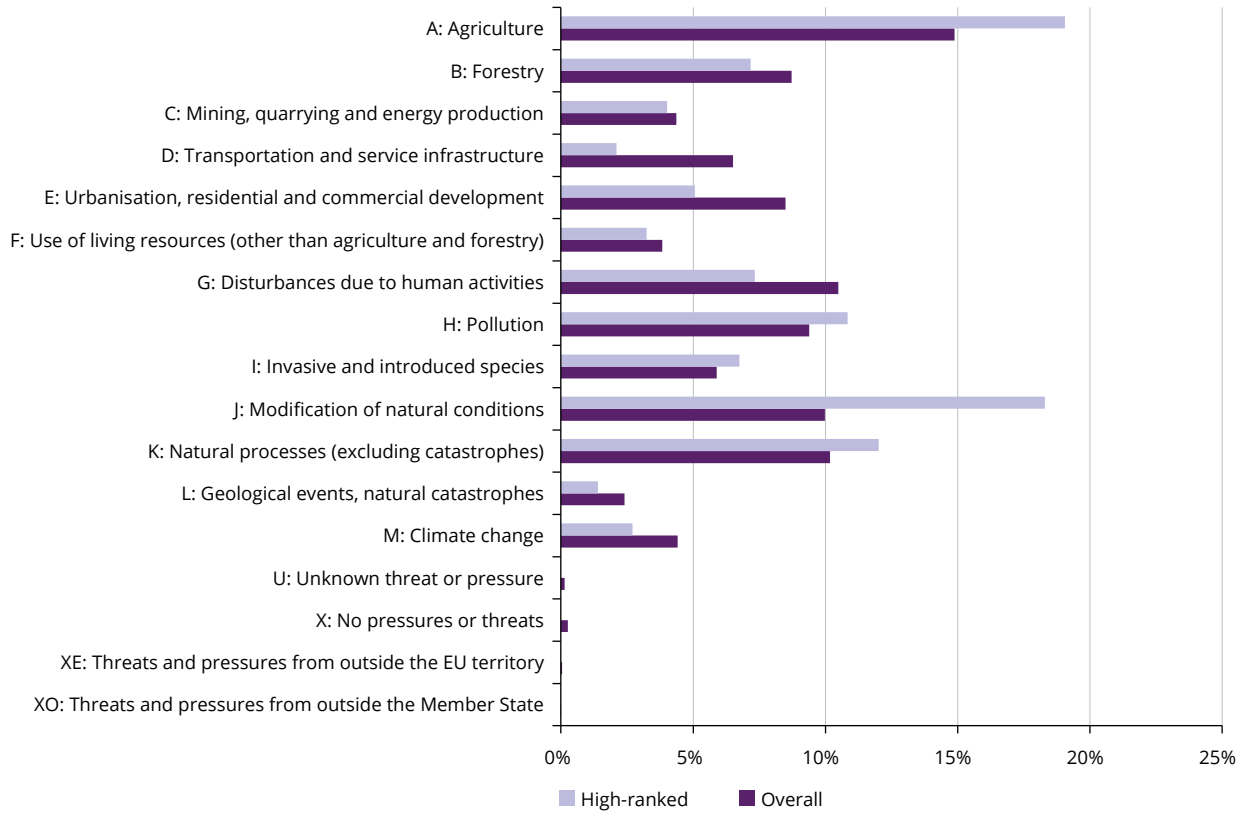
Member States were given the option of using a qualifier for pollution (nitrogen, phosphor/phosphate, acidification, toxic inorganic chemicals, toxic organic chemicals and mixed pollutants), but only nine countries chose to do so. Despite this limitation, it is nevertheless clear that 'nitrogen deposition' presents the greatest pollution pressure. This threat is reported at a 78% frequency for 'bogs, mires and fens' and at a 50% to 60% frequency for dunes, forests, grasslands, heath and scrub, rocky habitats and sclerophyllous scrub.

Reports from across the European biogeographical regions are largely consistent with the findings on habitat pressures and threats noted above.

However, several notable differences are also worth highlighting:

- while 'natural processes (excluding catastrophes)' is reported at only a 12% frequency in the high-ranked Level 1 habitat pressures, this factor represents 28% of pressures in the Pannonian region;
- 'climate change' makes up only 1% of the reported high-ranked pressures overall, but represents 14% of all pressures in the Steppic region;
- the pressure caused by 'urbanisation, residential and commercial development' is reported to be almost three times higher than the average in the Black Sea and Mediterranean regions.

Figure 3.19 Frequency (%) of Level 1 pressures and threats (together) reported for habitats



Notes: The total number of assessments for high-ranked and overall threats and pressures is 5 128 and 21 979, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

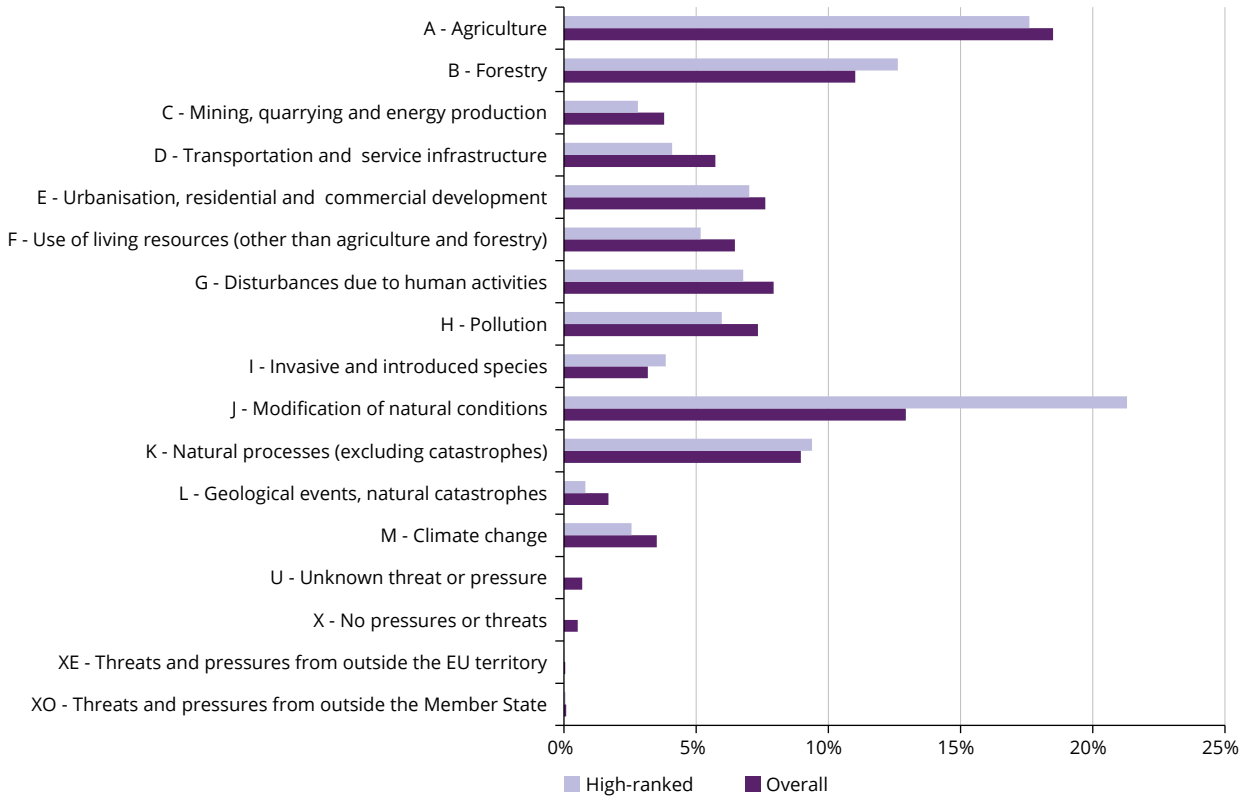
3.3.3 Results of assessing pressures on and threats to non-bird species

A total of 41 782 species pressures and 42 775 threat entries were reported, encompassing high-, medium- and low-importance impacts for 15 Level 1 categories. These entries have been aggregated at Level 2 to allow for comparison between Member States, providing a total of 34 239 species pressures and 34 965 threat entries. The detailed distribution of entries per category and their respective high-level importance/impact percentages are outlined in Table C.18 in Annex C.

In Figure 3.20, 'modification of natural conditions' and 'agriculture' are the two most frequently reported **high-ranked** Level 1 pressures/threats for non-bird species (each reported at an approximately 19% frequency). The main pressures/threats included within the 'modification of natural conditions' are described at Level 2, and include human-induced changes in hydraulic conditions, anthropogenic reduction of habitat connectivity and modification of hydrographic functioning. The next most frequently reported high-ranked ranked Level 1 pressure/threat, at approximately 12%, is 'natural processes (excluding catastrophes)' (e.g. vegetation succession/biocenotic evolution, abiotic natural processes and interspecific floral/fauna relations), closely followed by pollution at 11% (e.g. pollution to surface waters and groundwater, and air pollution/airborne pollutants) (see Box 3.1).

The **overall** ranking of Level 1 pressures/threats (i.e. high, medium and low importance) diverges slightly from the high-ranked ordering. While 'agriculture' remains the most frequently reported pressure/threat overall (making up 15% of all pressure/threat reports), the subsequent ranking differs. Following 'agriculture', the second most frequently reported pressures/threats at Level 1 are 'disturbances due to human activities', the 'modification of natural conditions', and 'natural processes (excluding catastrophes)', each reported at approximately 10% frequency overall. 'Disturbances due to human activities' include, for example, the following Level 2 pressures/threats: outdoor sports, leisure and recreational activities, and other human intrusions and disturbances.

Figure 3.20 Frequency (%) of total Level 1 pressures and threats (together) reported for species of the Habitats Directive

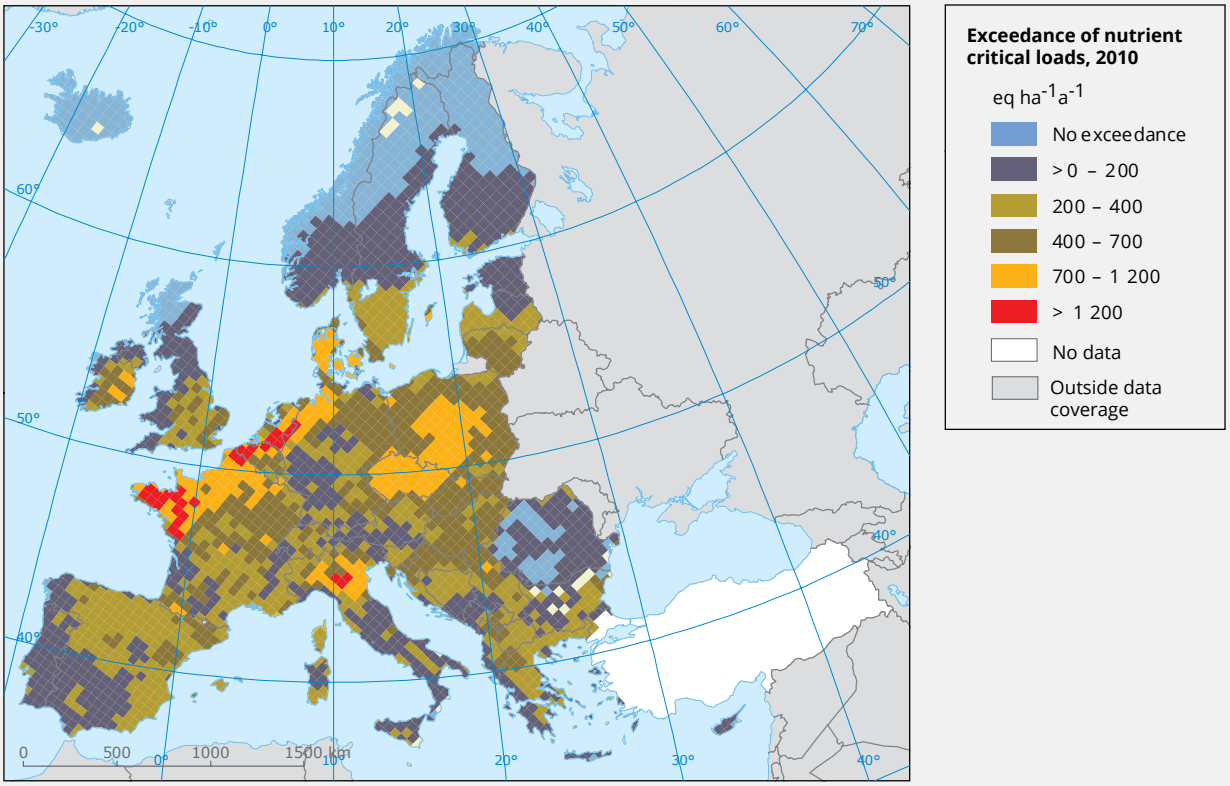


Notes: These are species from the Habitats Directive. The total number of assessments for high-ranked and overall threats and pressures is 11 011 and 37 976, respectively. Greece did not provide an Article 17 report.

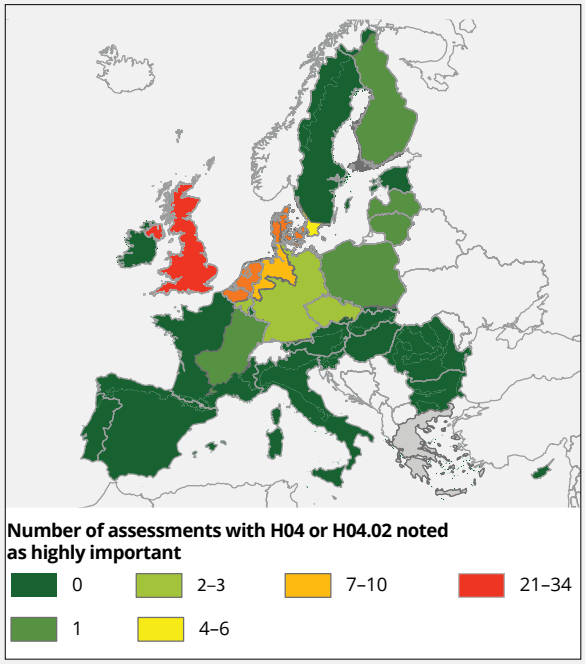
Source: EEA, 2015b, Article 17 reports and assessments.

Box 3.1 Nitrogen deposition — a significant pressure on Europe's ecosystems

Map 3.4 Exceedance of critical loads for eutrophication due to the deposition of nutrient nitrogen, 2010



Map 3.5 Number of habitat assessments with H04 Airborne pollution or H04.02 Nitrogen input reported as 'Highly important', per region and country



Nitrogen deposition has long been recognised as a chief pressure on terrestrial ecosystems, resulting in the adoption and implementation of international and national policies aimed at reducing air pollution. Examples are the Convention on Long-Range Transboundary Air Pollution (UNECE, 1979) and the Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (1999, amended 2012).

Approximately one in five Article 17 habitat reports (one per biogeographical region, per country) note as pressures either type H04 Airborne pollution, or type H04.02 Nitrogen input. These pressures are frequently noted in dunes, heaths and mires, and they are mainly reported in north-west Europe, as shown in map 3.5 above. It may be expected that the Atlantic part of France have the same level of reporting as in the United Kingdom and Belgium. However, it appears that France has reported this pressure under agriculture, particularly as A08 Fertilisation, since the pollution is agricultural in origin.

Source: EEA, 2010; Whitfield and McIntosh, 2014.

While the frequency of reported pressures and threats within a given Level 1 category are largely consistent, it should be noted that this is not always the case. For example, the **threat** of 'climate change' and 'geological events/natural catastrophes' are up to three times as high as the reported **pressures** within these categories.

High-ranked pressures have a number of impacts on specific taxonomic groups, including the following.

- 'Modification of natural conditions', for example, are credited with 69% of the reported pressures on fish, 36% of the pressure on molluscs and 27% of the pressure on amphibians.
- While the 'use of living resources other than agriculture and forestry' only accounts for 3% of the high-ranked pressures, it is responsible for 21% and 13% of the pressures on 'other invertebrates' (*Centrostephanus longispinus, Corallium rubrum* and *Hirudo medicinalis*) and reptiles, respectively.
- Similarly, 'disturbances due to human activities' only makes up 8% of the high-ranked pressures, but accounts for 18% of the pressures on mammals: 'urbanisation, residential and commercial development' made up 5% of the high-ranked pressures, but are attributed to 12% of the pressures on mammals and 17% on reptiles.
- Finally, while 'climate change' represents less than 2% of the high-ranked pressures, it accounts for 10% of the reported pressures on other invertebrates.

3.4 Data quality and completeness

The methodology used for assessing conservation status depends on data from a variety of sources. Ideally, the data would have been collected during the reporting period, using methods compatible across all Member States. However, this is an unrealistic expectation: Member States have used data collected for diverse purposes and over varying time periods. In many cases, suitable data do not exist and expert opinion has been used to allow assessments to be made.

There was no report from Greece for the period from 2007 to 2012; for species and habitats present in Greece, the 2001–2006 report was used for the EU regional assessments, despite these data covering a different period. It is also known that the 2001–2006 Greek report was based on data from Natura 2000 sites rather than from the whole of Greece.

Work has already started in order to improve the reporting process for the next reporting period, and will focus on topics which caused problems or presented difficulties when preparing the 2007–2012 reports.

3.4.1 Assessments reported as unknown

There was a marked decrease in the number of assessments not reported or reported as unknown, compared to the previous reporting period. This was largely attributable to Spain, which reported a large proportion of assessments as unknown from 2001 to 2006, and which contains a great many habitats and species, and six biogeographical and marine regions. Most countries showed a decline in the proportion of assessments reported as unknown. Exceptions include species in Denmark and habitats in Poland, although in both cases, the number of assessments also increased; many had not been reported from 2001 to 2006 (see Figure 3.21). For Denmark, this may also be linked to a change in assessments: from those based on expert opinion to those that are evidence-based.

Although there has been some improvement, marine habitats and species remain poorly known, with 18.5% of marine habitats reported as unknown (5% for non-marine) and 50% unknown for marine species (13% for non-marine species). Marine species which are only listed in Annex IV in particular are unknown (64%).

3.4.2 Variations between countries and regions

Figures 3.1 and 3.4 (above) show that there is a wide range in the proportion of Member State assessments reported as favourable, from 4% to 95% (for habitats), and from 16% to 38% (for species). Some of this variation reflects real differences in the condition of species and habitats across the EU, but an indeterminate proportion is due to differing approaches and methodologies. It is not surprising that the proportion of habitats and species assessed as favourable is low, while the unfavourable-bad assessment is high in north-west Europe compared to elsewhere. This part of Europe is known to be subject to intense pressures, for example from intensive agriculture and urbanisation. It is less clear why so many habitats in Cyprus are considered favourable, particularly for coastal habitats in a region known to be under heavy pressure from tourism and urbanisation. For example, the habitat '2110 Embryonic shifting dunes' is reported as favourable, but the list of typical species includes three species listed as endangered in the *Red Data Book of the flora of Cyprus* (Tsintides et al., 2007). For species, Cyprus has reported the Egyptian Fruit Bat (*Rousettus aegyptiacus*)

and the Cypriot Grass Snake (*Natrix natrix cypriaca*) as unfavourable-inadequate, although there is evidence of a 95% decrease in the population of the fruit bat (Nicolaou et al., 2010) and that the Cyprus grass snake is in serious danger of extinction (Baier and Wiedl, 2010).

3.4.3 The impact of missing and 'poor' data

For EU biogeographical and marine regional assessments (see Section 3.2.1) the preferred methods required data on area (habitats) or population (species), unless all the Member States in a region report the same conservation status or the habitat/species only occurring in one Member State in the region (39% of habitat and 55% of species assessments). Furthermore, data for population needs to be in the same unit for all countries within the region being assessed.

For the assessment of the parameter 'habitat area', where there were two or more Member States reporting different assessments, the preferred method (using Member State data in the evaluation matrix) could only be used for 43% of evaluations, while the second preference (weighting by reported area) was used for 20% of assessments. Weighting had to be based on geographic information system (GIS) data for 36% of assessments.

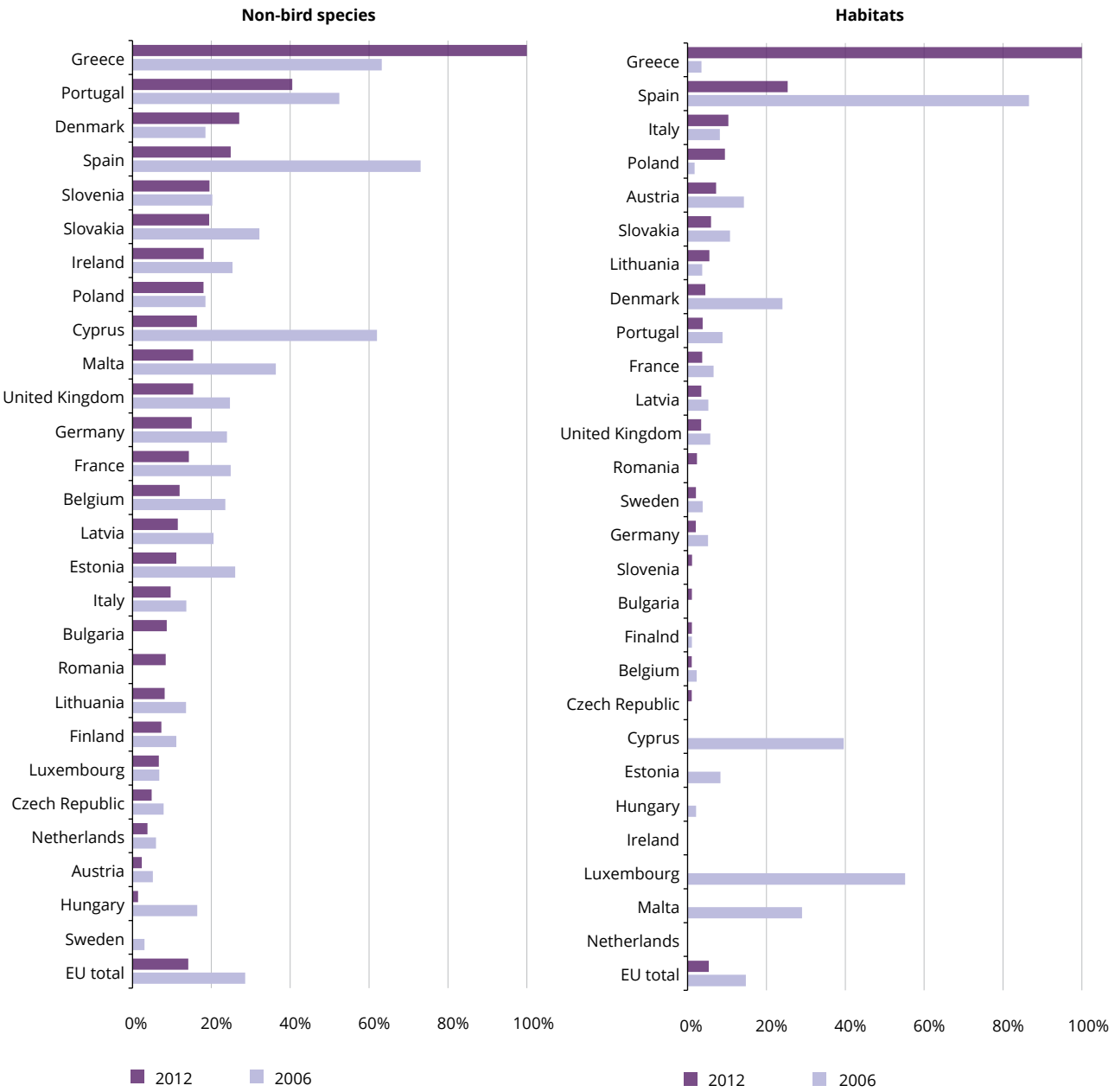
By contrast, for species assessments where two or more Member States are reporting different assessments, the preferred method (using Member State data in the evaluation matrix) could only be used for 14% of evaluations, and weighting based on GIS distribution had to be used for 71% of assessments. This was largely due to the use of a variety of units for populations (see Figure C.3 in Annex C).

Even when data are complete, assessors may decide that the preferred method should not be used, as it would draw on poor data, which would result in an unreliable assessment. For example, the data for habitat '3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation' for the Alpine biogeographical region is complete, but the area reported by Romania is equal to the area of the gridded distribution, something which is extremely unlikely. Using this value would have overestimated the contribution of Romania, and the assessor chose to weight by area of distribution (from the gridded distribution map) instead, which resulted in an assessment of unfavourable-bad rather than unfavourable-inadequate. For about 15% of EU regional assessments for habitats where weighting was required, the non-preferred weighting had to be used, due to poor quality data.

The use of the previous Greek reports may have had an impact on the EU assessments, but this is difficult to quantify.

Further information on data quality and associated issues is given in Annex C, and it is recommended that anyone wishing to use the Article 17 data set read this annex.

Figure 3.21 Proportion of conservation status assessments reported as 'unknown' in 2007–2012 (black) and 2001–2006 (grey), for habitats (left) and species (right) of the Habitats Directive



Notes: Non-bird species are species from the Habitats Directive. A mean per category across all Member States is provided on line 'EU total'. The total number of assessments for habitats is 2 756 and 3 022, for the reporting periods 2001–2006 and 2007–2012, respectively. The total number of assessments for non-bird species is 6 064 and 6 759 for the reporting periods 2001–2006 and 2007–2012, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

4 Results by ecosystem

4.1 Introduction

Given the increasing focus on ecosystems in biodiversity policy, as suggested, for instance, by Target 2 of the EU 2020 Biodiversity Strategy ('to maintain and restore ecosystems and their services'), it is important to reflect the contribution of both nature directives in assessing the status of major European ecosystem types.

This chapter therefore presents the results of Article 12 and Article 17 reporting, grouped by the different ecosystem types of the MAES ('Mapping and Assessment of Ecosystems and their Services') typology (EC, 2013b). The three major ecosystem groups are terrestrial, freshwater, and marine (see Table 4.1).

While linking habitat types to broad ecosystems (as with the MAES typology) can be straightforward, making these connections for species is more complex, as some of them use different ecosystems during their life cycle or across seasons. In addition, their ecological requirements may differ depending on the biogeographical context in which they are found. As a result, some species are associated with more than one ecosystem: for example, the Great Crested Newt (*Triturus cristatus*) is associated with both 'wetlands' and 'rivers and lakes'.

Table 4.1 Classification of ecosystems by MAES

Terrestrial ecosystems	Cropland Grassland Woodland and forest Wetlands Heathland and shrub Sparsely vegetated land Urban
Freshwater ecosystems	Rivers and lakes
Marine ecosystems	Marine inlets and transitional waters Coastal Shelf Open ocean

Source: EC, 2013b ([37]).

A reference data set was developed by the EEA ETC/BD where all habitats and species covered by the Birds and Habitats directives are allocated to ecosystem types as defined by the MAES typology. This allocation of species and habitat per ecosystem is performed for each of the nine terrestrial biogeographic regions (in line with the Habitats Directive) and each marine region (in line with the Marine Strategy Framework Directive). For a more detailed description of the methodology used to link birds, non-bird species and habitats with MAES ecosystem types, please see Annex D.

Box 4.1 How to interpret results in this chapter

This chapter does not provide assessments of the ecosystems per se, but it rather presents information on the habitats and species from the nature directives associated with each ecosystem (see Table 4.2 for details). As mentioned in Chapters 2 and 3, population status and conservation status were assessed at EU level (birds) or EU biogeographical level (habitats and other species), and this is what was used to compile the statistics for each of the MAES ecosystems.

As species frequently occur in more than one ecosystem, the threats, pressures and measures reported for one of the ecosystems may be more typical of another ecosystem. Thus, although measures reported under the cropland ecosystem may be more relevant to the grassland ecosystem, they may appear under both, since many species are associated with both ecosystems

The MAES typology includes 'urban' as an ecosystem, but this is not included here, as relatively few bird species or habitats and species listed in the Habitats Directive occur here.

([37]) See http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/pdf/MAESWorkingPaper2013.pdf.

As Table 4.2 shows, the habitats and species covered by the Birds and Habitats directives were mainly allocated to terrestrial and freshwater ecosystems, especially sparely vegetated land, woodland and forest, rivers and lakes, heathland and shrub, and wetlands, and a few were allocated to marine ecosystems. This corresponds with the very low number of marine habitats and relatively few marine species covered by the Habitats Directive.

Most Annex I habitat types (94%) are associated with a single MAES ecosystem. For species, the situation is more complex, as many can be associated with different ecosystems depending on the biogeographical region and/or season; however, some 60% of non-bird species occur in only one ecosystem. There is much variation between taxonomic groups with 73% of vascular plants (with many localised endemics) linked to a single ecosystem, but only 25% of mammal species. Only 13% of bird species were linked to a single ecosystem, and most were linked to two or three MAES ecosystems (68%).

All the information provided in this chapter is based on Articles 12 and 17 reporting data and subsequent assessments. However, while data for pressures and threats and conservation measures is based on Member State assessments, the assessment of EU population status for birds and of conservation status and trends in conservation status for habitats and other species are based on EU biogeographic assessments (see Table 4.2).

The methodology for the assessment and presentation of data on population status and trends for birds is presented in Chapter 2. For birds, although allocation of ecosystem type was carried out at the level of reporting (subspecies and flyway populations for some birds), the analysis presented in this chapter is at species level. Bird trends presented in this chapter are breeding population trends for the majority of species, with the exception of those species for which EU population status assessments were based on winter data. The methodology for the assessment and presentation of data on conservation status and trends for habitats and species from the Habitats Directive is presented in Chapter 3.

As in Chapters 2 and 3, the assessment of pressures and threats per ecosystem in the individual ecosystem section is based on the pressures and threats reported under Articles 12 and 17 reporting at Member State level (birds) and Member State biogeographical level (habitats, species). For a description of the methodology used for the assessment of pressures and threats, see Sections 2.3 and 3.3. However, in contrast to the focus of Chapters 2 and 3 on Level 1 of the pressures and threats categorisation, this chapter concentrates on Level 2, and examines high-ranked pressures alone. Each figure on pressures and threats shows the top 10 most frequently reported high-ranked pressures and threats at Level 2; according to their relative share of the total reported high-ranked pressures and threats, they show the relative importance of the pressures and threats for each ecosystem at Level 2. Moreover,

Table 4.2 Number of birds (Birds Directive) and habitats and species (Habitats Directive), per ecosystem

MAES ecosystem type	Birds (BD)	Habitats (HD)	Species (HD)
Cropland	78 (78)	none	34 (50)
Grassland	75 (75)	45 (158)	309 (609)
Woodland and forest	151 (151)	81 (229)	254 (642)
Wetlands	127 (127)	14 (61)	228 (528)
Heathland and shrub	95 (95)	38 (106)	248 (404)
Sparsely vegetated land	165 (165)	26 (105)	420 (550)
Rivers and lakes	128 (128)	19 (94)	236 (615)
Marine inlets and transitional waters	47 (47)	13 (51)	23 (35)
Coastal	37 (37)	8 (28)	29 (53)
Shelf	15 (15)	3 (14)	34 (55)
Open ocean	8 (8)	2 (6)	35 (66)

Notes: Number of EU population assessments (Birds Directive) and EU biogeographical assessments (Habitats Directive) given in parentheses.

Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

information encompassing Levels 1, 2 and 3 is used in the description of the figures, providing a greater level of detail than in Chapters 2 and 3. The precise numbers used for each figure can be found in Annex D in Tables D.1 through D.33.

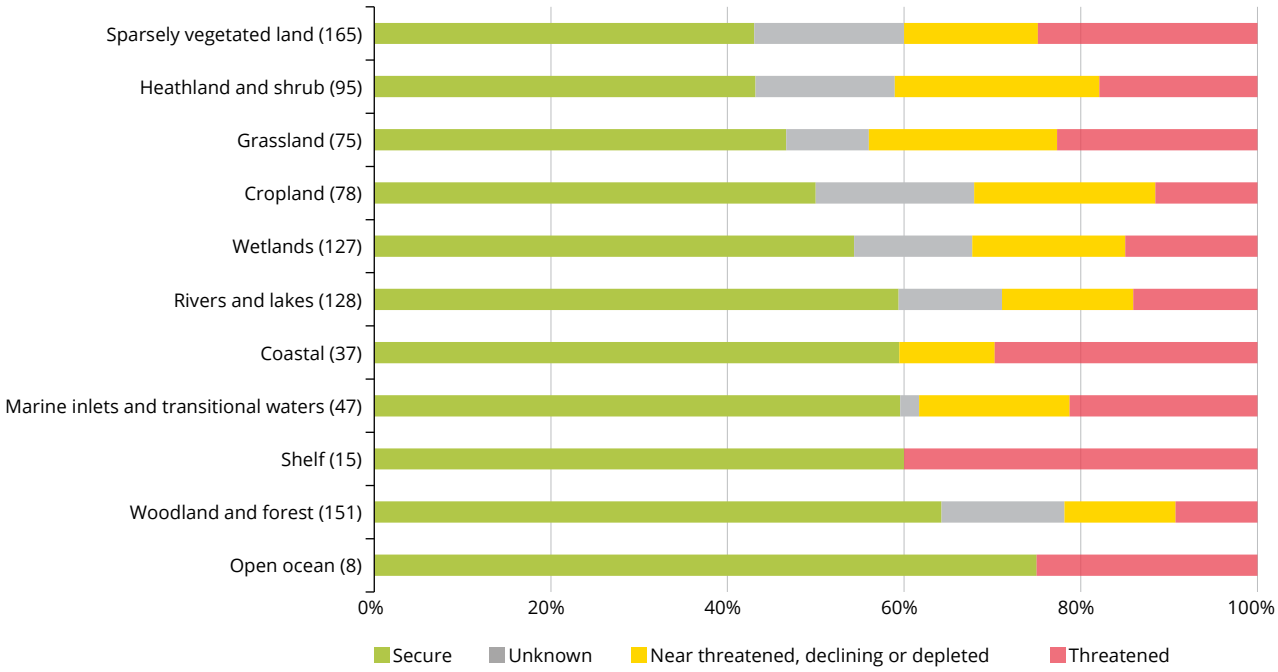
It should be noted that this is a slightly different approach than that taken in the Article 12 and Article 17 national summaries ([38]), which show the percentage of Member State assessments reported as being affected by one or more pressures or threats categorised as being of 'high importance'. Therefore, Chapter 4 shows the relative importance of reported pressures and threats as a share of overall reported pressures and threats. The national summaries show this as a share of the overall number of assessments.

As in Chapter 5, the assessment of conservation measures per ecosystem in the individual ecosystem section is based on the conservation measures reported by Member States under Articles 12 and 17 reporting. A more detailed description of the methodology used for the assessment of conservation measures can be found in Chapter 5. The focus of this chapter is on high-ranked Level 2 conservation measures. Each figure on conservation measures shows the top five most frequently reported high-ranked conservation measures at Level 2; according to their relative share of the total reported high-ranked conservation measures, they indicate the relative importance of the conservation measures for each ecosystem. As with pressures and threats, this approach is slightly different from the one taken in the Member State national summaries, which look at the percentage of biogeographical assessments for which one or more 'high importance' conservation measures was implemented.

It is also necessary to note that both pressures and threats (combined for birds) and conservation measures were reported for individual species and habitats by Member States. Thus, the data presented for pressures and threats and conservation measures should only be seen as a proxy for the 'pressures and responses' for each ecosystem.

Figure 4.1 shows the EU population status of birds per MAES ecosystem type, based on 926 EU population status assessments.

Figure 4.1 EU population status of birds, per MAES ecosystem type



Notes: The total number of assessments is 926.

Source: EEA, 2015a, Article 12 reports and assessments.

([38]) Links to the Member State national summaries for Articles 12 and 17 reporting can be found at http://bd.eionet.europa.eu/activities/Reporting/Article_12/Reports_2013 and http://bd.eionet.europa.eu/activities/Reporting/Article_17/Reports_2013.

The results by ecosystem type show that, with the exception of 'woodland and forest ecosystem', birds from marine ecosystems generally hold a higher share of secure assessments than birds associated with terrestrial and freshwater ecosystems. However, three of the four marine ecosystems (open ocean, shelf and coastal) hold the highest shares of threatened assessments. For terrestrial and freshwater ecosystems, the woodland and forest ecosystem stands out as having the highest share of secure assessments (64%), as well as the lowest share of threatened assessments (9%). As for the other ecosystems, the share of secure assessments ranges from 43% (for sparsely vegetated land ecosystems) to 59% (for rivers and lakes ecosystems), and the share of threatened assessments from 12% (for cropland ecosystems) to 25% (for sparsely vegetated land ecosystems). The share of unknown and near threatened, declining or depleted assessments varies significantly between ecosystem types.

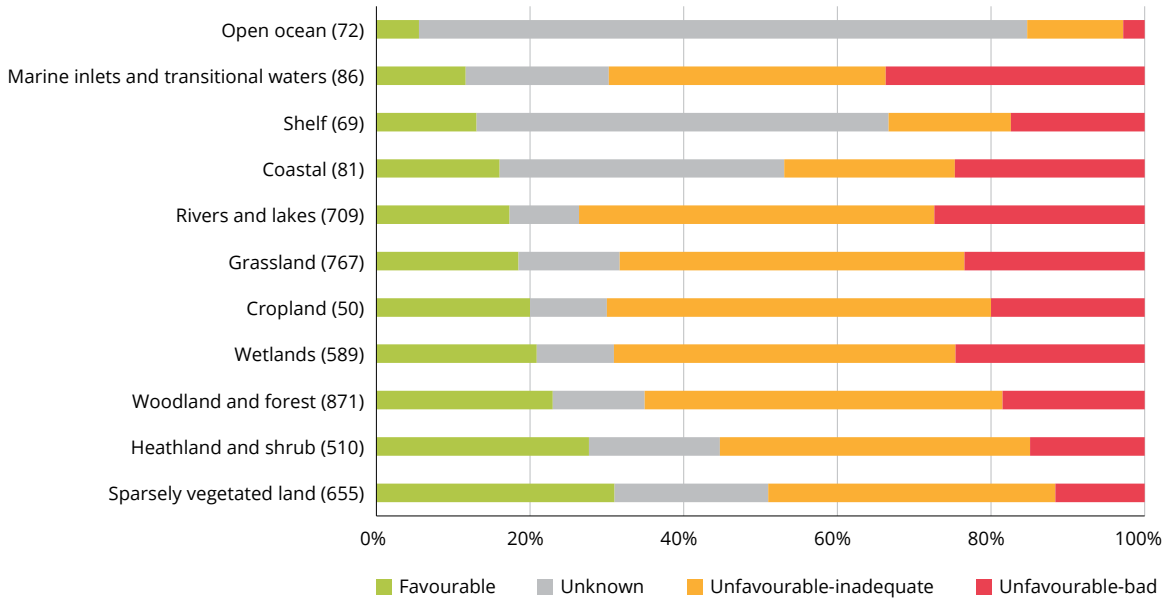
Figure 4.2 shows the conservation status of the combined habitats and non-bird species assessments per MAES ecosystem type, based on 4 459 EU assessments.

The results by ecosystem type show that the share of favourable assessments of habitats and species from the Habitats Directive is the lowest among the four marine ecosystems. With the exception of marine inlets and transitional waters ecosystem, the marine ecosystems also have an exceptionally high proportion of unknown assessments, in particular for open ocean ecosystems (79%). As for terrestrial and freshwater ecosystems, the share of favourable assessments ranges from 17% for rivers and lakes ecosystems to 31% for terrestrial ecosystems sparsely vegetated land. The share of unknown assessments (9% to 20%) is largely higher for ecosystems with a higher relative share of favourable assessments, while the share of unfavourable-inadequate assessments (37% to 46%) and unfavourable-bad assessments (12% to 27%) is generally lower. The main ecosystems linked to agriculture (grassland and cropland ecosystems) have the lowest share of favourable assessments among terrestrial ecosystems.

Figure 4.3 shows the short-term trends in population status of birds, per MAES ecosystem type. The figure is based on 924 EU population status assessments.

The results by ecosystem type show that marine ecosystems had four of the five highest shares of decreasing assessments, while the share of increasing assessments varied significantly, ranging from 24% for coastal ecosystems to 50% for open ocean ecosystems. Woodland and forest ecosystems again stood out from terrestrial and freshwater ecosystems, as having the highest share of increasing assessments and the lowest share of decreasing assessments. For other ecosystem types, the share of increasing assessments varies moderately: from 30% for sparsely vegetated land ecosystems to 20% for heathland and shrub

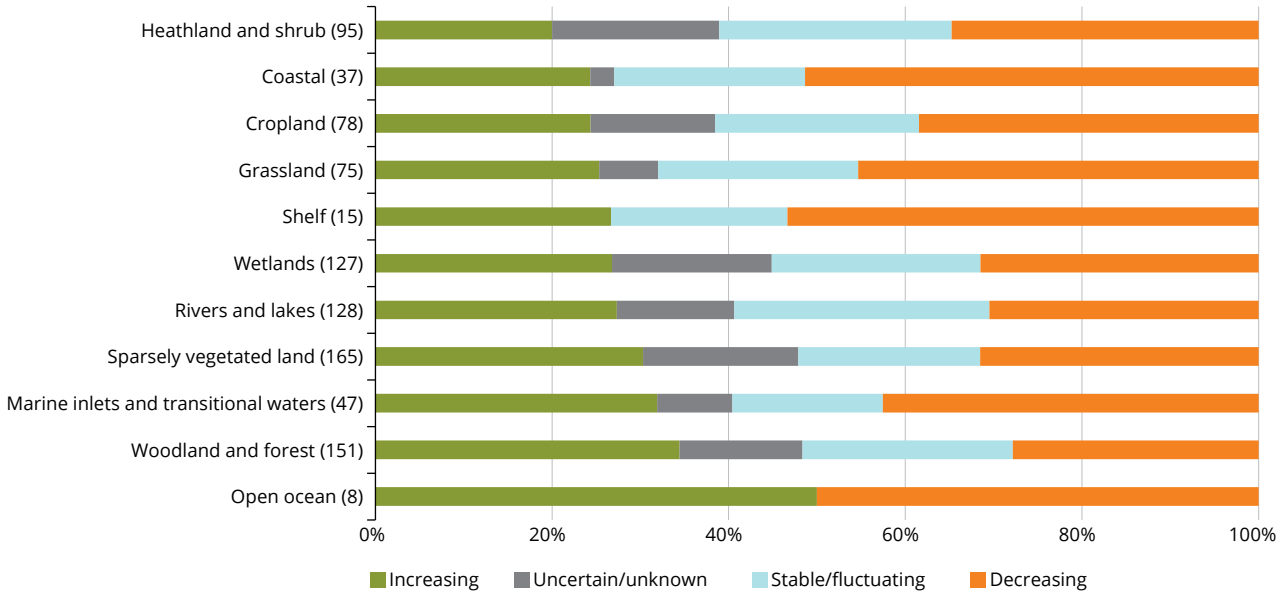
Figure 4.2 Conservation status of habitats and species (merged), per MAES ecosystem type



Notes: The total number of assessments is 4 459.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 4.3 Short-term population trends of bird species, per MAES ecosystem type



Notes: The total number of assessments is 926.

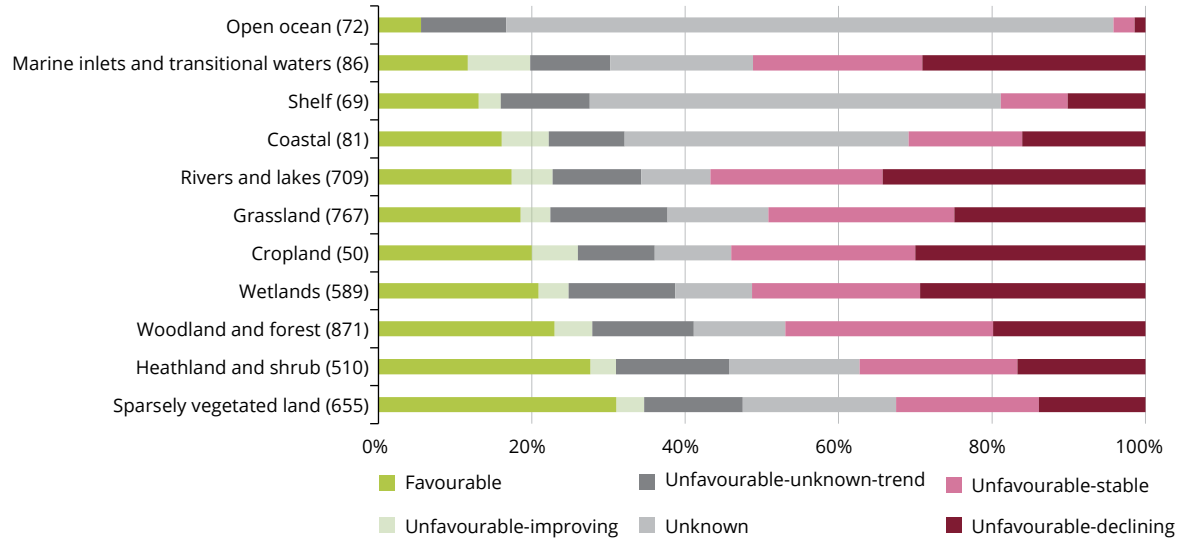
Source: EEA, 2015a, Article 12 reports and assessments.

ecosystems. The margin is slightly larger for decreasing assessments (from 30% for rivers and lakes ecosystems to 45% for grassland ecosystems), and slightly smaller for stable/fluctuating assessments (from 20% for sparsely vegetated land ecosystems to nearly 29% for rivers and lakes ecosystems). The ecosystems linked to agriculture (grassland and cropland ecosystems) have the highest share of decreasing assessments among terrestrial ecosystems.

Figure 4.4 shows the trends in conservation status of the combined habitats and non-bird species assessments per MAES ecosystem type. The figure is based on 4 459 EU assessments in total.

The results by ecosystem type show that the share of assessments assessed as unfavourable-improving or unfavourable-unknown is generally small, ranging from 0% to 7% (unfavourable-improving) to 10% to 19%

Figure 4.4 Trends in conservation status of habitats and species (merged), per MAES ecosystem type



Notes: The total number of assessments is 4 459.

Source: EEA, 2015b, Article 17 reports and assessments.

(unfavourable-unknown), with the exception of marine inlets and transitional waters, which had higher shares of both categories. Among freshwater and terrestrial ecosystems, the highest shares of unfavourable-declining assessments were reported for rivers and lakes, cropland, wetlands and grassland ecosystems, whereas the lowest shares were reported for sparsely vegetated land, heathland and shrub and woodland and forest ecosystems. Shares of unfavourable-stable assessments showed greater variability, ranging from 22% for sparsely vegetated land ecosystems to 37% for woodland and forest ecosystems. Marine ecosystems, on the other hand, generally had lower shares of unfavourable-declining and unfavourable-stable assessments, with the exception of marine inlets and transitional waters ecosystems.

4.2 Terrestrial ecosystems

Terrestrial ecosystems cover the land surface and form the largest group, with seven ecosystems; note that MAES includes an urban ecosystem, but it has not been included in the analysis for this chapter.

The EU population status and short-term trends of birds vary considerably between terrestrial ecosystems. Woodland and forest ecosystem clearly stands out in terms of having the highest share of secure (64%) population status assessments and increasing short-term trend assessments (34%), as well as the lowest share of threatened population status assessments (9%) and decreasing short-term trends (28%). Sparsely vegetated land has the lowest share of secure and the highest share of threatened EU population status assessments. Heathland and shrub is second lowest in terms of secure EU population status assessments and lowest in terms of increasing short-term trend assessments. The two main ecosystems linked to agriculture, cropland and grassland ecosystems are at the lower end of the range, both in terms of the share of secure EU population status assessments and increasing short-term trend assessments.

The conservation status of habitats and species from the Habitats Directive varies considerably between terrestrial ecosystems. For example, the share of favourable assessments for habitats ranges from 11% (for grassland ecosystems) to 29% (for sparsely vegetated land ecosystems). There are also significant differences between species and habitats: habitats, for example, generally have a larger share of unfavourable assessments and a lower share of favourable and unknown assessments than species. As for trends in conservation status, while the share of unfavourable-improving assessments are comparable for both species and habitats, the share of declining and stable assessments tends to be higher for habitats, and the share of unknown assessments tends to be higher for species.

More generally, for conservation status, unfavourable assessments make up more than half of the assessments for all terrestrial ecosystems, while wetlands and grassland ecosystems have significantly larger shares of unfavourable-bad assessments, particularly for habitats. As for trends, wetlands and grassland ecosystems also have a larger share of unfavourable-declining assessments, indicating that this is part of a broader negative trend. Sparsely vegetated land as well as heathland and shrub ecosystems, on the other hand, show comparatively higher shares of favourable assessments and lower shares of unfavourable-bad assessments. This is mirrored by a relatively low share of stable and declining trend assessments.

Interestingly, the ranking of ecosystems by share of favourable assessments followed the same order for both species and habitats. These follow, in descending order (from highest to lowest): (1) sparsely vegetated land, (2) heathland and shrub, (3) woodland and forest, (4) wetlands, (5) grassland, and (6) cropland (only non-bird species).

While the most frequently reported pressures/threats vary by ecosystem type and across birds, non-birds and habitats, 'agriculture' and the 'modification of natural conditions' are particularly significant at Level 1, followed by 'disturbances due to human activities'. Within these overarching categories, the most frequently reported pressures/threats are the modification of cultivation practices, grazing by livestock and use of pesticides ('agriculture'), changes in waterbody conditions and other changes to ecosystems ('modification of natural conditions'). Vegetation succession/biocenotic evolution was also commonly mentioned at Level 2 in a number of terrestrial ecosystems. Several ecosystem types are affected by further overarching pressure/threat categories. Woodland and forest ecosystem species and habitats, for example, are subject to considerable forestry-related pressures/threats and 'urbanization, residential and commercial development' is of key importance to sparsely vegetated land.

The two most common individual types of conservation measures are 'establish protected areas/sites' and 'legal protection of habitats and species', although the frequency of reporting varies across ecosystems. For birds and habitats, 'establish protected area/sites' tended to play a slightly more significant role than for non-bird species; the opposite holds true for the 'legal protection of habitats and species'. Additional

measures were also common in specific ecosystems, such as the importance of 'maintaining grasslands and other open habitats' for grassland and heathland, shrub, and cropland ecosystems, 'restoring/improving the hydrological regime' in wetlands, and 'adapting crop production' for cropland bird and non-bird species. 'Adapt forest management' is also ranked highly for woodland and forest habitats, as are 'specific single species or species group management measures' for urban ecosystems.

4.2.1 Cropland ecosystem

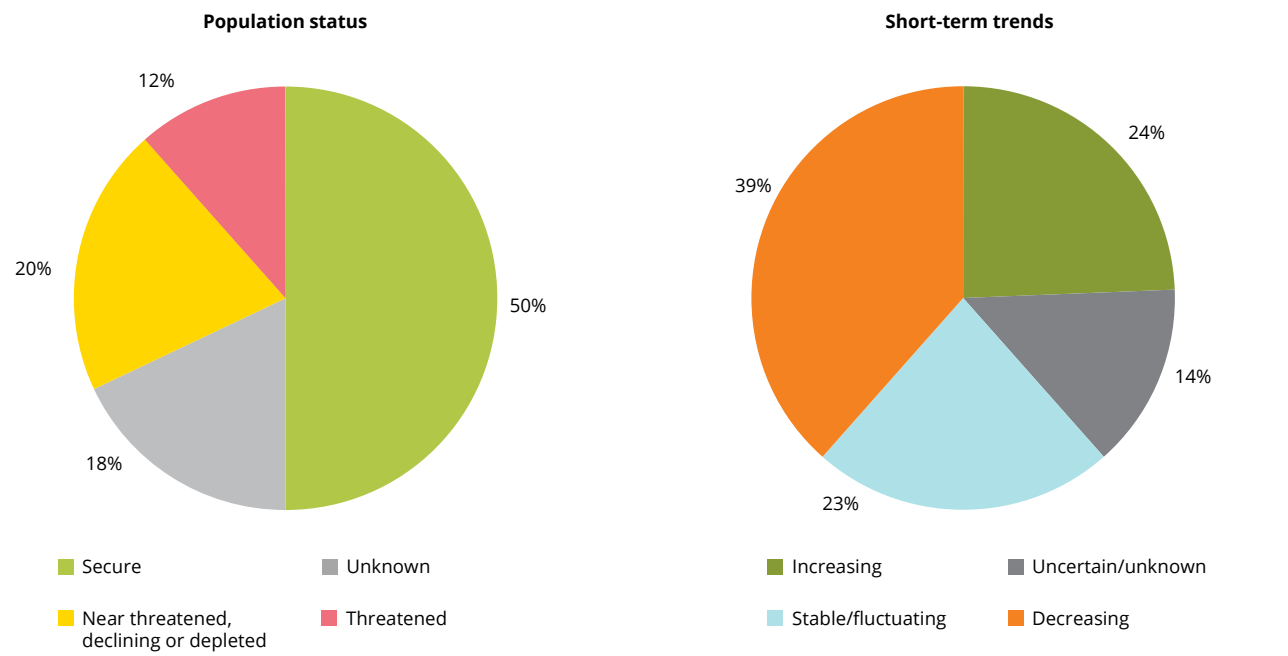
This ecosystem includes regularly or recently cultivated agricultural, horticultural and domestic habitats and agro-ecosystems with significant coverage of natural vegetation (agricultural mosaics) (EC, 2013b). Not only are croplands a source of food, feed, fibre, and fuel for humans, but as a widespread type of ecosystem, they are also an important habitat, providing a broad range of essential ecosystems services, including pollination and landscape values (European Commission, 2014). No Annex I habitat type is linked to the cropland ecosystem type, although two ('21A0 Machairs' and '6310 Dehesas with evergreen *Quercus* spp.') can have cultivated areas.

Figure 4.5 shows the conservation status of cropland-related bird species. Exactly half of the assessments of EU population status are secure, whereas threatened (12%) and near threatened, declining or depleted (20%) assessments together make up about one-third of assessments, and unknown assessments make up close to one-fifth. For short-term trends in EU bird populations, about a quarter of assessments each are reported as increasing (24%) and stable/fluctuating (23%), while the largest share (39%) is reported as decreasing.

As shown in Figure 4.6, most of the assessments of conservation status for cropland non-bird species are unfavourable, with 50% assessed as unfavourable-inadequate and 20% assessed as unfavourable-bad. Favourable assessments, on the other hand, represent 20% of assessments. As for the trends in conservation status, nearly a third of the assessments are unfavourable and declining (30%), while only 6% are unfavourable but improving, indicating a worsening of the overall status of the non-bird species associated with cropland. Of the remaining assessments, 24% of assessments are assessed as unfavourable-stable and 10% as unfavourable-unknown. These figures are based on 50 non-bird species assessments.

The majority of pressures and threats for cropland birds are attributed to 'agriculture' (representing 54% of the total reported pressures/threats at Level 2), the most significant of which is 'modification of

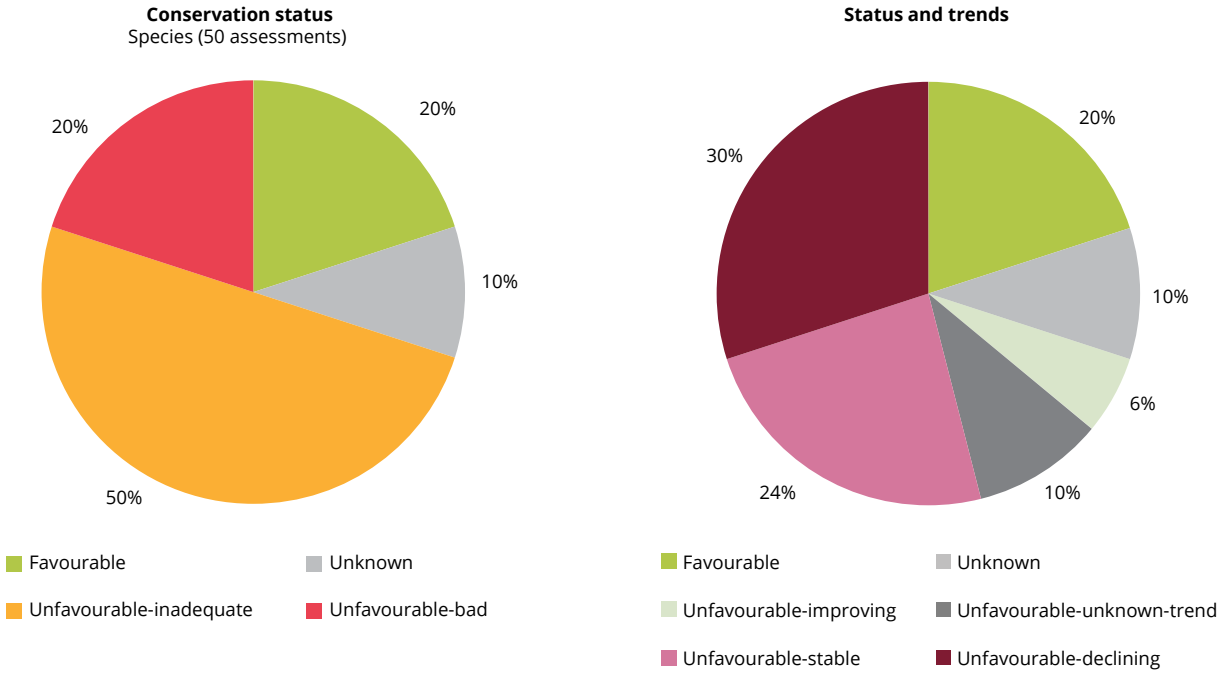
Figure 4.5 Population status and short-term trends of bird species associated with cropland ecosystem



Notes: The total number of assessments is 78 for birds.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 4.6 Conservation status and trends of species (Habitats Directive) associated with cropland ecosystem



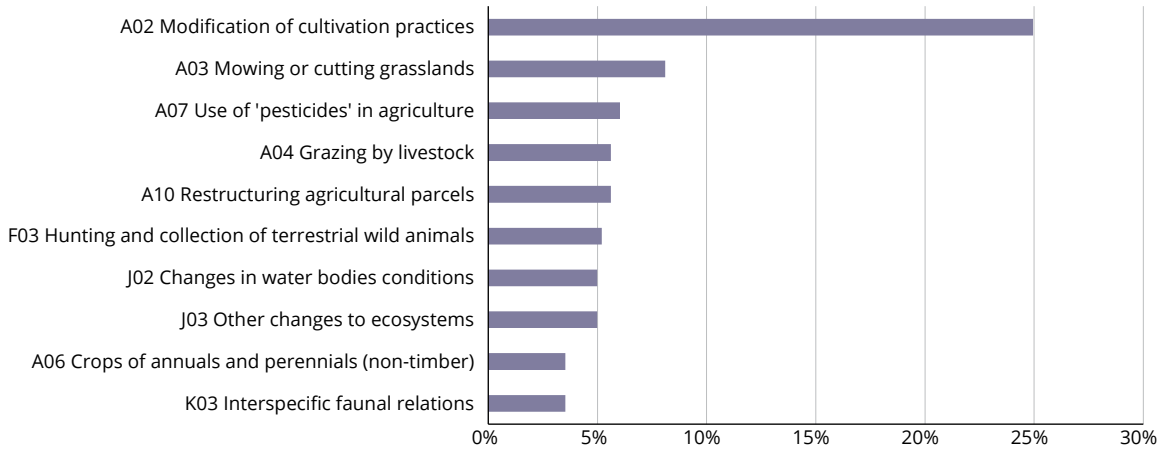
Notes: These are species from the Habitats Directive. There are no Annex I habitats associated with this ecosystem. The total number of assessments is 50 for species of the Habitats Directive.

Source: EEA, 2015b, Article 17 reports and assessments.

cultivation practices' (listed in over a quarter of all reports). This pressure/threat stems from agricultural intensification, grassland conversion into arable land and crop change. The remaining top-ranked Level 2 pressures/threats are quite similar in reported frequencies (see Figure 4.7).

Non-bird species associated with cropland are, as one would expect, most notably affected by the threat/pressure 'agriculture' (accounting for 34% of the total reported pressures/threats at Level 1). The main threats/pressures within this category are the modification of cultivation practices and the use of

Figure 4.7 Top 10 (% of frequency) reported high-ranked pressures/threats for birds associated with cropland ecosystem



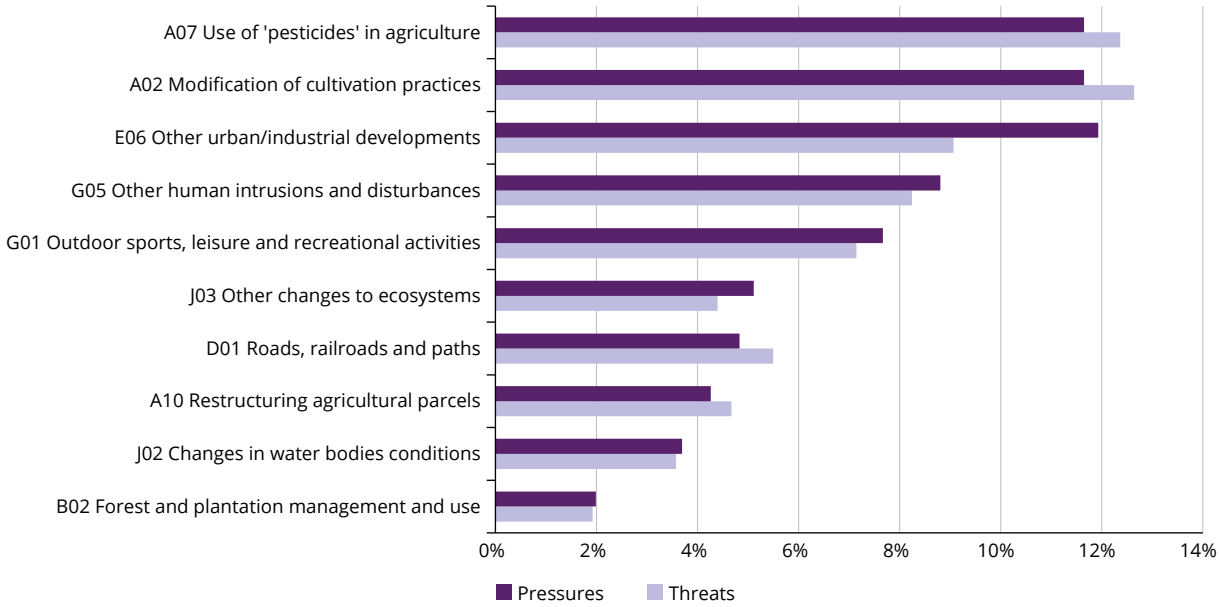
Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 481. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

'pesticides' in agriculture. Non-bird species are also significantly impacted at Level 1 by 'disturbances due to human activities' (15% of the total reported threats/pressures) and 'urbanization, residential and commercial development' (14%). Within these categories, human intrusions and disturbances and outdoor sports, leisure and recreational activities as well as other urban/industrial developments play the largest roles overall (see Figure 4.8).

Table 4.3 lists the five most frequently reported conservation measures for cropland birds and non-bird species at Level 2 of the conservation measures categorisation. The two most common types of measures are 'establish protected areas/sites' (top measure for birds) and 'legal protection of habitats and species' (top measure for non-bird species). These two conservation measures alone make up more than 40% of all reported conservation measures for birds and

Figure 4.8 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with cropland ecosystem



Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 352 and 354, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.3 Top five Level 2 conservation measures ranked high for species associated with cropland ecosystem

Top five	Bird species			Non-bird species		
		Measure	%		Measure	%
1.	6.1	Establish protected areas/sites	22.5	6.3	Legal protection of habitats and species	28.4
2.	6.3	Legal protection of habitats and species	18.8	6.1	Establish protected areas/sites	19.4
3.	2.1	Maintaining grasslands and other open habitats	13.1	7.4	Specific single species or species group management measures	9.7
4.	2.2	Adapting crop production	8.4	2.1	Maintaining grasslands and other open habitats	7.1
5.	7.1	Regulation/Management of hunting and taking	8.0	2.2	Adapting crop production	5.8
5.				9.1	Regulating/Management exploitation of natural resources on land	5.8

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 640 and 155 for birds and non-bird species, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

non-bird species. 'Maintaining grasslands and other open habitats' and 'adapting crop production' also play a significant role for both birds and non-bird species. The final conservation measure frequently reported for birds is 'regulation/management of hunting and taking', whereas for non-bird species, 'specific single species or species group management measures' are frequently reported, as is 'regulating/management exploitation of natural resources on land'.

4.2.2 Grassland ecosystem

Grasslands are areas dominated by two kinds of grassy vegetation (including tall forbs, mosses and lichens): (a) managed pastures, and (b) natural and semi-natural (extensively managed) grasslands (EC, 2013b). Grasslands are widely distributed in the EU, although natural grasslands are mostly restricted to areas above the treeline in the mountains; in other areas, grasslands are a result of human activity and without continued management will transition into woodland (Halada et al., 2011). Grasslands cover approximately 10% of the EU land area (ETC/BD, 2011) and provide a variety of services, including livestock production, regulation and maintenance services and cultural services (EC, 2013b). Forty-five Annex I habitat types are included in the MAES grassland ecosystem.

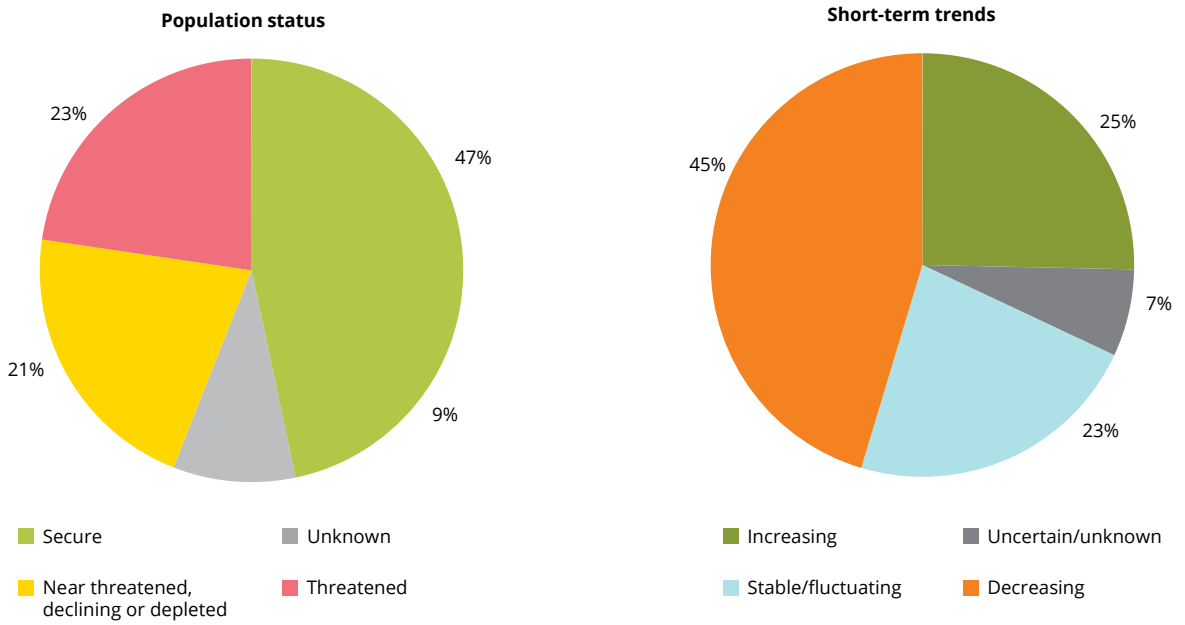
Figure 4.9 shows the conservation status of grassland-related bird species, based on 75 assessments.

Nearly half of assessments of EU population status for grassland bird species are secure (47%), whereas threatened (23%) and near threatened, declining or depleted (21%) each make up about one-fifth of assessments. For short-term trends in EU population status, assessments reported as decreasing made up the largest share (45%), whereas about a quarter of assessments each are reported as increasing (25%) and stable/fluctuating (23%).

As shown in Figure 4.10, the majority of the assessments of conservation status for grassland-related species from the Habitats Directive are unfavourable, with nearly half assessed as unfavourable-inadequate (47%). Slightly more assessments, however, are assessed as favourable (20%) than as unfavourable-bad (17%). A relatively high amount of assessments (16%) are also assessed as unknown. As for the trends in conservation status, a significant share of the assessments is assessed as unfavourable-stable (23%) or unfavourable-declining (21%), while only 4% are assessed as unfavourable-improving.

The assessments for grassland habitats were significantly less favourable compared to grasslands (see Figure 4.10), with only 11% assessed as favourable and nearly half (49%) assessed as unfavourable-bad. Moreover, a significant share of conservation status assessments are unfavourable-inadequate (37%), for a combined 86% of unfavourable assessments.

Figure 4.9 Population status and short-term trends of bird species associated with grassland ecosystem



Notes: The total number of assessments is 75 for birds.

Source: EEA, 2015a, Article 12 reports and assessments.

As for trends in conservation status, a significantly larger share of unfavourable assessments are further declining compared to species, while the shares of unfavourable assessments that are improving, unknown and stable are similar. This less favourable picture for grassland habitats than for grassland species may partially be explained by the significantly lower share of unknown assessments for grassland habitats compared with grassland non-bird species (i.e. 3% vs 16%).

Grassland-related birds are the most vulnerable to agriculture-related pressures/threats, with this category comprising 51% of the reported high-ranked Level 1 pressures/threats. Within this category, the most dominant pressure/threat is the modification of cultivation practices (listed in more than a fifth of all reports), including, for instance, agricultural intensification, grassland removal for arable land, and crop change. The reports provide further details regarding the main underlying causes of the

Figure 4.10 Conservation status and trends of species (a) and habitats (b) (Habitats Directive) associated with grassland ecosystem

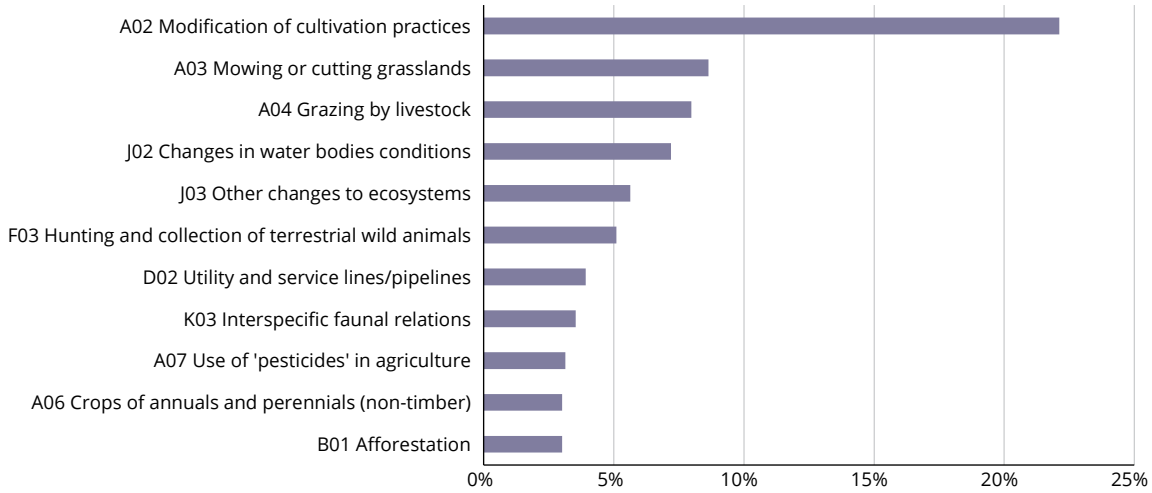
Notes: The total number of assessments is 609 and 158 for species and habitats, respectively.

Source: EEA, 2015b, Article 17 reports and assessments.

pressures/threats outlined in Figure 4.11. For example, 'grazing by livestock' can be predominantly attributed to the abandonment of pastoral systems/lack of grazing, while 'other ecosystem modifications' is linked with the reduction or loss of specific habitat features, and 'hunting and collection of wild animals' refers largely to trapping/poisoning/poaching.

As shown in Figure 4.12, the largest threat/pressure to grassland-related species from the Habitats Directive

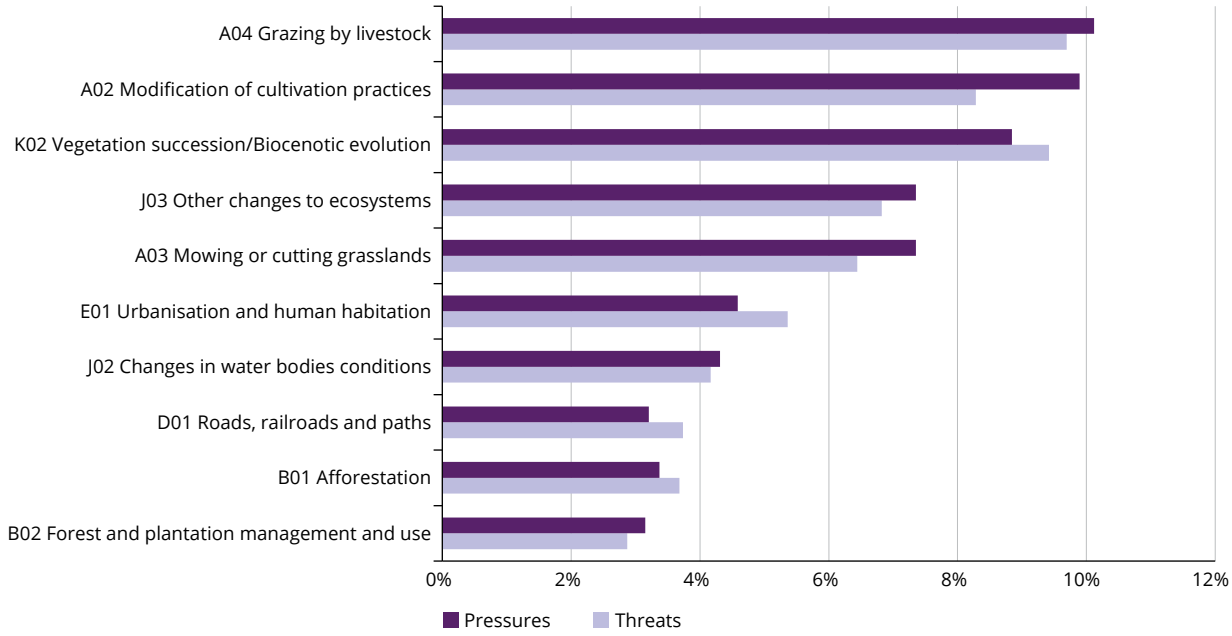
Figure 4.11 Top 10 (% of frequency) reported high-ranked pressures/threats for birds associated with grassland ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 764. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 4.12 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with grassland ecosystem



Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 1 809 and 1 847, respectively. Greece did not provide an Article 17 report.

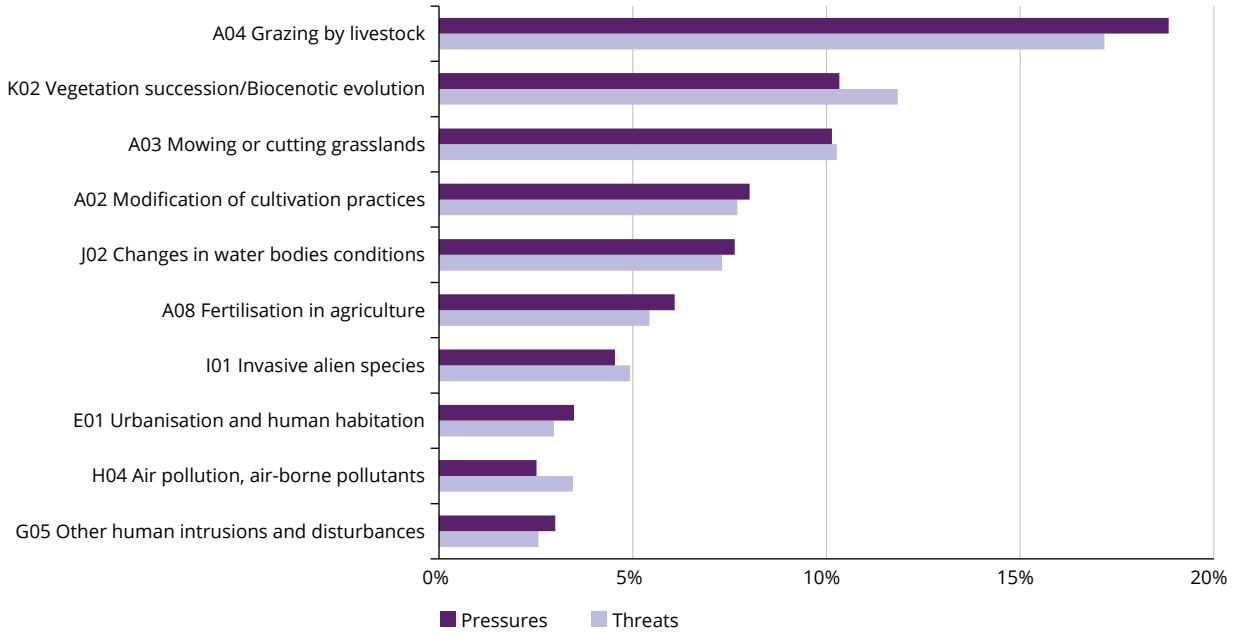
Source: EEA, 2015b, Article 17 reports and assessments.

is 'agriculture' (34% of the total reported pressures/threats at Level 1), followed by 'natural processes (excluding catastrophes)' (14%) and 'modification of natural conditions' (13%). Within these categories, the most frequently reported pressures/threats are grazing by livestock (particularly the abandonment of pastoral systems/lack of grazing) and modification of cultivation practices, vegetation succession/biocenotic evolution (especially regarding species composition change), and other changes to ecosystems (referring primarily to an anthropogenic reduction of habitat connectivity) respectively.

Annex I grassland habitat types are most affected by the category 'agriculture' (forming 44% of the total reported Level 1 pressures/threats), and particularly by 'grazing by livestock' (see Figure 4.13). 'Natural processes (excluding catastrophes)' (13%) and 'modification of natural conditions' (11%) are also significant at Level 1 classification. When examined in more detail, the main agriculture-related pressures/threats to grassland habitats are — in order of decreasing frequency — abandonment of pastoral systems, lack of grazing, lack of mowing, fertilisation, modification of cultivation practices and agricultural intensification. Two additional prevalent pressure/threat categories at Level 2 are 'vegetation succession/biocenotic evolution' (referring largely to species composition change) and changes in waterbody conditions (e.g. water abstractions from groundwater).

Table 4.4 lists the five most frequently reported conservation measures for grassland birds, non-bird species and habitats at Level 2 of the conservation measures categorisation. The three most common individual types of conservation measure were 'establish protected areas/sites', 'legal protection of habitats and species' and 'maintaining grasslands and other open habitats', which represented the top three categories for birds, non-bird species and habitats alike. Across these groups, however, there were slight variations; 'establish protected areas/sites' represents the single most important conservation measure for birds, while 'legal protection of habitats and species' is top for non-bird species, and 'maintaining grasslands and other open habitats' is most significant for habitats. Other frequently reported conservation measures included 'specific single species or species group management measures' and 'regulating/management exploitation of natural resources on land'.

Figure 4.13 Top 10 (% of frequency) reported high-ranked pressures and threats for habitats associated with grassland ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 1 035 and 1 013, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.4 Top five Level 2 conservation measures ranked high for species and habitats associated with grassland ecosystem

Top five	Birds			Non-bird species			Habitats		
		Measure	%		Measure	%		Measure	%
1.	6.1	Establish protected areas/sites	21.2	6.3	Legal protection of habitats and species	22.9	2.1	Maintaining grasslands and other open habitats	30.9
2.	6.3	Legal protection of habitats and species	18.9	6.1	Establish protected areas/sites	18.8	6.1	Establish protected areas/sites	21.8
3.	2.1	Maintaining grasslands and other open habitats	14.7	2.1	Maintaining grasslands and other open habitats	18.7	6.3	Legal protection of habitats and species	7.9
4.	7.4	Specific single species or species group management measures	7.3	7.4	Specific single species or species group management measures	8.2	9.1	Regulating/Management exploitation of natural resources on land	6.4
5.	2.2	Adapting crop production	6.6	9.1	Regulating/Management exploitation of natural resources on land	4.8	6.0	Other spatial measures	5.1

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 948, 1 444 and 1 070 for birds, non-bird species and habitats, respectively. Greece did not provide any Articles 12 and 17 reports.

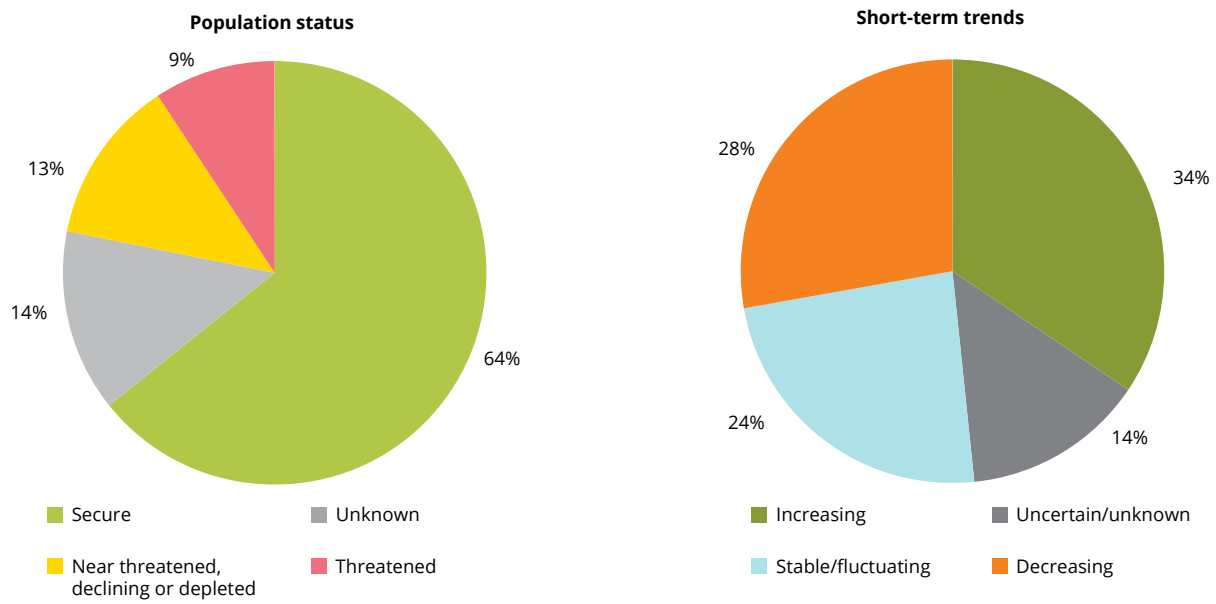
Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

4.2.3 Woodland and forest ecosystem

The woodland and forest ecosystem is dominated by woody vegetation supporting a wide range of ecosystem services (EC, 2013b). Annex I of the Habitats Directive lists 81 types of forest habitats. About 30% of the land area of the EU comprises forests and woodlands (ETC/BD, 2011). Most of these are used for commercial production of timber, fuel-wood and other forest products; less intensive forestry tends to support more biodiversity (Miklín and Čížek, 2014). Forests are key sources of ecosystems services such as soil and erosion protection, biomass production, and carbon and water cycle regulation (European Commission, 2014).

Figure 4.14 shows the population status of woodland and forest bird species. Nearly two-thirds of the

Figure 4.14 Population status and short-term trends of bird species associated with woodland and forest ecosystem



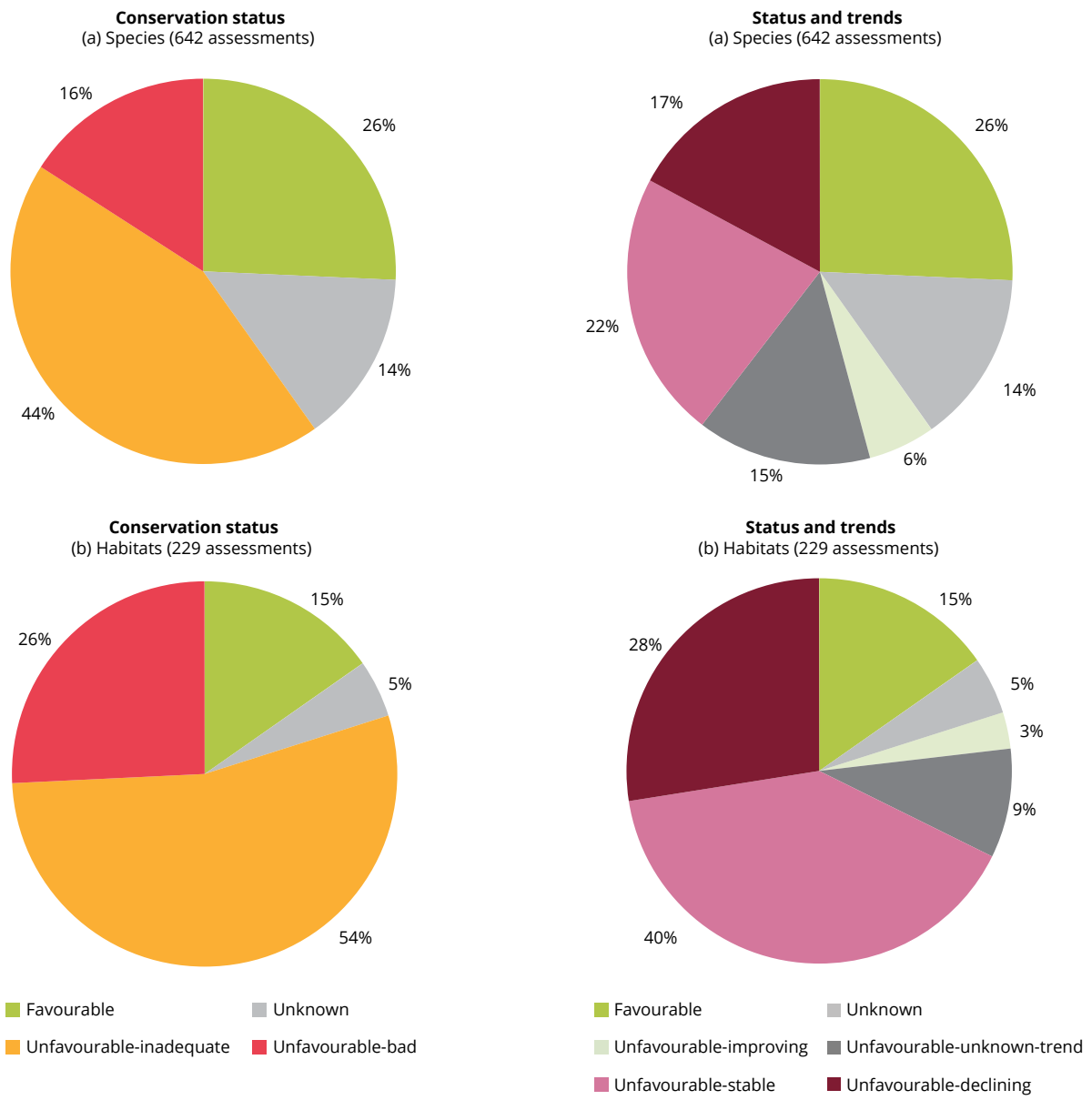
Notes: The total number of assessments is 151 for birds.

Source: EEA, 2015a, Article 12 reports and assessments.

assessments of EU population status for woodland and forest bird species are secure (64%), whereas threatened (9%) and near threatened, declining or depleted (13%) and unknown (14%) assessments each account for relatively small proportions. This was the highest share of secure assessments and the lowest share of threatened assessments among all terrestrial and freshwater ecosystems. For short-term trends in EU population status, assessments reported as decreasing (28%) and stable/fluctuating (24%) each make up about a quarter of assessments, whereas increasing assessments supply the largest share (34%), with more than a third of assessments.

As shown in Figure 4.15, the majority of the assessments of conservation status for woodland and forest species from the Habitats Directive are unfavourable, with 44% assessed as unfavourable-inadequate and 16% assessed as unfavourable-bad. However, more than a quarter of assessments are assessed as favourable (26%). As for the trends in conservation status, nearly a quarter of the

Figure 4.15 Conservation status and trends of species (a) and habitats (b) (Habitats Directive) associated with woodland and forest ecosystem



Notes: The total number of assessments is 642 and 229 for species and habitats, respectively.

Source: EEA, 2015b, Article 17 reports and assessments.

assessments are assessed as unfavourable-stable (22%), while only 6% are assessed as unfavourable-improving. Moreover, a significant amount of the remaining assessments (17%) are assessed as unfavourable-declining. As such the overall picture is mixed, with a relatively high share of favourable assessments, but also with a high share of unfavourable assessments and few signs of improvement.

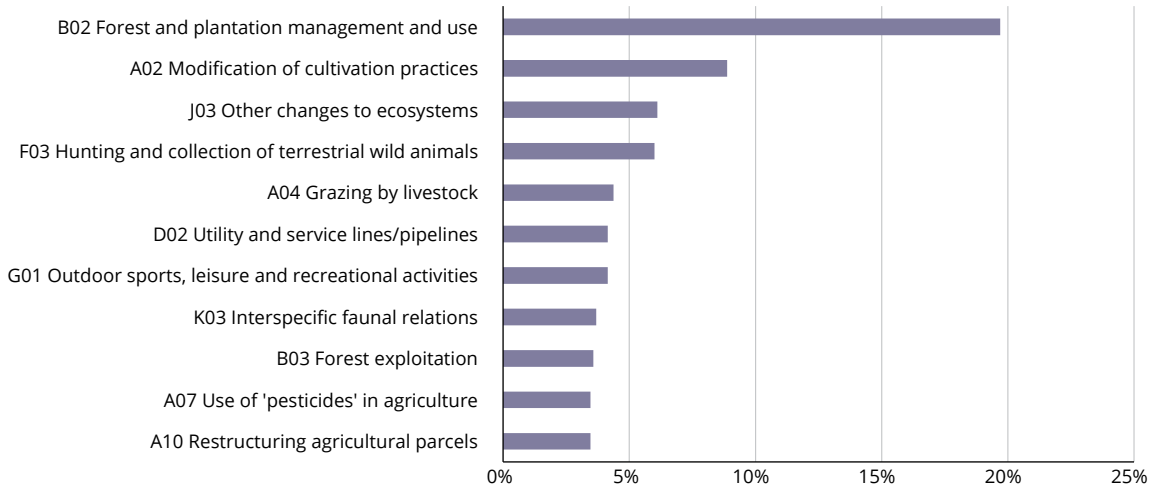
The assessments for woodland and forest habitats were less favourable compared to woodland and forest species, with only 15% assessed as favourable and 54% assessed as unfavourable-inadequate. Unfavourable-bad assessments also made up a higher share of assessments (26%). As for trends in conservation status, both unfavourable-stable (40%) and unfavourable-declining (28%) made up a significant share of assessments, while unfavourable-improving accounted for a mere 3%. There are 229 assessments for woodland and forest habitats.

Unsurprisingly, woodland and forest birds are most affected by forestry and agriculture-related pressures/threats (accounting for 29 and 24% of all reported pressures/threats at Level 1, respectively). At Level 2, the largest pressure/threat stems from forest and plantation management and use (listed in approximately a fifth of all reports). Within this category, the removal of dead and dying trees and forestry clearance are most significant. The modification of cultivation practices is the second most frequently reported Level 2 category, and primarily refers to agricultural intensification, and grassland removal for arable land and crop change. This is probably due to many forest species also being linked to other ecosystems (e.g. grasslands). The remaining Level 2 top-ranked pressures/threats are distributed fairly equally across a variety of categories, indicating the need to consider a range of factors when approaching woodland/forest bird population management (see Figure 4.16).

The dominant threat and pressure for woodland and forest ecosystem non-bird species unsurprisingly relates to 'forestry' (comprising 30% of the total reported threats/pressures at Level 1). Level 2 reporting mirrors this trend, with forest and plantation management and use clearly being the most significant factor (listed in over a fifth of all reports). As for bird species, the remaining top Level 2 pressures/threats were distributed relatively equally across five additional overarching (Level 1) categories ([39]) (see Figure 4.17).

Unequivocally, woodland and forest habitats face the largest pressures/threats from 'forestry' (responsible for 26% of the total reported pressures/threats at Level 1) and the 'modification of natural conditions' (19%). Key pressures /threats within these categories include forest and plantation management (particularly the removal of dead and dying trees) and changes

Figure 4.16 Top 10 (% of frequency) reported high-ranked pressures /threats for birds associated with woodland and forest ecosystem

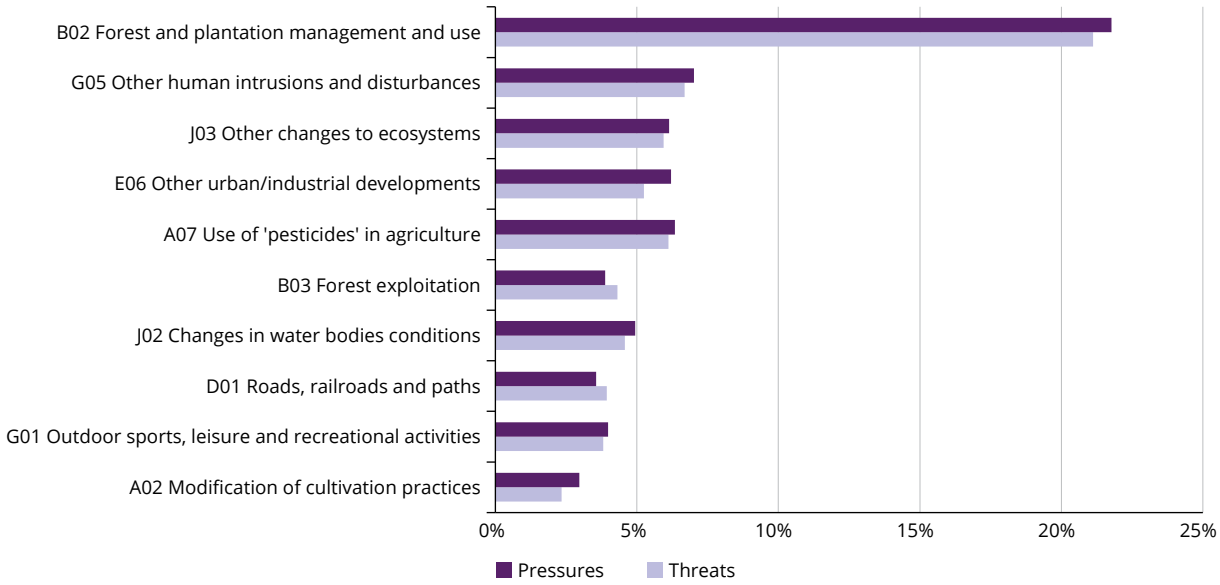


Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 868. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

([39]) i.e. human intrusions and disturbances; natural systems modifications; urbanisation, residential and commercial development; agriculture; transportation and service corridors; and biological resource use other than agriculture and forestry.

Figure 4.17 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with woodland and forest ecosystem



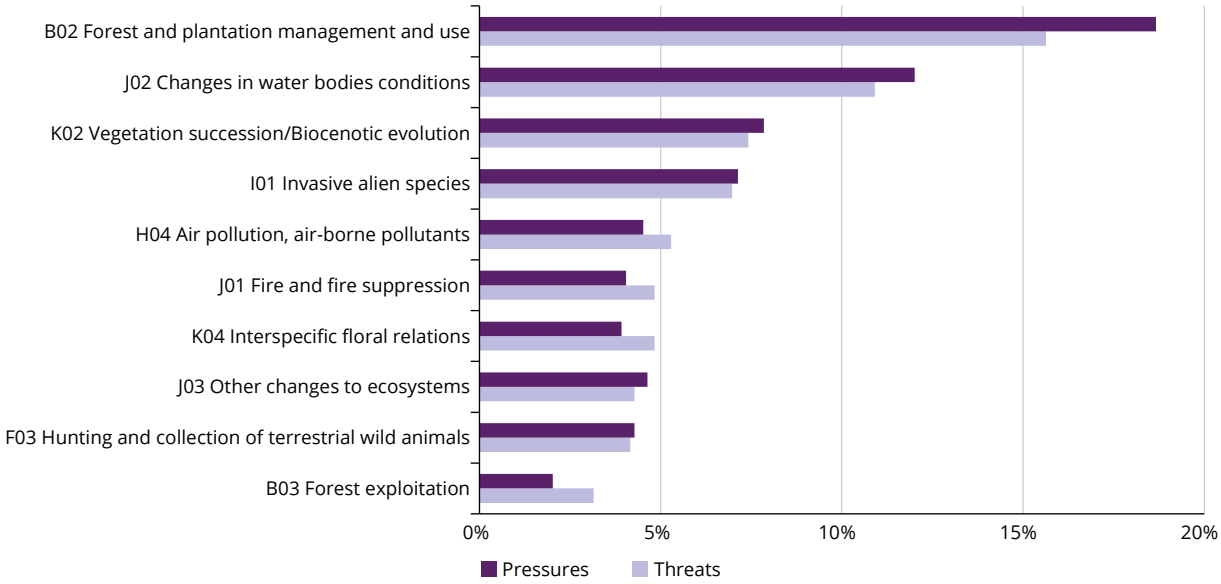
Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 2 835 and 2 993, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

in waterbody conditions. Vegetation succession/ biocenotic evolution is a further significant pressure/ threat to woodland and forest habitats, alongside invasive alien species (see Figure 4.18).

Table 4.5 lists the five most frequently reported conservation measures for woodland and forest birds, and non-bird species and habitats at Level 2 of the conservation measures categorisation. The top-ranked

Figure 4.18 Top 10 (% of frequency) reported high-ranked pressures and threats for habitats associated with woodland and forest ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 841 and 889, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.5 Top five Level 2 conservation measures ranked high for species and habitats associated with woodland and forest ecosystem

Top five	Birds			Non-bird species			Habitats		
		Measure	%		Measure	%		Measure	%
1.	6.3	Legal protection of habitats and species	22.2	6.3	Legal protection of habitats and species	25.4	6.1	Establish protected areas/sites	26.8
2.	6.1	Establish protected areas/sites	21.8	6.1	Establish protected areas/sites	19.1	3.2	Adapt forest management	18.9
3.	3.2	Adapt forest management	11.5	7.4	Specific single species or species group management measures	8.4	3.1	Restoring/improving forest habitats	18.4
4.	3.1	Restoring/improving forest habitats	7.9	3.2	Adapt forest management	8.2	6.3	Legal protection of habitats and species	8.6
5.	7.4	Specific single species or species group management measures	6.9	3.1	Restoring/improving forest habitats	7.7	6.2	Establishing wilderness areas/allowing succession	5.6

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 997, 1 815 and 1 256 for birds, non-bird species and habitats, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

measures for birds and non-bird species are 'legal protection of habitats and species' (24% and 25%, respectively) and 'establish protected areas/sites' (24% and 19%, respectively). 'Adapt forest management', 'restoring/improving forest habitats' and 'specific single species or species group management measures' were also ranked top for bird and non-bird species. Habitats differed slightly, with 'establish protected areas/sites' and 'adapt forest management' being the highest ranked, followed by 'restoring/improving forest habitats', 'legal protection of habitats and species' and 'establishing wilderness areas/allowing succession'.

4.2.4 Wetlands ecosystem

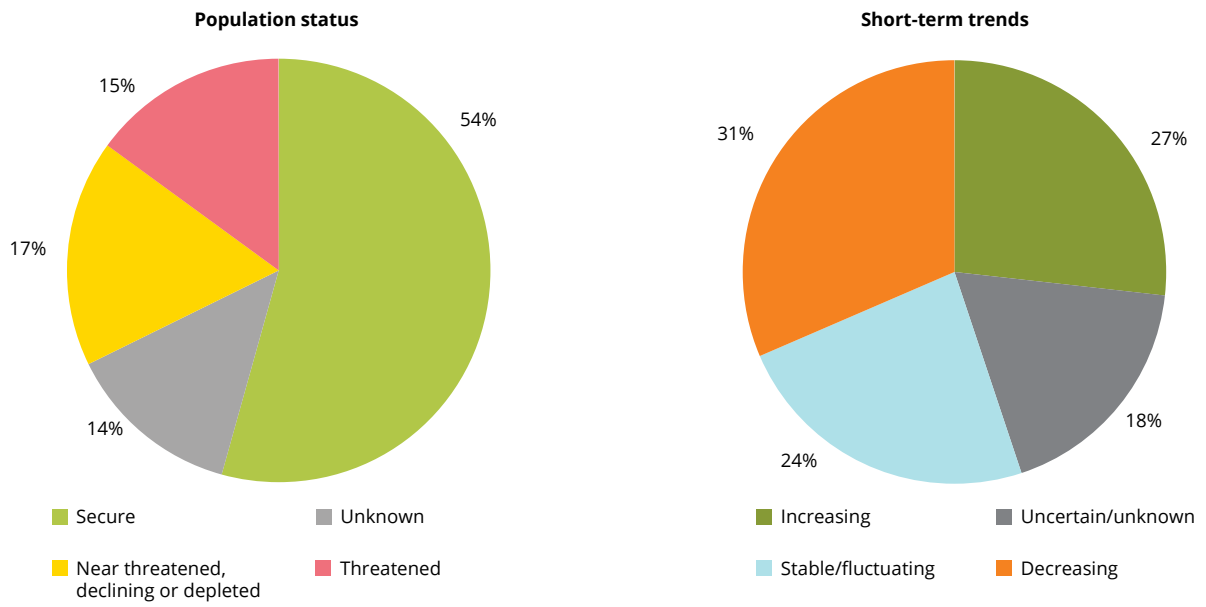
The MAES wetlands ecosystem is defined as predominantly waterlogged plant communities, often peat forming. This ecosystem type includes natural or modified mires, bogs and fens, plus some dune habitats (EC, 2013b, 24). Wetlands represent about 2% of the EU land area (ETC/BD, 2011). The wetlands ecosystem is an important provider of water-related ecosystems services such as water quality regulation and — depending on its management — it can be either a significant source of or sink for greenhouse gas emissions. Note that this is different to the Ramsar definition of wetlands (The Convention on Wetlands ([40])) that includes features such as waterbodies.

Figure 4.19 shows the population status of wetlands-related birds. More than half the assessments of EU population status for wetlands ecosystem bird species are secure (54%), whereas threatened (15%) and near threatened, declining or depleted (17%) combined make up about one-third of assessments. Unknown assessments make up a slightly smaller share, at 14%. Concerning short-term trends in EU population status, assessments reported as decreasing form the largest share (32%), whereas about a quarter of assessments each are reported as increasing (27%) and stable/fluctuating (24%). Another 17% were reported as uncertain/unknown. Moreover, as shown in Chapter 2, it should be noted that some waterbird species (ducks, waders and grebes) tend to have a particularly high proportion of threatened species compared to other groups.

As shown in Figure 4.20, the majority of assessments of conservation status for wetlands-related species of the Habitats Directive are unfavourable, with nearly half (46%) assessed as unfavourable-inadequate. Moreover, slightly less than a quarter were assessed as favourable or unfavourable-bad, each representing a share of 22% and 21%, respectively. As for the trends in conservation status, more than a quarter of assessments were assessed as declining (28%), while a significant share were also assessed as stable or unknown. Only a very small share, on the other hand, were assessed as improving (4%).

([40]) See http://www.ramsar.org.

Figure 4.19 Population status and short-term trends of bird species associated with wetlands ecosystem



Notes: The total number of assessments is 127.

Source: EEA, 2015a, Article 12 reports and assessments.

The assessments for wetlands ecosystem habitats were significantly less favourable compared to wetland species, with 13% assessed as favourable and more than half (51%) assessed as unfavourable-bad. Moreover, unfavourable-inadequate assessments made up more than a third of assessments (34%). As for trends in conservation status, unfavourable-stable (21%) and unfavourable-declining (28%) reports made up nearly half of the assessments, while only 7% were reported as improving.

Wetland bird populations are most affected by the 'modification of natural conditions' and 'agriculture', comprising 31% and 23% of all reported Level 1 pressures/threats, respectively. The most significant pressure/threat at Level 2 classification is 'human-induced changes in waterbody conditions', listed in almost a quarter of all reports. While this pressure/threat stems from numerous factors, the most significant contributors are the 'modification of hydrographic functioning', 'large-scale water deviation', and 'landfill/land reclamation and drying out'. With far lower frequencies, the next highest-ranked Level 2 categories are the 'modification of cultivation practices' and other changes to ecosystems (see Figure 4.21).

Wetland non-bird species are reported to be most affected by the 'modification of natural conditions' (28% of the total reported pressures/threats at Level 1). The largest pressure/threat within this overarching category is changes in waterbody conditions (listed in a fifth of reported pressures/threats). The remaining top Level 2 pressures/threats are each reported in less than 8% of cases and are fairly equally distributed over seven Level 1 categories ([41]), indicating the range of factors requiring consideration when addressing wetland (non-bird) species management (see Figure 4.22).

'Modification of natural conditions' — referring particularly to changes in waterbody conditions — is the most dominant threat/pressure to wetland habitats. Vegetation succession/biocenotic evolution is the second most frequently reported Level 2 pressure/threat, with species composition change making the most significant contribution. The majority of the remaining top Level 2 threats/pressures relate to 'agriculture' (three pressures/threats) and 'pollution' (three pressures/threats) (see Figure 4.23).

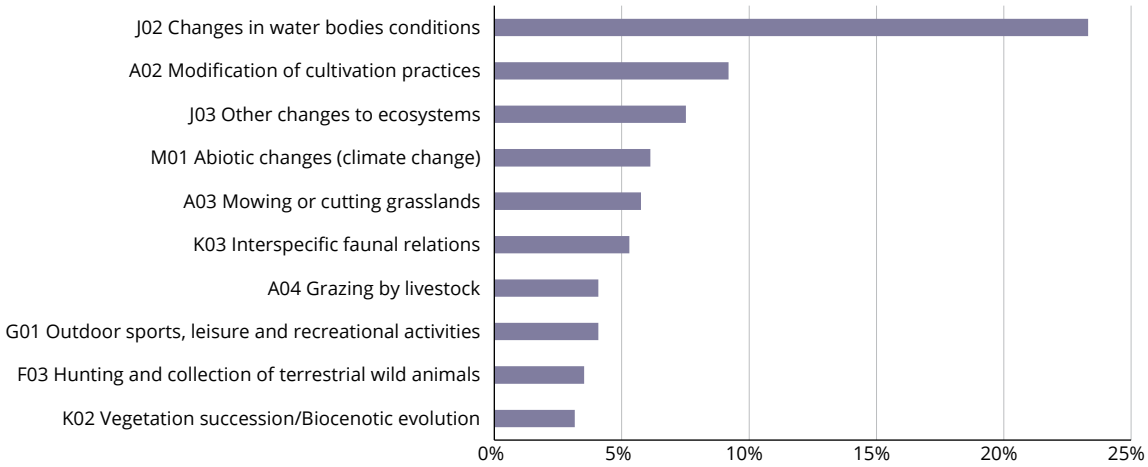
([41]) i.e. natural system modifications; agriculture; pollution; natural biotic and abiotic processes; transportation and service corridors; urbanisation, residential and commercial development; silviculture/forestry; invasive, other problematic species and genes.

Figure 4.20 Conservation status and trends of species (a) and habitats (b) (Habitats Directive) associated with wetlands ecosystem

Notes: Non-bird species are species from the Habitats Directive. The total number of assessments is 528 and 61 for non-bird species and habitats, respectively.

Source: EEA, 2015b, Article 17 reports and assessments.

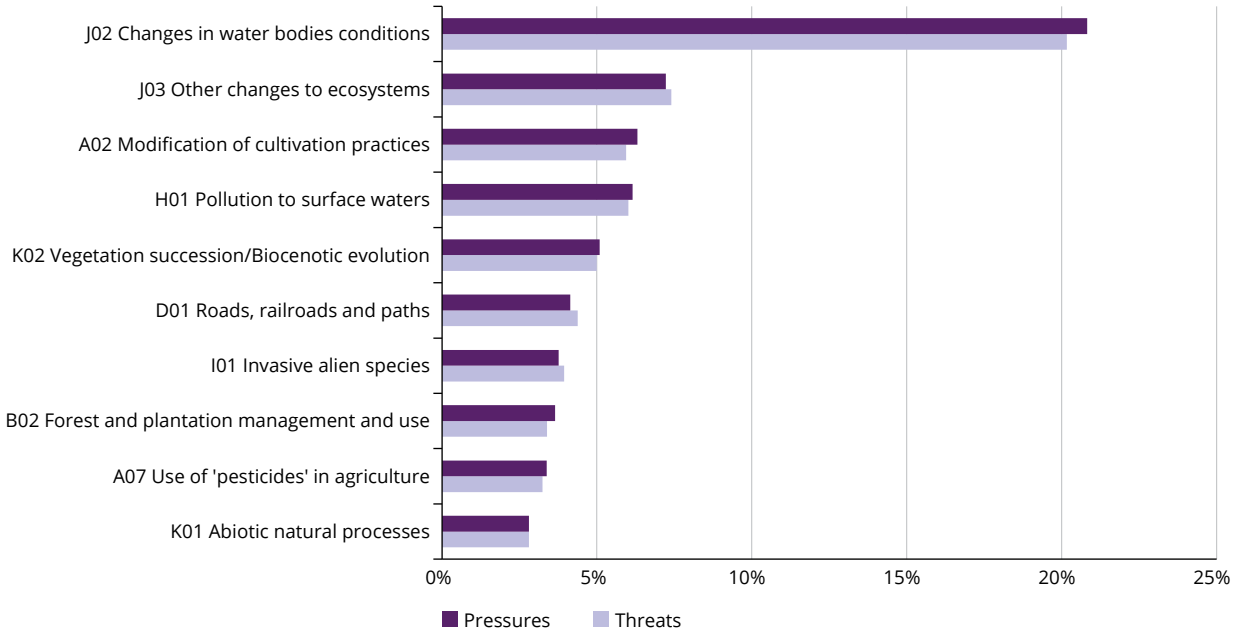
Figure 4.21 Top 10 (% of frequency) reported high-ranked pressures/threats for birds associated with wetlands ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 1 077. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

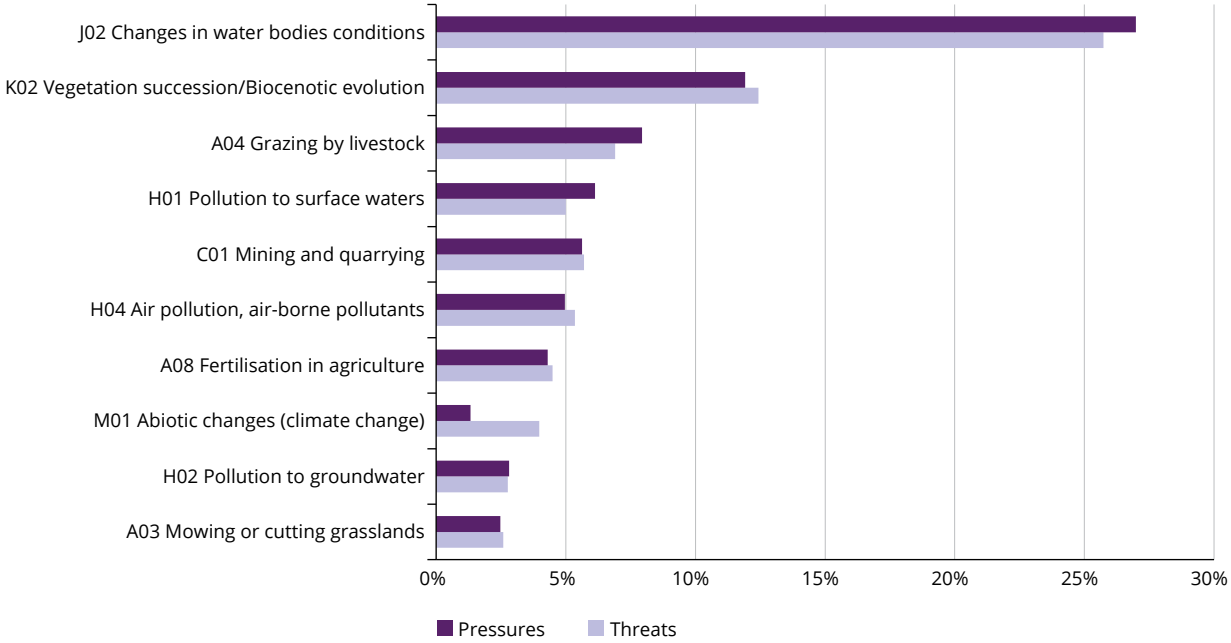
Figure 4.22 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with wetlands ecosystem



Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 2 631 and 2 742, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 4.23 Top 10 (% of frequency) reported high-ranked pressures and threats for habitats associated with wetlands ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 604 and 579, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.6 lists the five most frequently reported conservation measures for wetland birds, non-bird species and habitats at Level 2 of the conservation measures categorisation. The four most common types of conservation measures are shared across groups, albeit in slightly different rankings. 'Establish protected areas/sites' is the top measure for birds and habitats (representing 25% and 23%, respectively), while the 'legal protection of habitats and species' is highest ranked for non-bird species (20%). 'Restoring/improving the hydrological regimes plays a more important role for habitats (ranked second) than for

Table 4.6 Top five Level 2 conservation measures ranked high for species and habitats associated with wetlands ecosystem

Top five	Birds			Non-bird species			Habitats		
		Measure	%		Measure	%		Measure	%
1.	6.1	Establish protected areas/sites	24.9	6.3	Legal protection of habitats and species	20.0	6.1	Establish protected areas/sites	22.5
2.	6.3	Legal protection of habitats and species	19.7	6.1	Establish protected areas/sites	14.9	4.2	Restoring/improving the hydrological regime	16.4
3.	4.2	Restoring/improving the hydrological regime	15.2	4.2	Restoring/improving the hydrological regime	11.4	6.3	Legal protection of habitats and species	14.3
4.	2.1	Maintaining grasslands and other open habitats	6.6	2.1	Maintaining grasslands and other open habitats	9.0	2.1	Maintaining grasslands and other open habitats	11.1
5.	7.1	Regulation/Management of hunting and taking	6.1	4.1	Restoring/improving water quality	7.0	4.1	Restoring/improving water quality	5.9

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 1 664, 1 762 and 610 for birds, non-bird species and habitats, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

birds and non-bird species (ranked third). 'Maintaining grasslands and other open habitats' is ranked fourth for all groups, followed by 'restoring/improving water quality' (non-birds species and habitats) and 'regulation/management of hunting and taking' (birds).

4.2.5 Heathland and shrub ecosystem

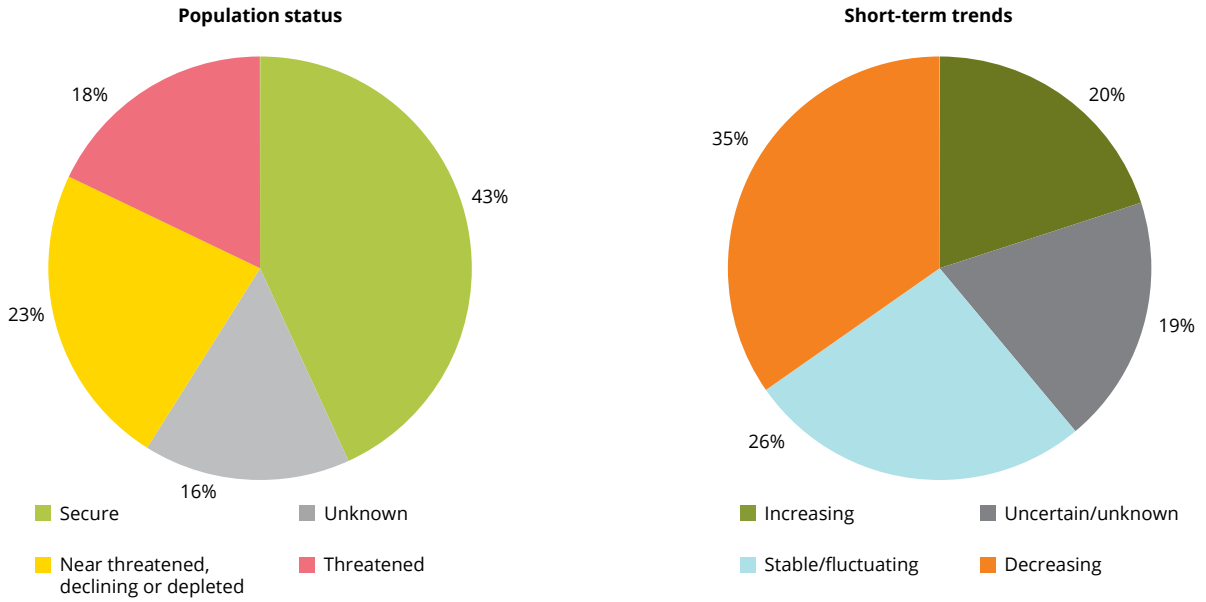
The heathland and shrub ecosystem consists of areas with vegetation dominated by shrubs or dwarf shrubs. It predominantly refers to secondary ecosystems including moors, heathland and sclerophyllous vegetation (EC, 2013b). Heathland and shrub covers about 7% of the EU land area (ETC/BD, 2011). Annex I of the Habitats Directive includes 22 types of heath and shrub habitats.

Figure 4.24 shows the population status of birds associated with heathland and shrub. The largest share of EU population status for heathland and shrub bird species is reported as secure (43%), whereas near threatened, declining or depleted (23%) also made up a significant portion of assessments, at nearly a quarter of assessments. This places heathland and shrub at second place for the lowest share of secure assessments among all MAES ecosystems. Threatened (18%) and unknown (16%) reports made up slightly smaller shares. As for short-term trends in EU population status, assessments reported as decreasing made up the largest share (35%) with about one-third, and stable/fluctuating (26%) made up about a quarter of assessments. Increasing (20%) and uncertain/unknown (19%) reports, on the other hand, each made up about one-fifth of assessments. Heathland and shrub has the lowest share of increasing, as well as the overall highest share of unknown short-term trend assessments among all ecosystems.

As shown in Figure 4.25, about half the assessments of conservation status for heathland and shrub species from the Habitats Directive are unfavourable, with a majority of these assessed as inadequate (38%) as opposed to bad (12%). Furthermore, close to one-third of the assessments are favourable (30%) and a relatively large share (20%) are unknown. As for the trends in conservation status, stable, declining and unknown assessments each had similar shares of about 15%, while only 3% were assessed as having an improving trend. There are 404 assessments for heathland and shrub non-bird species.

The assessments for heath and shrub habitats were considerably less favourable compared to heathland and shrub non-bird species, with about half assessed as inadequate, approximately a quarter assessed as bad, and a smaller share assessed as favourable (21%). Moreover, the share of unknown assessments is significantly lower compared to non-bird species. As for trends in conservation status, about a third of

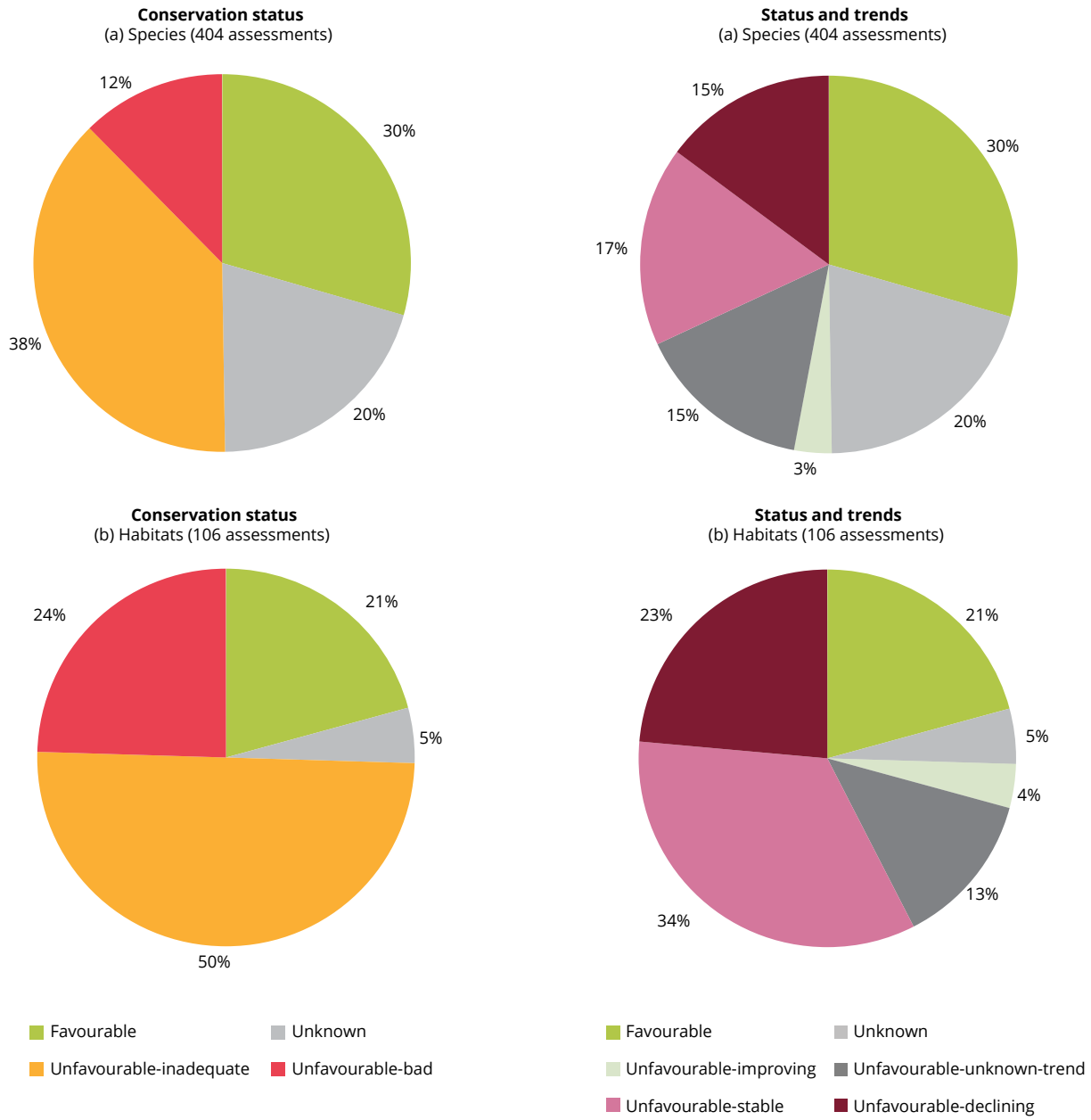
Figure 4.24 Population status and short-term trends of bird species associated with heathland and shrub ecosystem



Notes: The total number of assessments is 95 for birds.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 4.25 Conservation status and trends of species (a) and habitats (b) (Habitats Directive) associated with heathland and shrub ecosystem



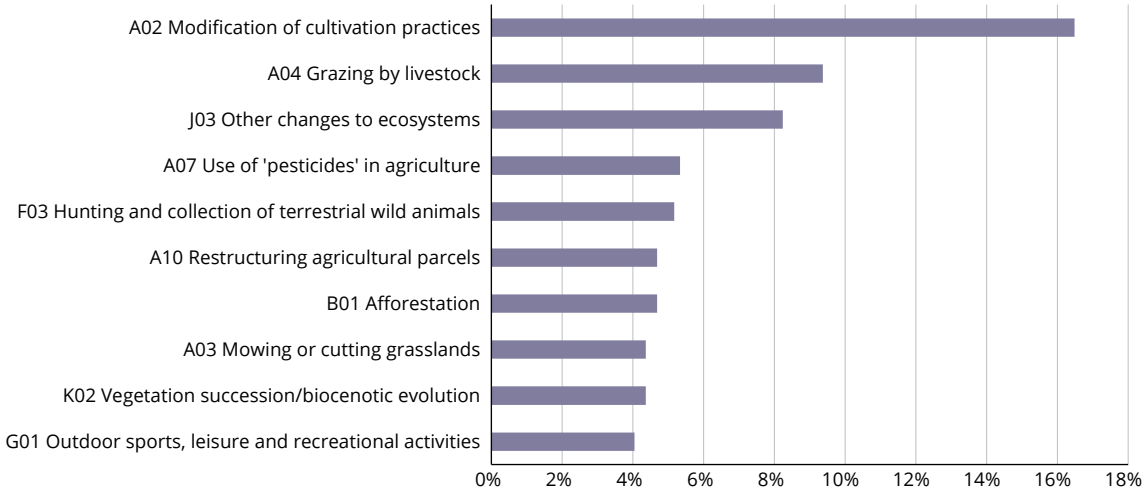
Notes: Non-bird species are species from the Habitats Directive. The total number of assessments is 404 and 106 for non-bird species and habitats, respectively.

Source: EEA, 2015b, Article 17 reports and assessments.

the assessments were assessed as stable and about a quarter as declining, while only 4% were assessed as improving. There are 106 assessments for heathland and shrub habitats.

Approximately half the top-ranked pressures/threats to heathland and shrub birds relate to 'agriculture' at Level 1. Within this category, the top pressure/threat is the modification of cultivation practices (e.g. agricultural intensification, grassland removal for arable land, and crop change). The second most frequently reported Level 2 pressure/threat is grazing by livestock, predominantly the abandonment of pastoral systems/ lack of grazing. Finally, the third-ranked pressure/ threat — other changes to ecosystems — stems largely from the reduction or loss of specific habitat features. The remaining top-ranked Level 2 reported pressures/ threats have similar frequencies (see Figure 4.26).

Figure 4.26 Top 10 (% of frequency) reported high-ranked pressures/threats for birds associated with heathland and shrub ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 619. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

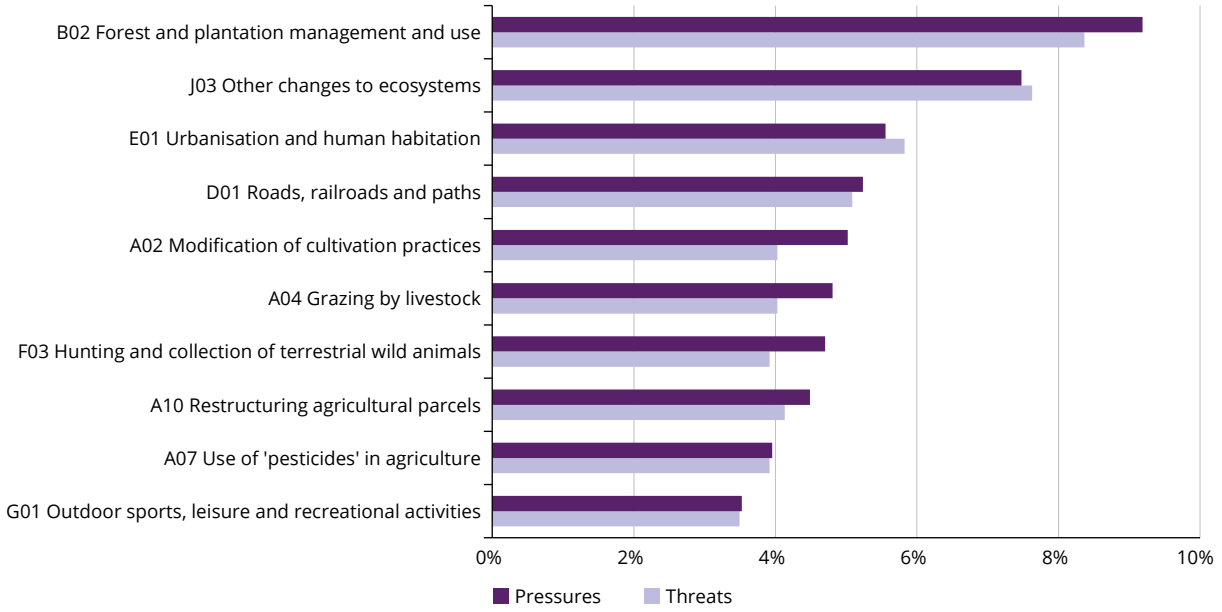
Heathland and shrub non-bird species are reported to be most impacted by 'agriculture' (21% of the total reported threats/pressures at Level 1), followed closely by 'forestry' (16%) and 'modification of natural conditions' (13%). Agricultural pressures/threats are, however, not among the top four Level 2 pressures/threats. Instead, forest and plantation management and use, other changes to ecosystems, urbanisation and human habitation, and roads, railroads and paths are the four most frequently reported factors. The remaining top Level 2 pressures/threats are less significant and are reported with similar frequencies (see Figure 4.27).

Heathland and shrub habitats are most severely affected by 'agriculture' (21% of the total reported pressures/threats at Level 1) and 'natural processes (excluding catastrophes)' (15%). Within these categories, the most frequently reported pressures/threats are grazing by livestock (specifically the abandonment of pastoral systems/lack of grazing) and vegetation succession/biocenotic evolution (particularly species composition change/succession). The remaining top-ranked Level 2 pressures/threats were widely distributed across seven Level 1 categories ([42]) (see Figure 4.28).

Table 4.7 lists the five most frequently reported conservation measures for heathland and shrub birds, non-bird species and habitats at Level 2 of the conservation measures categorisation. The two most common individual types of conservation measure across all assessments were 'establish protected areas/sites' and 'legal protection of habitats and species'; 'maintaining grasslands and other open habitats' were frequently reported for birds and habitats, and 'specific single species or species group management measures' were frequently reported for birds and non-bird species.

([42]) i.e. pollution; invasive, other problematic species and genes; natural system modifications; urbanisation, residential and commercial development; silviculture/forestry; climate change; and human intrusions and disturbances.

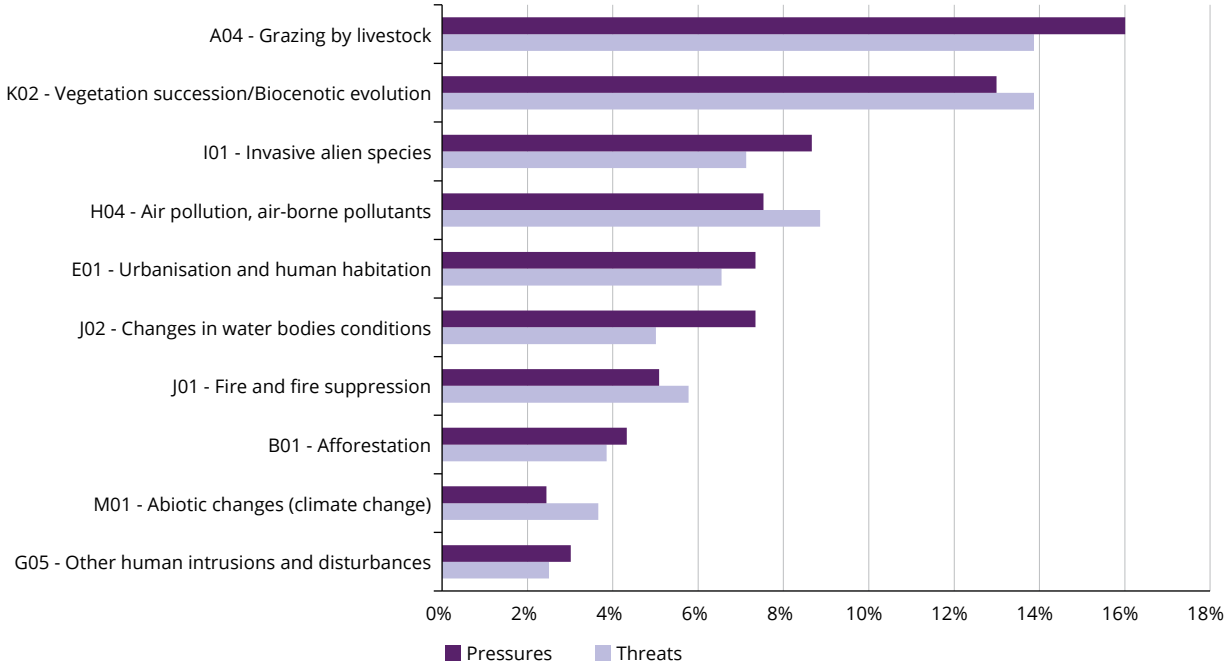
Figure 4.27 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with heathland and shrub ecosystem



Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 936 and 944, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 4.28 Top 10 (% of frequency) reported high-ranked pressures and threats for habitats associated with heathland and shrub ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 531 and 519, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.7 Top five Level 2 conservation measures ranked high for species and habitats associated with heathland and shrub ecosystem

Top five	Birds			Non-bird species			Habitats		
		Measure	%		Measure	%		Measure	%
1.	6.1	Establish protected areas/sites	24.3	6.3	Legal protection of habitats and species	24.5	6.1	Establish protected areas/sites	25.2
2.	6.3	Legal protection of habitats and species	22.6	6.1	Establish protected areas/sites	18.2	2.1	Maintaining grasslands and other open habitats	21.0
3.	2.1	Maintaining grasslands and other open habitats	12.4	7.4	Specific single species or species group management measures	9.6	6.3	Legal protection of habitats and species	14.6
4.	7.4	Specific single species or species group management measures	7.4	9.1	Regulating/Management exploitation of natural resources on land	8.6	6.0	Other spatial measures	6.4
5.	7.1	Regulation/Management of hunting and taking	5.7	7.1	Regulation/Management of hunting and taking	6.3	6.4	Manage landscape features	5.3

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 646, 653 and 547 for birds, non-bird species and habitats, respectively. No Articles 12 and 17 reports were provided by Greece.

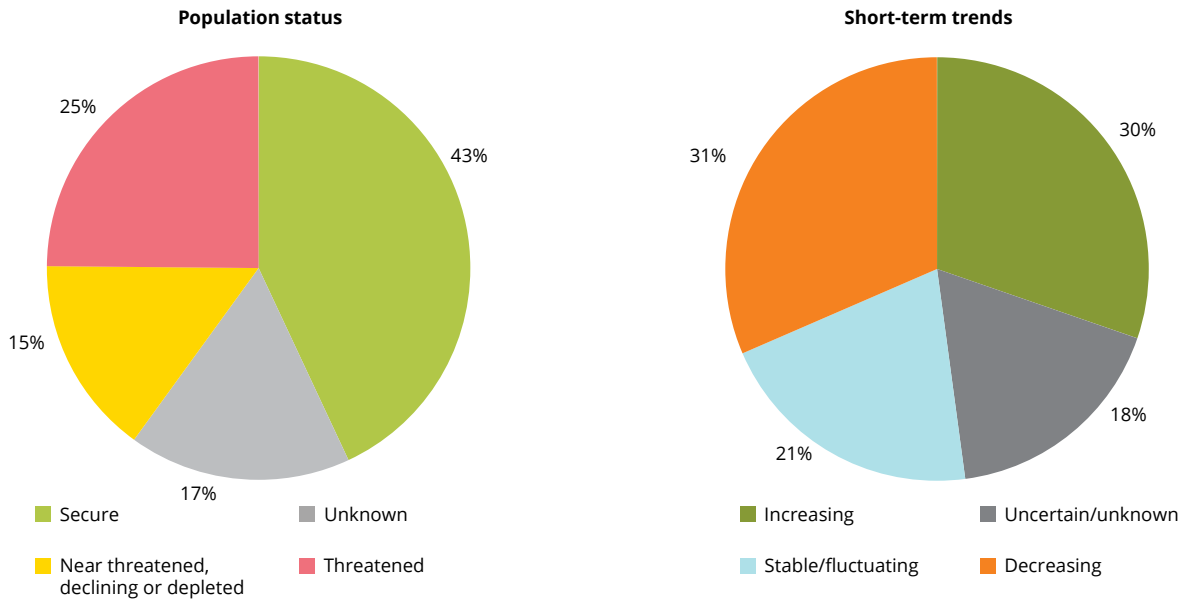
Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

4.2.6 Sparsely vegetated land ecosystem

The sparsely vegetated land ecosystem consists of areas naturally unvegetated or with sparse vegetation, such as cliffs, scree, glaciers, beaches and some dunes. This ecosystem is relatively rare in Europe and is found mostly on mountains. Often, this ecosystem has extreme natural conditions that support specialised, often rare, species, making it distinctive and rare (EC, 2013b). Though this ecosystem type harbours many specialist species, it is often less species-rich than other ecosystem types, due to its extreme conditions. Twenty-six habitats from Annex I of the Habitats Directive are included in this ecosystem type.

Figure 4.29 shows the population status of bird species associated with sparsely vegetated land. The largest share of EU bird population status is reported as

Figure 4.29 Population status and short-term trends of bird species associated with sparsely vegetated land ecosystem



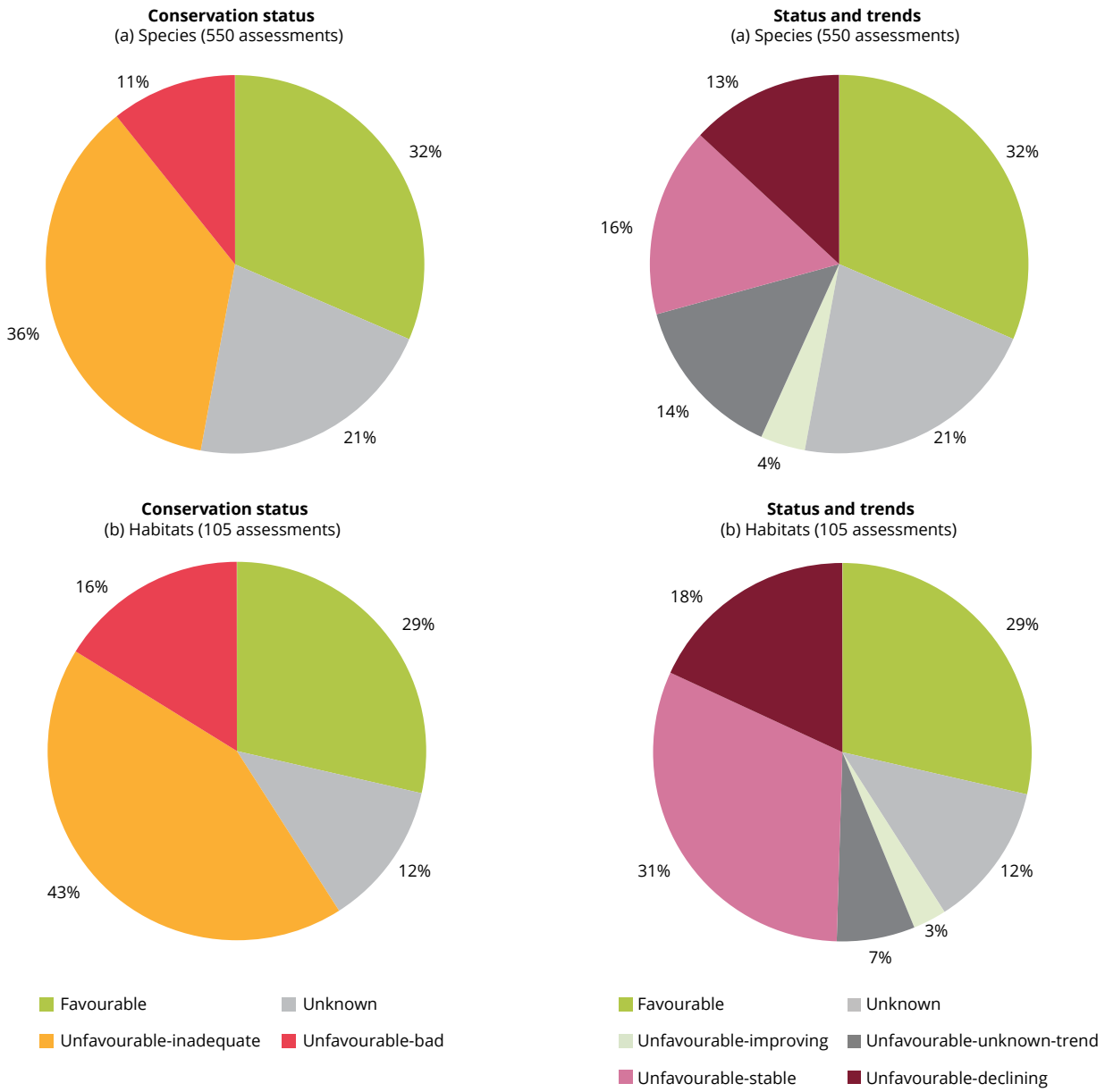
Notes: The total number of assessments is 165 for birds.

Source: EEA, 2015a, Article 12 reports and assessments.

secure (43%), whereas threatened (25%) also make up nearly a quarter of assessments. In comparison with other ecosystem types, sparsely vegetated land birds have the lowest share of secure population status assessments overall, and the highest share of threatened assessments among terrestrial and freshwater ecosystems. Near threatened, declining or depleted (15%) and unknown (17%) assessments make up smaller, yet significant shares. As for short-term trends in EU population status, assessments reported as decreasing make up the largest share (31%) of about one-third, but are roughly equivalent with the share of increasing (30%) assessments. Moreover, the categories stable/fluctuating (21%) and uncertain/unknown each makes up about one-fifth of assessments, respectively. Sparsely vegetated land has among the highest shares of unknown population assessments and unknown short-term trend assessments among all MAES ecosystems.

As shown in Figure 4.30, about half the assessments of conservation status for sparsely vegetated land species of the Habitats Directive are unfavourable, with 36%

Figure 4.30 Conservation status and trends of species (a) and habitats (b) (Habitats Directive) associated with sparsely vegetated land ecosystem



Notes: Non-bird species are species from the Habitats Directive. The total number of assessments is 550 and 105 for non-bird species and habitats, respectively.

Source: EEA, 2015b, Article 17 reports and assessments.

assessed as inadequate and 11% assessed as bad. This represents a relatively low share of unfavourable-bad assessments. Furthermore, a particularly large share of assessments are favourable (32%) or unknown (21%). As for the trends in conservation status, stable, declining and unknown assessments each make up about 15% of assessments, while only a small share are assessed as improving (4%). Regardless, more than a third of assessments are assessed as favourable or improving, and about a third as unknown or unfavourable-unknown; less than a third were assessed as stable and declining.

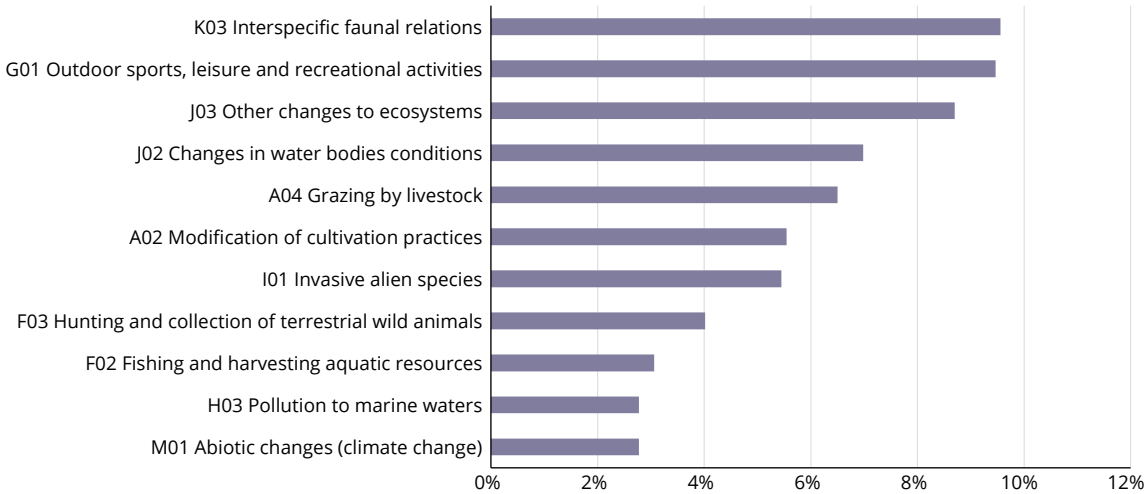
The assessments for sparsely vegetated habitats are slightly less favourable compared to non-bird species. While there are only slightly less favourable assessments (29%), a lower share of unknown assessments (12%) is matched by a slightly higher share of unfavourable-inadequate and unfavourable-bad assessments. As for trends in conservation status, about a third of assessments were stable (31%) and 18% declining, whereas only 3% were assessed as improving (see Figure 4.30).

Birds associated with sparsely vegetated land ecosystem are reported to be most affected by 'agriculture' (comprising 17% of all reported pressures/threats at Level 1) and the 'modification of natural conditions' (16%), followed by 'natural processes (excluding catastrophes)' and 'disturbances due to human activities' (each representing 12%). Looking at a more detailed categorisation, three main pressures/threats dominate, all of which were reported at approximately the same frequency: outdoor sports, leisure and recreational activities; interspecific faunal relations (e.g. predation); and other changes to ecosystems (e.g. reduction or loss of specific habitat features) (see Figure 4.31).

The main pressure/threat for non-bird species in the sparsely vegetated land ecosystem is 'agriculture' (17% of the total reported pressures/threats at Level 1), with 'urbanisation, residential and commercial development' (14%) and 'natural processes (excluding catastrophes)' (13%) following slightly behind. At Level 2, the main pressure/threat is urbanisation and human habitation (see Figure 4.32). The remaining top reported Level 2 factors are close in frequency, and are largely connected with anthropogenic factors: grazing by livestock, forest and plantation management and use; outdoor sports and leisure activities; roads, railroads and paths; and other human intrusions and disturbances.

Sparsely vegetated land habitats are reported to be most susceptible to 'disturbances due to human activities' (24% of the total reported pressures/threats at Level 1) and — to a lesser degree — 'natural processes (excluding catastrophes)' and the 'modification of natural conditions' (12% and 11%, respectively). Accordingly, the largest pressures/threats within these categories stem from outdoor sports, leisure and recreational activities and other human intrusions and disturbances (referring to trampling/overuse, in particular). Other significant threats are vegetation succession/biocenotic evolution (especially species composition change), mining and quarrying, and changes in waterbody conditions (particularly sea defence or coast protection works) (see Figure 4.33).

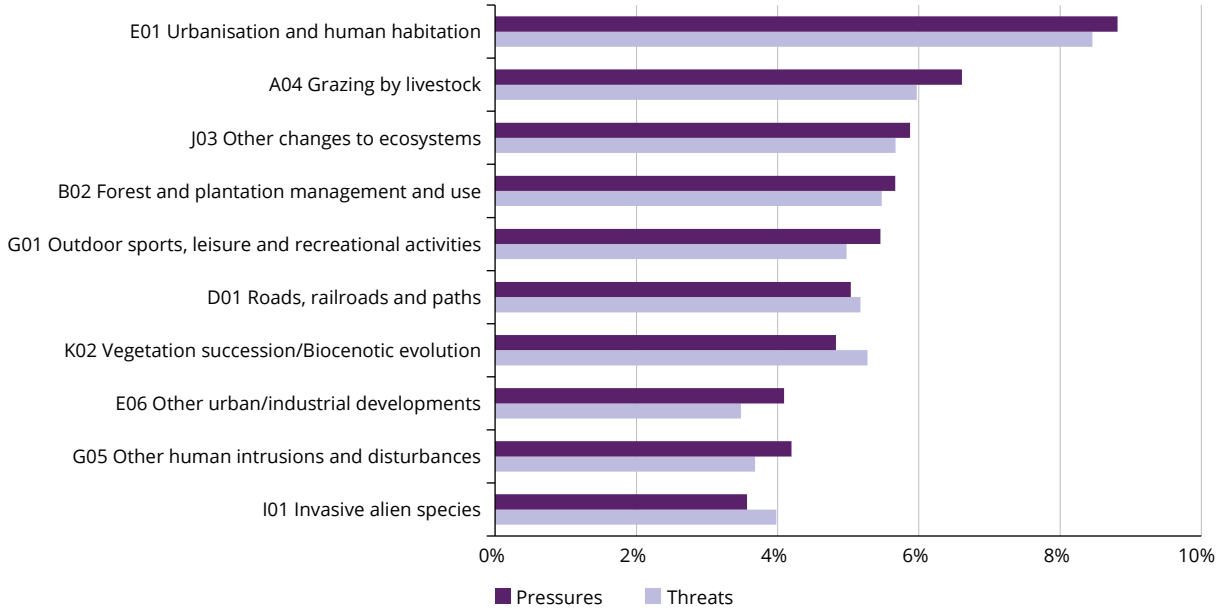
Figure 4.31 Top 10 (% of frequency) reported high-ranked pressures /threats for birds associated with sparsely vegetated land ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 1 046. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

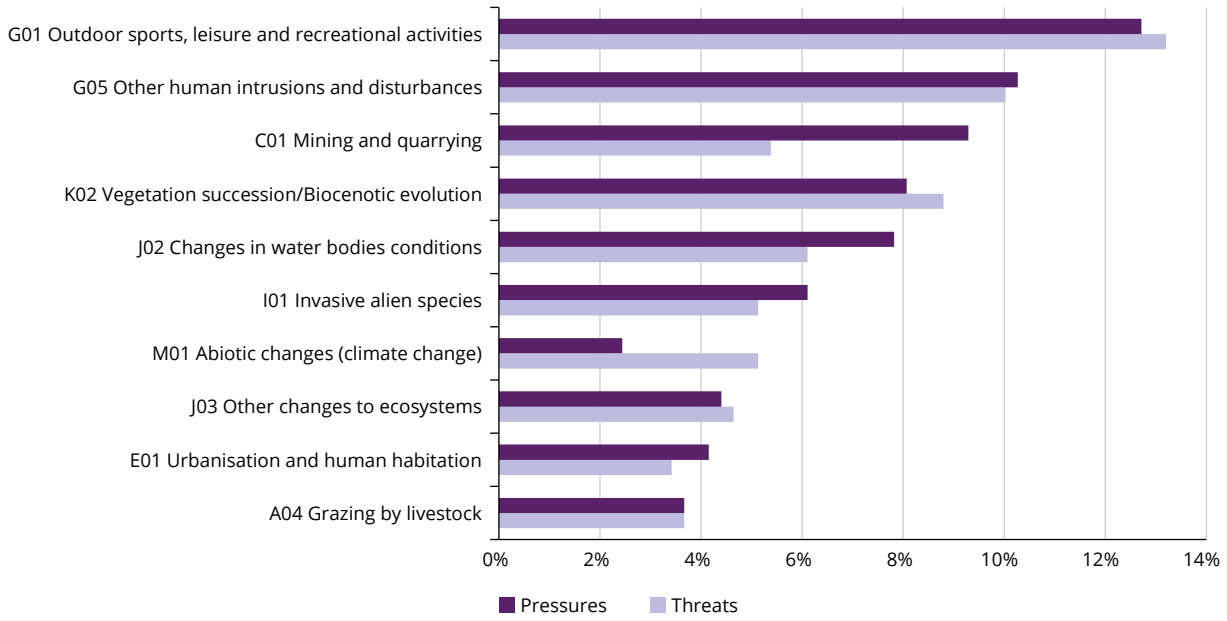
Figure 4.32 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with sparsely vegetated land ecosystem



Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 953 and 1 005, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 4.33 Top 10 (% of frequency) reported high-ranked pressures and threats for habitats associated with sparsely vegetated land ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 409 and 409, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.8 lists the five most frequently reported conservation measures for sparsely vegetated land birds, non-bird species and habitats at Level 2 of the conservation measures categorisation. The two most common types of conservation measures are 'establish protected areas/sites' (top measure for birds and habitats) and 'legal protection of habitats and species' (top measure for non-bird species). These two categories alone make up 52%, 45% and 50% of all reported conservation measures for birds, non-bird species and habitats, respectively. The subsequent rankings of birds and non-bird species are similar, with 'specific single species or species group management measures', and 'regulation/management of hunting and taking' on third and fourth place. Habitats differ slightly, with 'other spatial measures', 'regulating/management exploitation of natural resources on land' and 'maintaining grasslands and other open habitats' being the remaining most frequently reported subsequent measures.

Table 4.8 Top five Level 2 conservation measures ranked high for species and habitats associated with sparsely vegetated land ecosystem

Top five	Birds			Non-bird species			Habitats		
	Measure		%	Measure		%	Measure		%
1.	6.1	Establish protected areas/sites	27.5	6.3	Legal protection of habitats and species	26.8	6.1	Establish protected areas/sites	35.8
2.	6.3	Legal protection of habitats and species	24.7	6.1	Establish protected areas/sites	18.4	6.3	Legal protection of habitats and species	14.0
3.	7.4	Specific single species or species group management measures	8.4	7.4	Specific single species or species group management measures	9.7	6.0	Other spatial measures	10.5
4.	7.1	Regulation/Management of hunting and taking	6.3	7.1	Regulation/Management of hunting and taking	9.4	9.1	Regulating/Management exploitation of natural resources on land	9.0
5.	2.1	Maintaining grasslands and other open habitats	5.7	6.0	Other spatial measures	6.2	2.1	Maintaining grasslands and other open habitats	7.5

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 1 352, 679 and 522 for birds, non-bird species and habitats, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

4.3 Freshwater ecosystems

The rivers and lakes ecosystem is the only freshwater ecosystem under the MAES typology.

A large share of EU population status assessments for rivers and lakes related birds are secure (59%), with the remaining assessments evenly distributed across unknown, threatened, near threatened, declining or depleted. For short-term trends, the share of assessments reported as decreasing is high (31%), but is complemented by similarly large shares of increasing (27%) and stable/fluctuating assessments (29%).

A large share of the assessments of conservation status for rivers and lakes habitats and species from the Habitats Directive is unfavourable, with around half assessed as unfavourable-inadequate. Moreover, around a third of assessments of trends in conservation status are assessed as declining, while only 5% of assessments for both non-bird species and habitats are reported as improving. These figures indicate a largely unfavourable state of rivers and lakes ecosystems, with a significant declining trend.

A comparison between terrestrial and freshwater ecosystems shows that while the rivers and lakes ecosystems has the highest proportion of secure EU population status assessments for terrestrial and freshwater birds, and sparsely vegetated land ecosystems has the lowest, these rankings were reversed for conservation status assessments for habitats and species of the Habitats Directive. As such, rivers and lakes ecosystems has the lowest share of favourable habitat and species conservation status assessments among terrestrial and freshwater ecosystems, while sparsely vegetated land ecosystems had the highest share.

Rivers and lakes ecosystems is most impacted by the overarching pressure/threat category 'modification of natural conditions', and more specifically by changes in waterbody conditions. Birds and non-bird species are second most frequently affected by 'other changes to ecosystems', while habitats face the pressure/threat of 'pollution to surface waters'.

The most frequently reported conservation measure for freshwater birds and habitats is to 'establish protected areas/sites' (listed in more than a fifth of all reports). 'Restoring/improving the hydrological regime' is the most commonly listed measure for non-bird species (cited in almost a fifth of all reports).

4.3.1 Rivers and lakes ecosystem

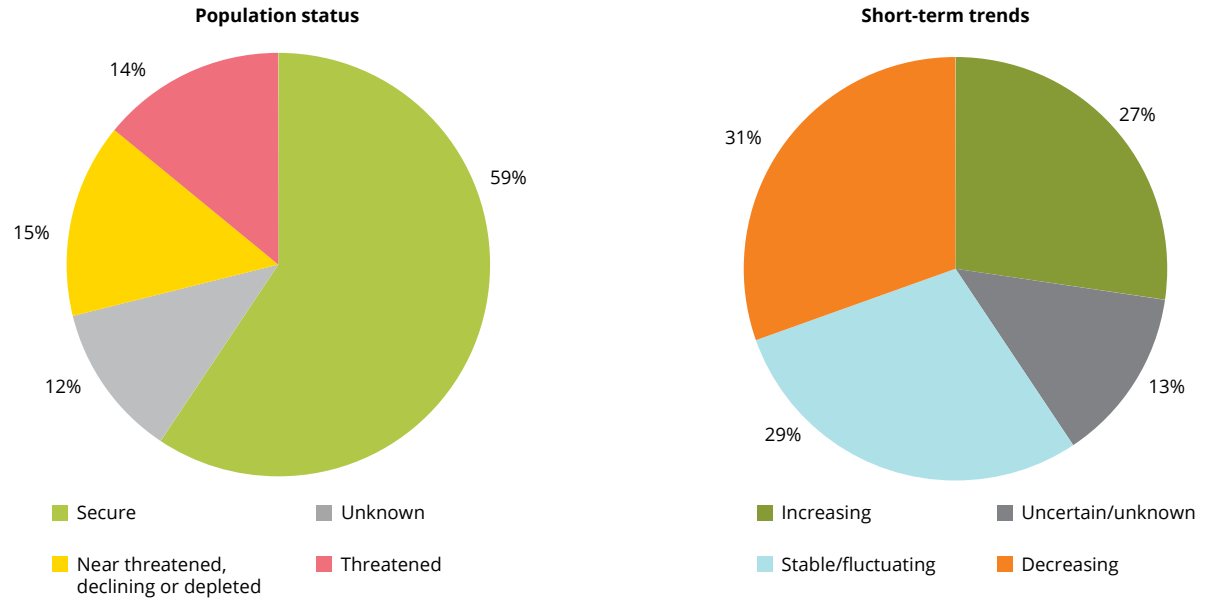
The freshwater ecosystem consists of inland freshwater systems, including rivers and lakes (EC, 2013b) and is the smallest ecosystem group in the MAES typology, with only one ecosystem. Rivers and lakes covers approximately 1% of the EU land area, although as this was derived from Corine Land Cover, which excludes small waterbodies, this is an underestimate (ETC/BD, 2011). Freshwater ecosystems are not only important for providing drinking water, but also for other ecosystems services such as recreation, food, industrial use, and mediation of wastes, and are fundamentally interconnected with many other ecosystems (European Commission, 2014). The Habitats Directive includes 19 Annex I freshwater habitat types that are linked to the MAES ecosystem 'rivers and lakes'.

Figure 4.34 shows the related conservation status of rivers and lakes. More than half the assessments of EU population status for rivers and lakes bird species are secure (59%), whereas threatened (14%), near threatened, declining or depleted (15%) and unknown (12%) assessments each make up smaller, but significant shares. For short-term trends in EU population status, decreasing (31%), increasing (27%) and stable/fluctuating assessments (29%) each make up sizeable shares, whereas the share of uncertain/unknown assessments is smaller, but significant. As has been demonstrated in Chapter 2, it should be noted that some waterbird species (ducks, waders and grebes) tend to have a particularly high proportion of threatened species compared to other groups.

As shown in Figure 4.35, a significant share of the assessments of conservation status for rivers and lakes ecosystem–related species (Habitats Directive) are unfavourable, with 45% assessed as inadequate and 29% assessed as bad. Furthermore, only a moderately sized share of the assessments is assessed as favourable (17%). As for the trends in conservation status, more than a third of assessments are assessed as declining (35%); combined, only about a quarter are assessed as stable (21%) or improving (5%). These figures indicate a largely unfavourable state of river and lake ecosystems with a significant declining trend.

The conservation status assessments for rivers and lakes habitats are comparable to rivers and lakes species, with 16% assessed as favourable and 56% assessed as unfavourable-inadequate. Unfavourable-bad assessments make up a further 17% of assessments. As for trends in conservation status, both stable (34%) and declining (31%)

Figure 4.34 Population status and short-term trends of bird species associated with rivers and lakes ecosystem



Notes: The total number of assessments is 128 for birds.

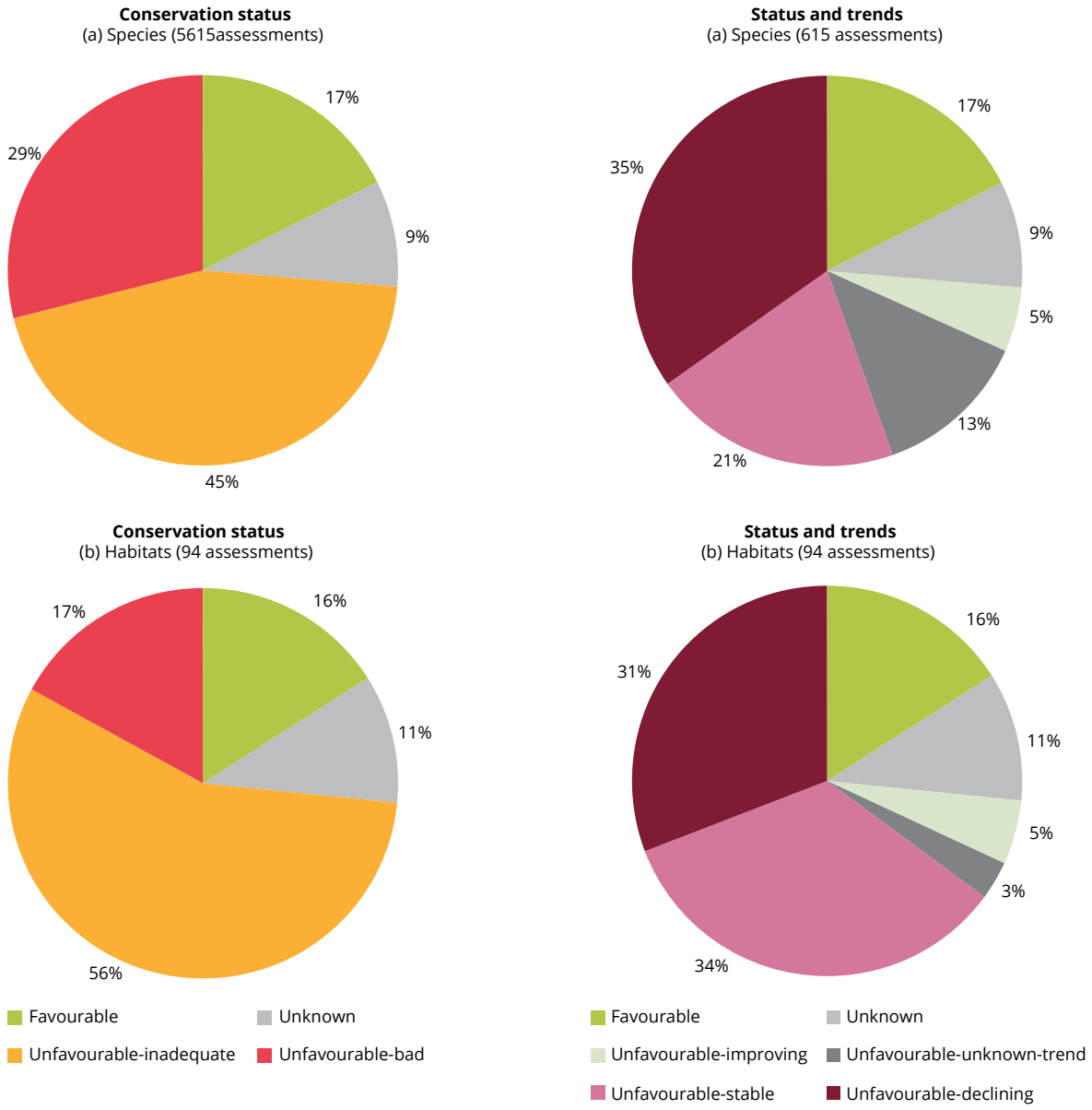
Source: EEA, 2015a, Article 12 reports and assessments.

assessments make up nearly a third of assessments, while only 5% of assessments are assessed as improving (see Figure 4.35). As such, while the share of unfavourable-bad and declining assessments is slightly less pronounced than for non-bird species, the overall picture is similarly unfavourable.

Rivers and lakes ecosystem–related birds are most frequently reported to be under pressure/threat by the 'modification of natural conditions' (33% of the total reported pressures/threats at Level 1) and, more specifically, by changes in hydraulic conditions (listed in more than a fifth of all reports). The remaining Level 2 pressures/threats are similar in their reported frequencies, and cover a wide range of Level 1 categories ([43]), indicating the need to consider an array of pressures/threats when addressing rivers and lakes bird species (see Figure 4.36).

([43]) i.e. human intrusions and disturbances; climate change; natural biotic and abiotic processes; biological resources use other than agriculture and forestry; agriculture; pollution; invasive, other problematic species and genes; and mining, extraction of materials and energy production.

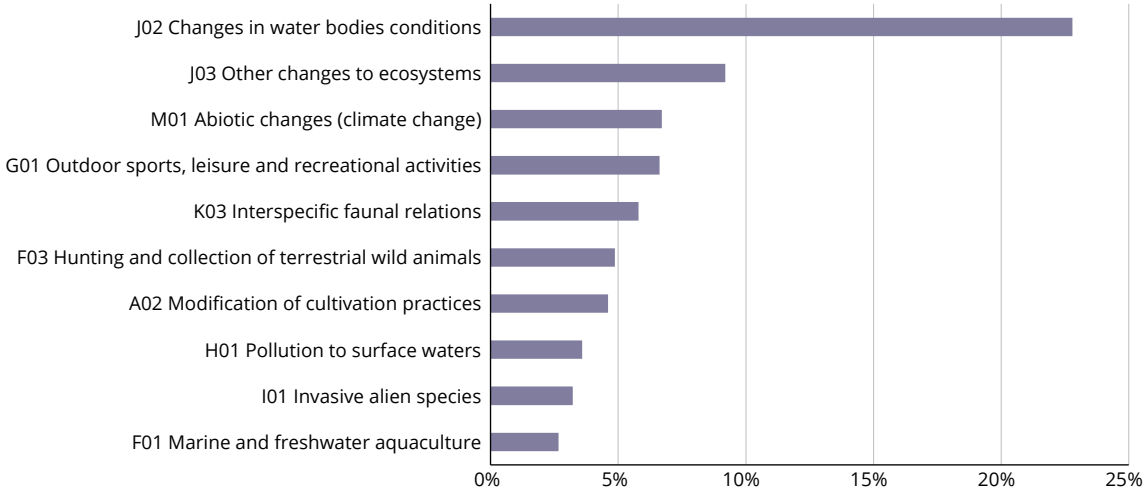
Figure 4.35 Conservation status and trends of species (a) and habitats (b) (Habitats Directive) associated with rivers and lakes ecosystem



Notes: The total number of assessments is 615 and 94 for species and habitats, respectively.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 4.36 Top 10 (% of frequency) reported high-ranked pressures/threats for birds associated with rivers and lakes ecosystem

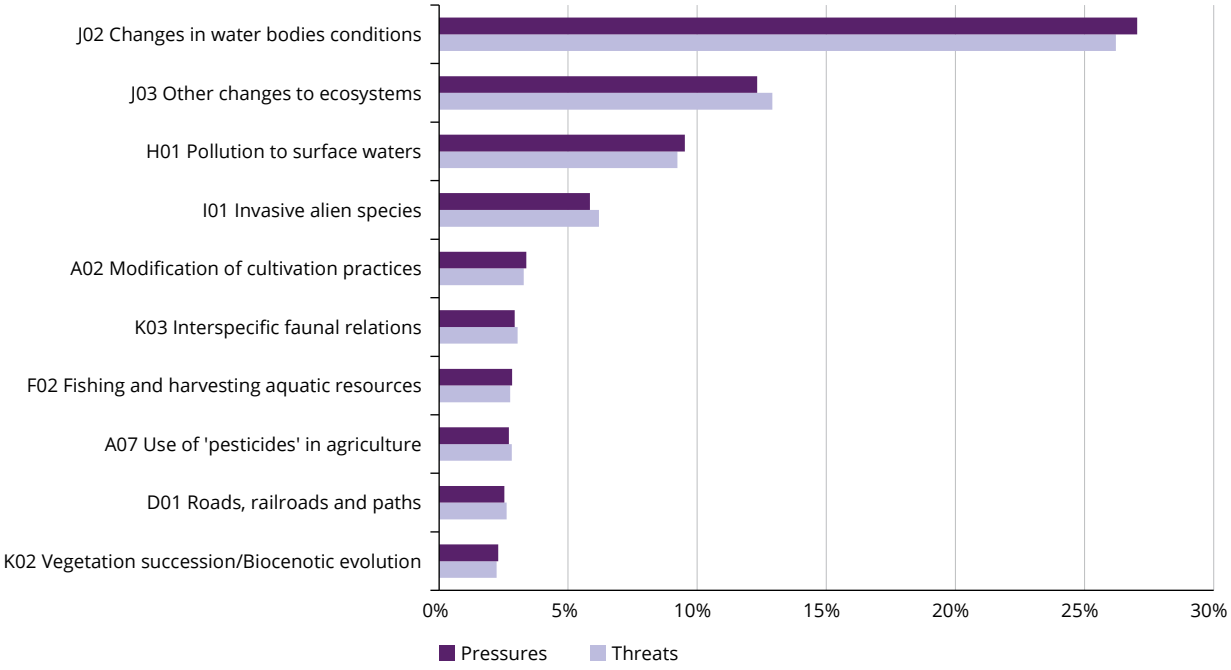


Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 1 088. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

Rivers and lakes ecosystem non-bird species are unambiguously reported to be most threatened/under pressure by the 'modification of natural conditions' (39% of all reported pressures/threats at Level 1). As is to be expected, the top pressures/threats correspond with this category, i.e. changes in waterbody conditions and other changes to ecosystems (particularly the anthropogenic reduction of habitat connectivity). Also, the pressures/threats pollution to surface waters and invasive non-native species at Level 2 are notable (see Figure 4.37).

Figure 4.37 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with rivers and lakes ecosystem



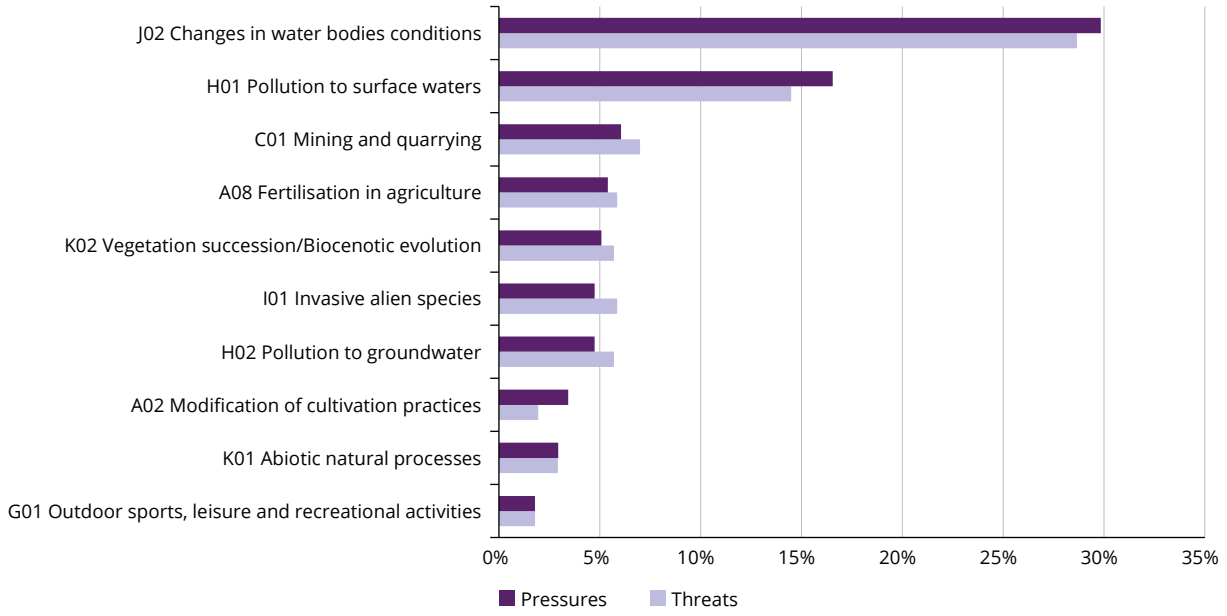
Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 2 962 and 3 052, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Rivers and lakes habitats are most severely affected by three main overarching pressure/threat categories, namely the 'modification of natural conditions', 'pollution' and 'agriculture' (28%, 22% and 13% of the total reported pressures/threats, respectively). At Level 2, changes in waterbody conditions and pollution to surface waters are listed most frequently (see Figure 4.38).

Table 4.9 lists the five most frequently reported conservation measures for rivers and lakes' birds, non-bird species and habitats at Level 2 of the conservation measures categorisation. Only three measures are shared across all groups, albeit in different orders of importance. 'Establish protected areas/sites' is the most common measure for birds and habitats (27% and 21%, respectively), but it is only

Figure 4.38 Top 10 (% of frequency) reported high-ranked pressures and threats for habitats associated with rivers and lakes ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 610 and 614, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.9 Top five Level 2 conservation measures ranked high for species and habitats associated with rivers and lakes ecosystem

Top five	Birds			Non-bird species			Habitats		
		Measure	%		Measure	%		Measure	%
1.	6.1	Establish protected areas/sites	27.0	4.2	Restoring/improving the hydrological regime	17.7	6.1	Establish protected areas/sites	20.5
2.	6.3	Legal protection of habitats and species	20.7	6.3	Legal protection of habitats and species	17.4	4.1	Restoring/improving water quality	16.2
3.	4.2	Restoring/improving the hydrological regime	14.2	4.1	Restoring/improving water quality	14.8	4.2	Restoring/improving the hydrological regime	13.7
4.	7.1	Regulation/Management of hunting and taking	6.8	6.1	Establish protected areas/sites	10.4	6.3	Legal protection of habitats and species	13.6
5.	4.0	Other wetland-related measures	5.7	4.3	Managing water abstraction	6.1	4.3	Managing water abstraction	6.6

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 1 777, 2 442 and 730 for birds, non-bird species and habitats, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

ranked fourth for non-bird species (10%). 'Restoring/improving the hydrological regime' is most commonly listed for non-bird species (18%), but it is only listed third for birds and habitats (14% for both). 'Legal protection of habitats and species' is also commonly listed, and is ranked second for birds and non-birds, and fourth for habitats.

4.4 Marine ecosystems

Marine ecosystems are divided into four types by MAES; although they cover some half of the EU's area, they include few Annex I habitats and a relatively low number of Habitats Directive species —this is particularly true for the shelf and open ocean ecosystems. Even when species are listed, they have frequently been reported as 'occasional' or assessed as unknown as for many of the whales. This means the results given below must be treated with caution, as they only cover a part of marine ecosystems and may not be representative of ecosystems in general.

While there is some variation between marine ecosystems for marine birds, they generally have some of the highest shares of secure EU population status assessments, as well as the highest share of threatened assessments. Short-term trends for marine ecosystems vary slightly more. While marine ecosystems generally hold among the highest shares of decreasing assessments, the share of increasing assessments varies from coastal area ecosystems on the low end (24%) to open ocean ecosystems on the high end (50%). Moreover, open ocean ecosystems also had the highest share of secure EU population status assessments, while coastal area ecosystems had the lowest. However, the number of marine bird species is very low compared to terrestrial and freshwater ecosystems.

As with other ecosystem groups, the conservation status and trends vary considerably across marine ecosystems. The share of favourable conservation status assessments for habitats, for example, is only 6% for marine inlets and transitional waters ecosystems, but 17% for the open ocean ecosystem. Significant ranges also apply to non-bird species, with the least number of favourable assessments reported for open ocean (5%) and the most given for marine inlets and transitional waters (20%). These examples further illustrate the considerable differences existing between non-bird species and habitats. Generally, habitats have a larger share than species of unfavourable assessments and a lower share of favourable and unknown assessments.

The share of unknown assessments for conservation status of marine ecosystems also ranges tremendously between ecosystems, and is consistently higher for species than for habitats. Looking at the ranges, marine inlets and transitional waters ecosystems have the lowest portion of unknown assessments for both non-bird species (20%) and habitats (18%); open ocean and shelf ecosystems have the highest share (83% for non-bird species associated with open ocean and 50% for shelf habitats). This stands in contrast to most terrestrial ecosystems, which tend to have a significantly lower share of unknown conservation status assessments.

Regarding trends in conservation status, the share of declining and stable assessments tends to be far higher for habitats, and unknown assessments tend to be considerably greater for non-bird species. While marine inlets and transitional waters as well as coastal ecosystems habitats have a larger share of unfavourable-declining assessments, these ecosystems also have the largest share of unfavourable-improving assessments as compared to other marine ecosystems presenting an unclear picture.

It is potentially of interest that the ranking of ecosystems by share of favourable assessments varied quite significantly between non-bird species and habitats. While open oceans have the highest share of favourable assessments in habitats, this ecosystem type has the smallest portion in non-bird species assessments. Similarly, although marine inlets and transitional waters are least frequently favourably assessed for habitats, this ecosystem has the greatest share of favourable assessments for non-bird species among the marine ecosystems. While these variations are notable, they should be interpreted and weighted by keeping the small number of submitted assessments in mind.

The greatest pressures/threats to marine ecosystems are the 'use of living resources (other than agriculture and forestry)' (which particularly affects species from both directives), followed by 'modification of natural conditions' (which particularly affects habitats) and 'pollution'. Looking at existing pressures/threats at a more detailed level, the rankings and most frequently reported categories vary between ecosystem type and birds, non-birds and habitats, but often include the 'fishing and harvesting of aquatic resources' and 'pollution to marine waters'.

The two most common individual types of reported conservation measures for marine ecosystems are 'establish protected areas/sites' and 'legal protection of habitats and species'. The establishment of protected areas/sites tends to play a more important role across ecosystems for birds and habitats, while legally protecting habitats and species is central to non-bird species.

4.4.1 Marine inlets and transitional waters ecosystem

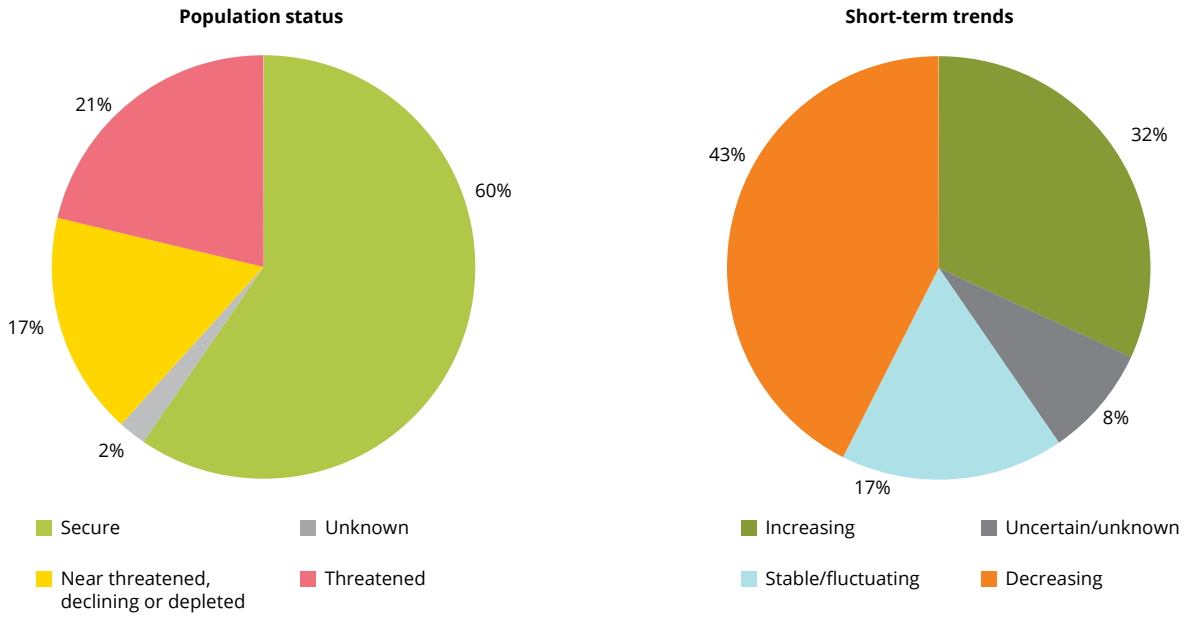
The marine inlets and transitional waters ecosystem forms the land-sea interface; it is under the influence of tides (where present), and has a salinity level higher than 0.5 ‰. This ecosystem type includes coastal wetlands, lagoons, estuaries and other transitional waters, fjords and sea lochs and bays (EC, 2013b). Annex I of the Habitats Directive includes 13 habitat types that are considered in the marine inlets and transitional waters ecosystem.

Figure 4.39 shows the population status of marine inlets and transitional waters bird species. More than half of assessments of EU population status are secure (60%), whereas threatened (21%) and near threatened, declining or depleted (17%) also make up significant shares. a very small share of assessments (2%) was assessed as unknown. For short-term trends in EU population status, decreasing (43%) assessments made up the largest share, while increasing (32%) assessments represented approximately one-third. A relatively small share of assessments were reported as uncertain/unknown (7%), and a small but significant share as stable/fluctuating.

As shown in Figure 4.40, a majority of the assessments of conservation status for marine inlets and transitional waters species of the Habitats Directive are unfavourable, with about a quarter assessed as inadequate (26%) and a third assessed as bad (34%). Furthermore, 20% of the assessments are assessed as favourable and 20% as unknown. As for the trends in conservation status, the largest trend class is unfavourable-stable (20%), while only 9% are assessed as improving. Of the remaining assessments, 17% of assessments are assessed as unfavourable-declining.

The assessments for marine inlets and transitional waters habitats are less favourable compared to species, with a significantly smaller share of favourable assessments (6%) and a significantly larger share of unfavourable-inadequate assessments (43%) (see Figure 4.40). The share of unfavourable-bad assessments is similar to non-bird species, at about one-third. Moreover, there is again a relatively large share (18%) of unknown assessments. As for trends in conservation status, both unfavourable-stable (23%) and unfavourable-declining (37%) make up a significant share of assessments.

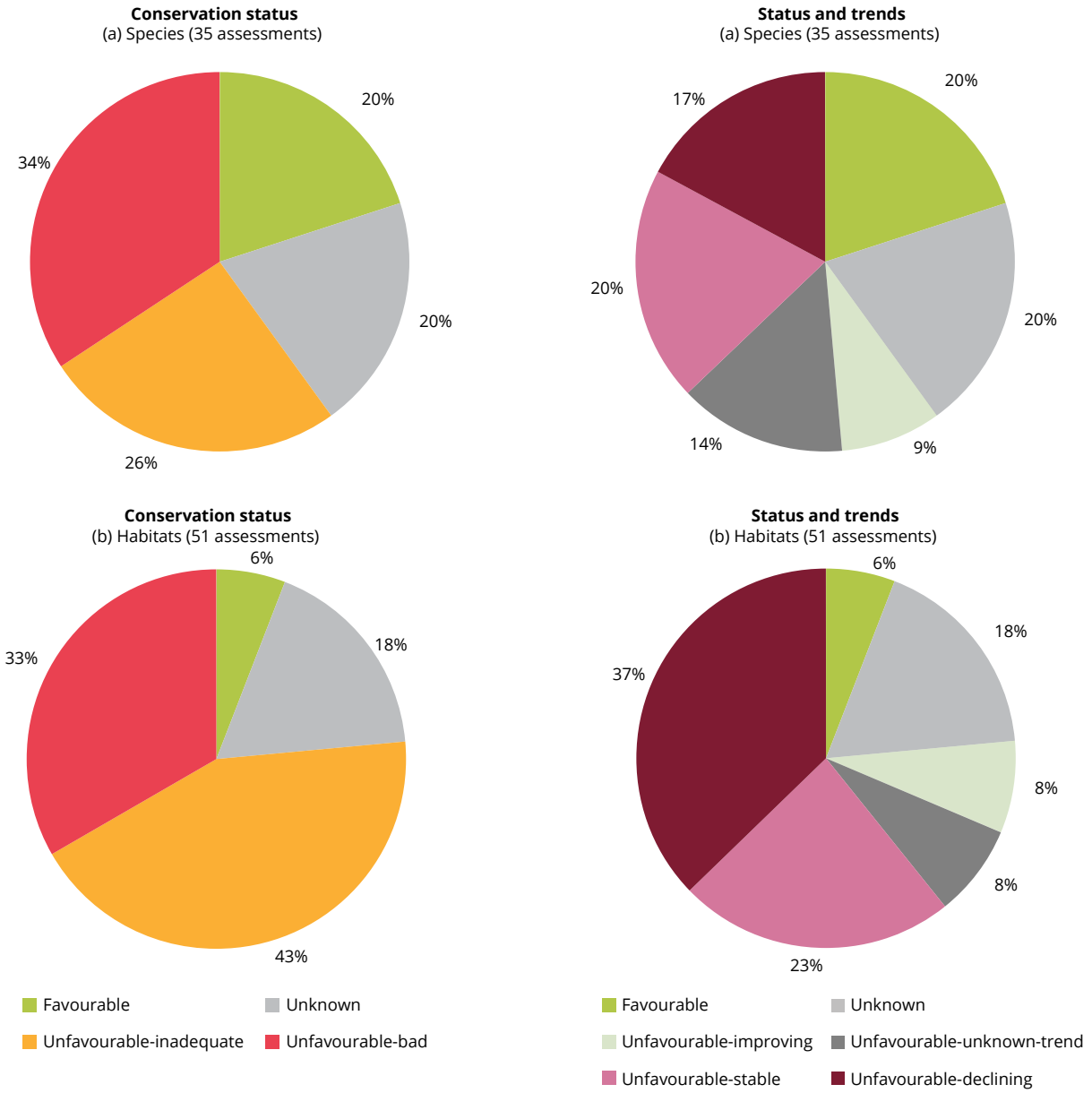
Figure 4.39 Population status and short-term trends of bird species associated with marine inlets and transitional waters ecosystem



Notes: The total number of assessments is 47 for birds.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 4.40 Conservation status and trends of species (a) and habitats (b) (Habitats Directive) associated with marine inlets and transitional waters ecosystem



Notes: The total number of assessments is 35 and 51 for species and habitats, respectively.

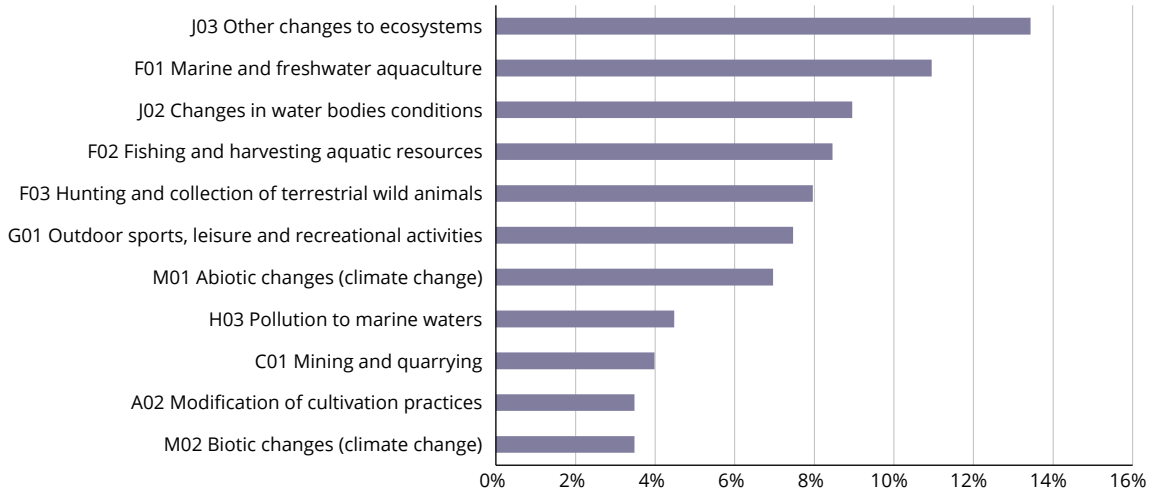
Source: EEA, 2015b, Article 17 reports and assessments.

These figures indicate that the conservation status of marine inlets and transitional waters ecosystems is largely unfavourable, with a significant declining trend and relatively small signs of improvement.

Marine inlets and transitional waters bird species are subject to a range of pressures/threats, predominantly linked to the 'use of living resources (other than agriculture and forestry)' and the 'modification of natural conditions' (29% and 22% of all reported pressures/threats at Level 1, respectively). More specifically, the top-ranked pressure/threat is other changes to ecosystems, which arises chiefly from the reduction or loss of specific habitat features. Another significant pressure/threat — marine and freshwater aquaculture — can also be attributed primarily to intensive fish farming/intensification (see Figure 4.41).

Marine inlets and transitional waters non-bird species are primarily threatened or facing pressure from

Figure 4.41 Top 10 (% of frequency) reported high-ranked pressures/threats for birds associated with marine inlets and transitional waters ecosystem

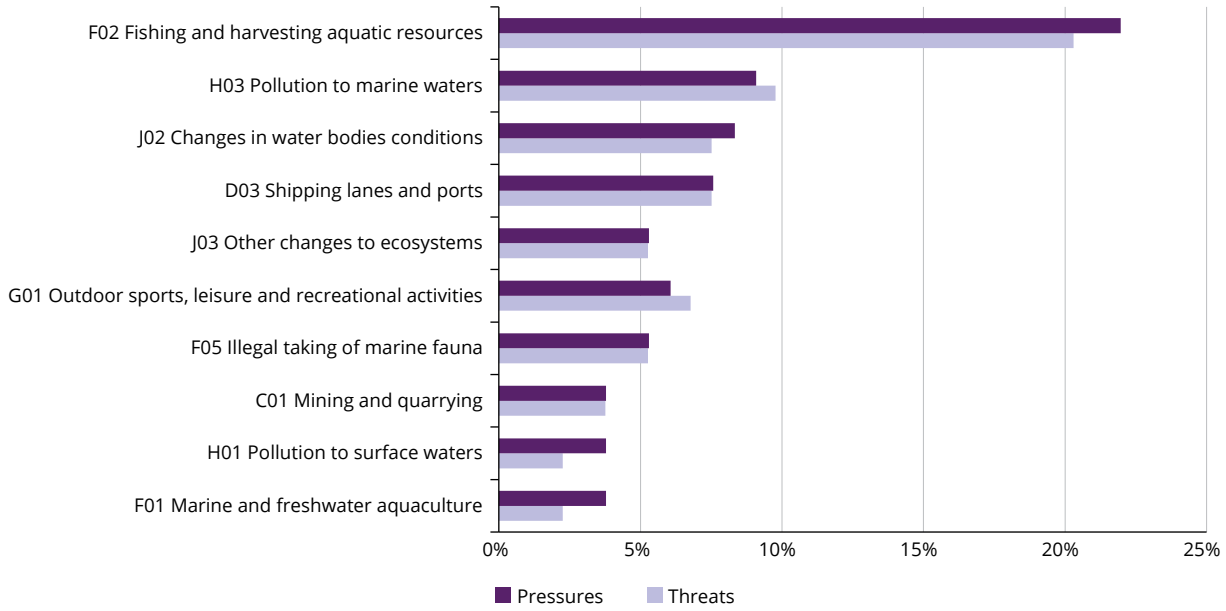


Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 201. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

the 'use of living resources (other than agriculture and forestry)' (31% of the total reported pressures/threats at Level 1) as well as — to a lesser degree — the 'modification of natural conditions' and 'pollution' (14% and 13%, respectively). The top-ranked Level 2 pressures/threats follow this trend, with fishing and harvesting of aquatic resources appearing twice as frequently as the next highest-ranked factor (see Figure 4.42). The remaining Level 2 pressures/threats largely relate to biological resource use

Figure 4.42 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with marine inlets and transitional waters ecosystem



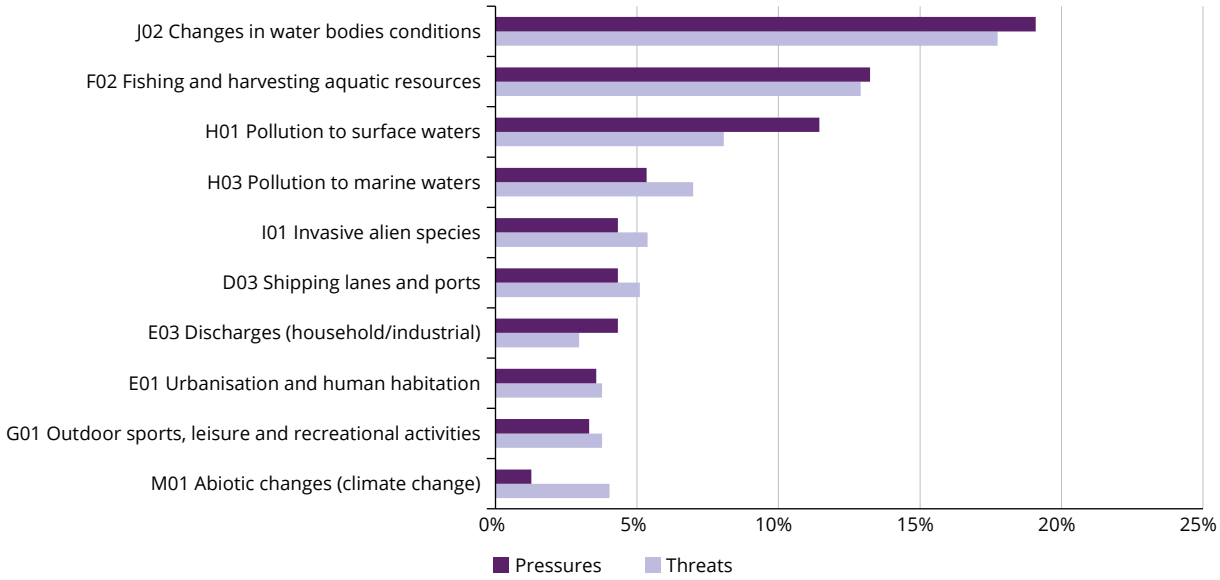
Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 132 and 133, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

(i.e. illegal taking/removal of marine fauna and marine/freshwater aquaculture), pollution (i.e. marine water pollution and pollution to surface waters), transportation and service infrastructure (i.e. shipping lanes and ports), disturbances due to human activities (i.e. outdoor sports, leisure and recreational activities) and natural system modifications (i.e. human-induced changes in hydraulic conditions and other ecosystem modifications).

Three main pressures/threats are reported most frequently for marine inlets and transitional waters habitats: 'modification of natural conditions' (20% of the total reported pressures/threats at Level 1), 'pollution' (21%) and 'use of living resources (other than agriculture and forestry)' (16%). Accordingly, the top-ranked pressures/threats within these categories are changes in waterbody conditions (most frequent), fishing and harvesting aquatic resources, and pollution

Figure 4.43 Top 10 (% of frequency) reported high-ranked pressures and threats for habitats associated with marine inlets and transitional waters ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 393 and 372, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.10 Top five Level 2 conservation measures ranked high for species and habitats associated with marine inlets and transitional waters ecosystem

Top five	Birds			Non-bird species			Habitats		
	Measure		%	Measure		%	Measure		%
1.	6.1	Establish protected areas/sites	36.1	6.1	Establish protected areas/sites	23.5	6.1	Establish protected areas/sites	21.7
2.	6.3	Legal protection of habitats and species	26.3	6.3	Legal protection of habitats and species	22.4	6.3	Legal protection of habitats and species	12.3
3.	7.1	Regulation/Management of hunting and taking	10.9	7.3	Regulation/Management of fishery in marine and brackish systems	8.2	4.1	Restoring/improving water quality	8.4
4.	4.2	Restoring/improving the hydrological regime	6.5	6.0	Other spatial measures	7.1	7.3	Regulation/Management of fishery in marine and brackish systems	7.6
5.	4.0	Other wetland-related measures	2.9	7.0	Other species management measures	7.1	4.2	Restoring/improving the hydrological regime	7.4

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 551, 85 and 406 for birds, non-bird species and habitats, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

to surface waters. Anthropogenic threats/pressures dominated the remaining top Level 2 threats, including, for instance, marine water pollution, shipping lanes and ports, discharges, and other human intrusions and disturbances (see Figure 4.43).

Table 4.10 lists the five most frequently reported conservation measures for marine inlets and transitional waters species and habitats at Level 2 of the conservation measures categorisation. The two most common individual types of conservation measures were 'establish protected areas/sites' and 'legal protection of habitats and species'. These two measures alone made up 62%, 46% and 34% of all reported conservation measures for birds, non-bird species, and habitats, respectively. The remaining top-ranked measures varied across birds, non-bird species and habitats.

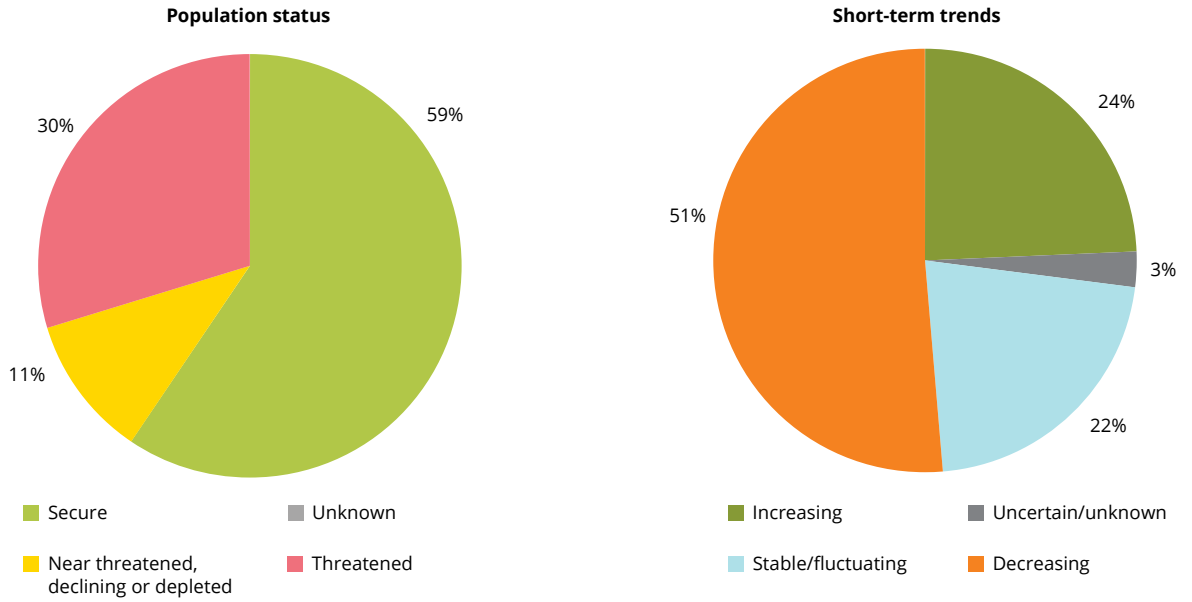
4.4.2 Coastal ecosystem

The coastal ecosystem is a coastal, shallow, marine ecosystem which is significantly influenced by processes and activities on the adjacent land. This ecosystem is subject to diurnal fluctuations in temperature, salinity and turbidity, and wave disturbance (EC, 2013b). Annex I of the Habitats Directive includes eight types of coastal habitats.

Figure 4.44 shows the population status of coastal ecosystem bird species. A large share of EU population status assessments for coastal area bird species are secure (59%), while nearly a third of assessments (30%) are reported as threatened. Moreover, a small share of assessments is reported as near threatened, declining or depleted (11%), while no assessments are reported as unknown. Concerning short-term trends in EU population status, decreasing trends (51%) make up more than half of the assessments, the second highest share across all ecosystem types. Furthermore, increasing (24%) and stable/fluctuating (22%) represent roughly a quarter and a fifth of assessments, respectively. A very small share of assessments is reported as uncertain/unknown (3%).

As shown in Figure 4.45, the largest share of the assessments of conservation status for coastal ecosystem species of the Habitats Directive is unknown (42%). This stands in contrast to most terrestrial ecosystems, which tend to have a significantly lower share of unknown assessments. The share of unfavourable assessments, on the other hand, is still significant, with more than a quarter assessed as bad and only a moderately sized share assessed as favourable (17%). As for the trends in conservation status, unfavourable-stable (13%) and unfavourable-unknown (15%) make up the largest share of unfavourable assessments, while favourable and declining assessments make up a relatively small share.

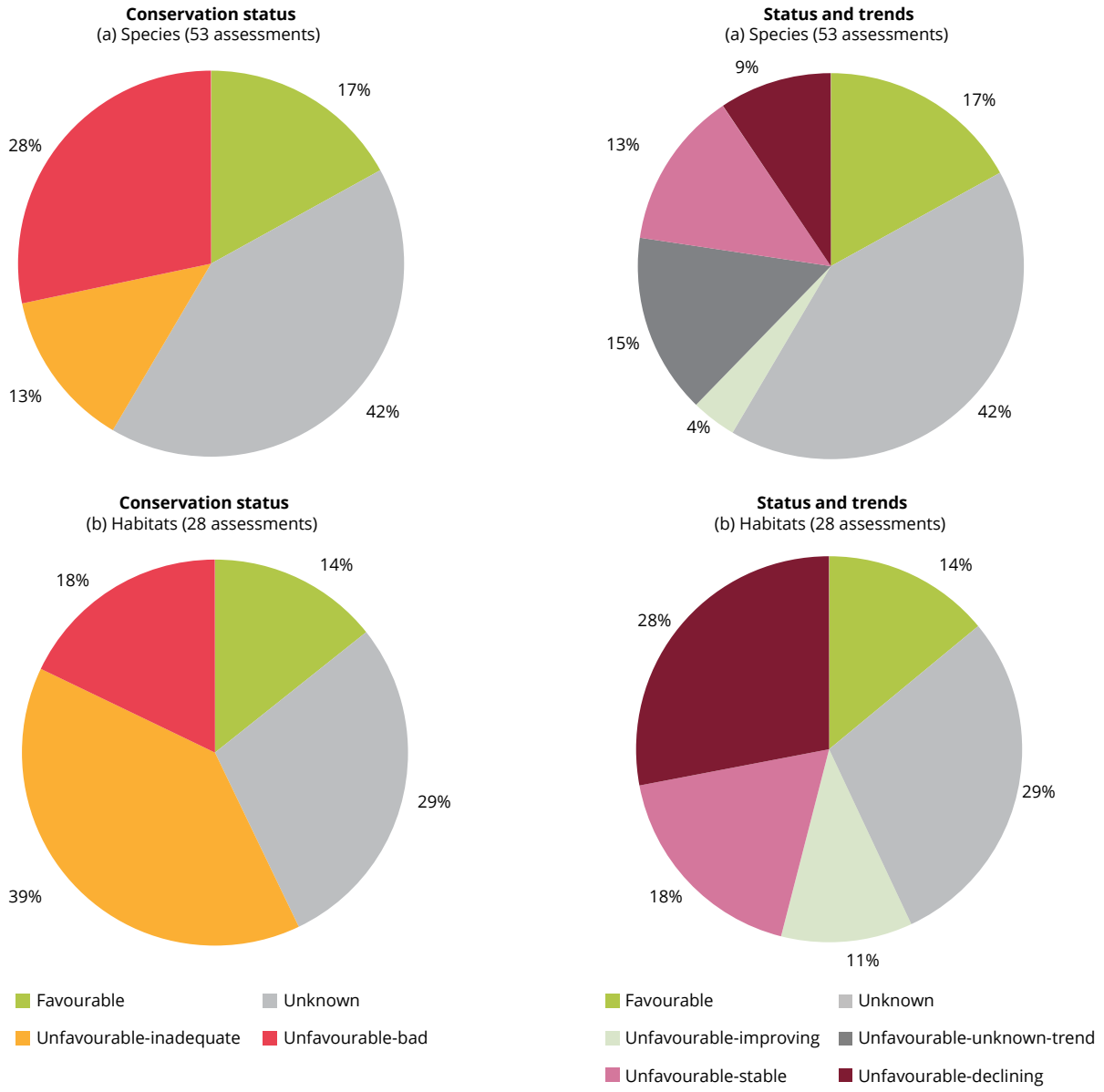
Figure 4.44 Population status and short-term trends of bird species associated with coastal ecosystem



Notes: The total number of assessments is 37 for birds.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 4.45 Conservation status and trends of species (a) and habitats (b) (Habitats Directive) associated with coastal ecosystem



Notes: The total number of assessments is 53 and 28 for species and habitats, respectively.

Source: EEA, 2015b, Article 17 reports and assessments.

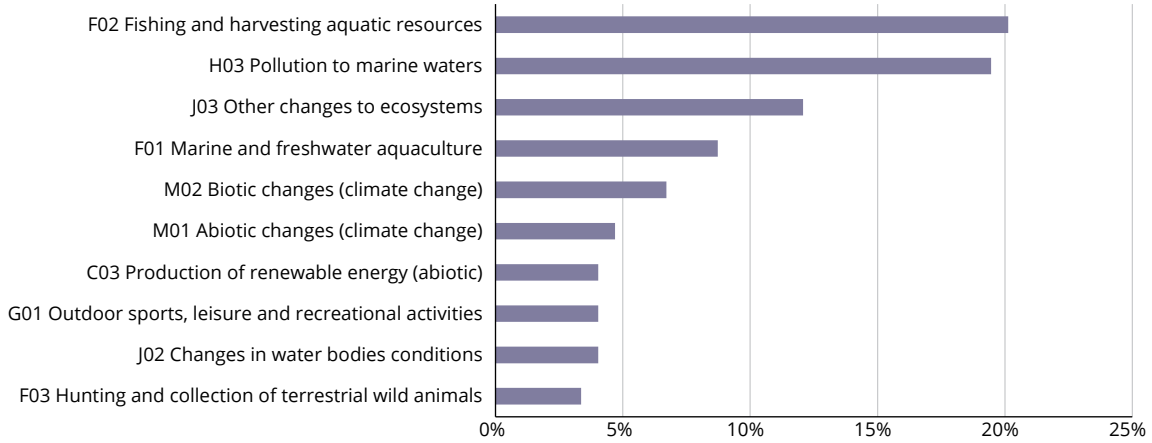
The assessments for coastal ecosystem habitats are quite different compared to species, with a slightly higher share of unfavourable assessments (see Figure 4.45). In particular, there are significantly more assessments assessed as unfavourable-inadequate (39%) and a slightly smaller share of assessments assessed as unfavourable-bad (18%). Moreover, there is a considerably smaller share of unknown assessments (29%). As for trends in conservation status, unfavourable-declining assessments make up more than a quarter of assessments (28%), while unfavourable-stable (18%) and unfavourable-improving assessments (11%) also make up a larger share of assessments.

These figures show that a relatively large share of coastal ecosystem assessments are unknown and that there are few assessments, due to the relatively small number of marine regional assessments. Nonetheless, the overall picture seems to be largely unfavourable, with non-bird species holding a larger share of unfavourable-bad assessments, and habitats showing a significant declining trend.

As is to be expected, coastal ecosystem bird species are most affected by the 'use of living resources (other than agriculture and forestry)', which are reported at Level 1 at a 34% frequency. 'Pollution' is the second largest overarching pressure/threat (21% of all reported pressures/threats). Accordingly, the fishing and harvesting of aquatic resources and pollution to marine waters are the pressures/threats within these categories (each of which is listed in approximately a fifth of all reports), referring to netting and oil spills in the sea, for instance (see Figure 4.46).

Non-bird species in coastal ecosystems are reported to be most impacted by the 'use of living resources (other than agriculture and forestry)' (representing 39% of the total reported pressures/threats at Level 1) and — to a

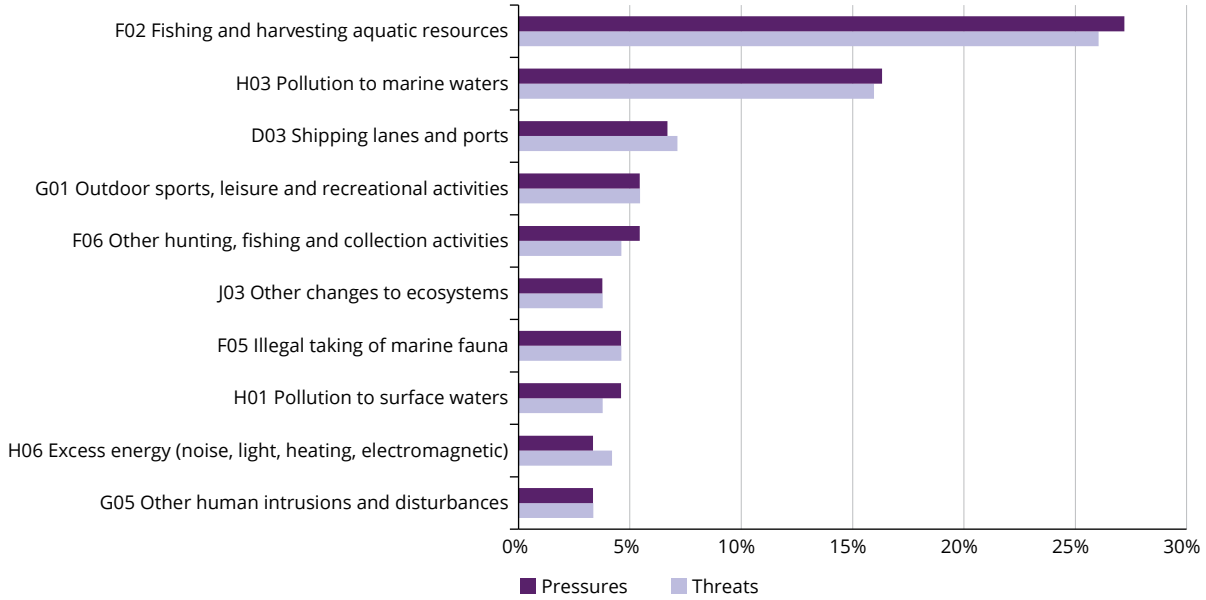
Figure 4.46 Top 10 (% of frequency) reported high-ranked pressures /threats for birds associated with coastal ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 149. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 4.47 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with coastal ecosystem



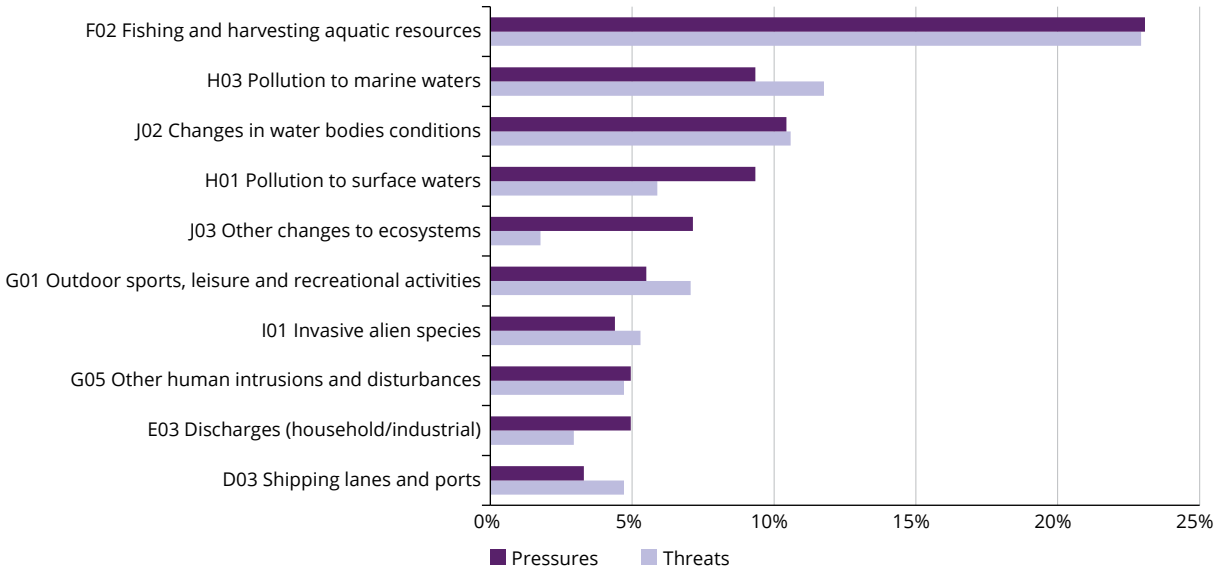
Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 239 and 238, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

lesser degree — 'pollution' (24%). Of the top 10 Level 2 pressures/threats, 6 stem from these categories. More specifically, the top Level 2 pressure/threat is the fishing and harvesting of aquatic resources (listed in approximately a quarter of all reports), followed by pollution to marine waters. The remaining Level 2 pressures/threats are reported at similar frequencies (see Figure 4.47).

The main pressure/threat to coastal ecosystem habitats is the 'use of living resources (other than agriculture and forestry)' (27% of total reported pressures/threats at Level 1), trailed by 'pollution' (21%) and the modification of natural conditions (15%). Level 2 rankings reflect these trends, with the fishing and harvesting of aquatic resources being the largest pressure/threat (reported in over a fifth of all cases).

Figure 4.48 Top 10 (% of frequency) reported high-ranked pressures and threats for habitats associated with coastal ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 182 and 170, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.11 Top five Level 2 conservation measures ranked high for species and habitats associated with coastal ecosystem

Top five	Birds			Non-bird species			Habitats		
		Measure	%		Measure	%		Measure	%
1.	6.1	Establish protected areas/sites	38.7	6.3	Legal protection of habitats and species	23.5	6.1	Establish protected areas/sites	23.2
2.	6.3	Legal protection of habitats and species	29.2	6.1	Establish protected areas/sites	18.2	6.3	Legal protection of habitats and species	14.5
3.	7.1	Regulation/Management of hunting and taking	6.1	7.3	Regulation/Management of fishery in marine and brackish systems	11.2	7.3	Regulation/Management of fishery in marine and brackish systems	11.8
4.	9.2	Regulating/Managing exploitation of natural resources on sea	5.5	7.0	Other species management measures	8.2	8.3	Managing marine traffic	9.1
5.	4.2	Restoring/improving the hydrological regime	3.4	8.3	Managing marine traffic	7.1	4.1	Restoring/improving water quality	8.6
5				9.2	Regulating/Managing exploitation of natural resources on sea	7.1			

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 380, 170 and 220 for birds, non-bird species and habitats, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

Changes in waterbody conditions and pollution to marine waters are the subsequent top-ranked Level 2 pressures/threats, having similar frequencies (see Figure 4.48). It is of note that several of the Level 2 pressures have been reported at notably higher frequencies than the equivalent threats, potentially indicating an expected improvement in the next two reporting periods.

Table 4.11 lists the five most frequently reported conservation measures for coastal ecosystem species and habitats at Level 2 of the conservation measures categorisation. The two most common individual types of conservation measures are 'establish protected areas/sites' and 'legal protection of habitats and species', with the former playing a more important role for birds and habitats and the latter likewise for non-bird species. These two categories alone make up 68%, 42% and 38% of all reported conservation measures for birds, non-bird species and habitats, respectively. The remaining commonly reported measures varied greatly across birds, non-bird species and habitats.

4.4.3 Shelf ecosystem

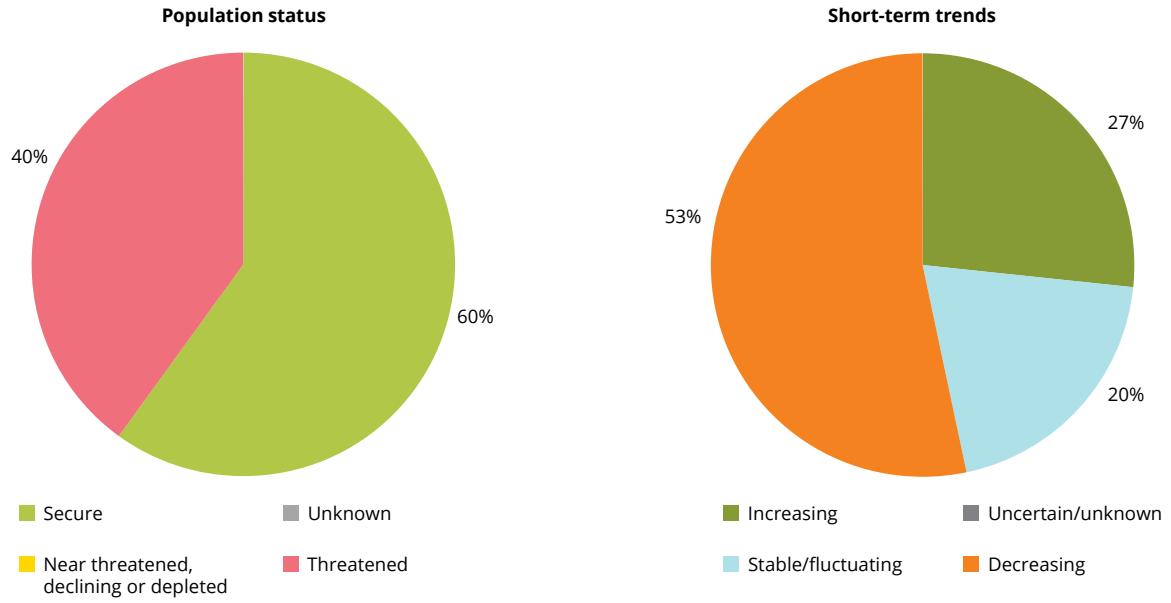
The shelf ecosystem concerns a marine ecosystem that is removed from coastal influence; often known as the Continental shelf, it extends down to the break of slope between the shelf and the abyssal plain. This ecosystem type experiences more stable temperature and salinity regimes than coastal systems, as the seabed is below the zone of wave disturbance (EC, 2013b). There are only three Annex I habitats in this ecosystem.

Figure 4.49 shows the population status of shelf ecosystem bird species. Only two categories of EU population status were reported for shelf birds: 60% of assessments are secure, while 40% are threatened. As for short-term trends in EU population status, only three categories were reported. More than half of assessments are reported as decreasing (53%), while about a quarter are reported as increasing (27%) and a fifth as stable/fluctuating (20%). These figures are based on a very small number (15) of bird assessments.

As shown in Figure 4.50, more than half of the assessments of conservation status for shelf ecosystem species of the Habitats Directive are assessed as unknown (54%), representing a high share compared with terrestrial ecosystems. As a result, favourable, unfavourable-inadequate and unfavourable-bad assessments each make up relatively small shares of a comparable size. As for the trends in conservation status, the largest share of unfavourable assessments was also assessed as unknown (15%), while the declining, stable and improving assessments made up considerably smaller shares.

Shelf ecosystem habitats have close to 50% of unknown assessments. More noticeable differences with the species include that of the share of unfavourable-bad assessments: it is less than half that for species (7%); the share of unfavourable-inadequate makes

Figure 4.49 Population status and short-term trends of bird species associated with shelf ecosystem



Notes: The total number of assessments is 15 for birds.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 4.50 Conservation status and trends of species (a) and habitats (b) (Habitats Directive) associated with shelf ecosystem

Notes: The total number of assessments is 55 and 14 for species and habitats, respectively.

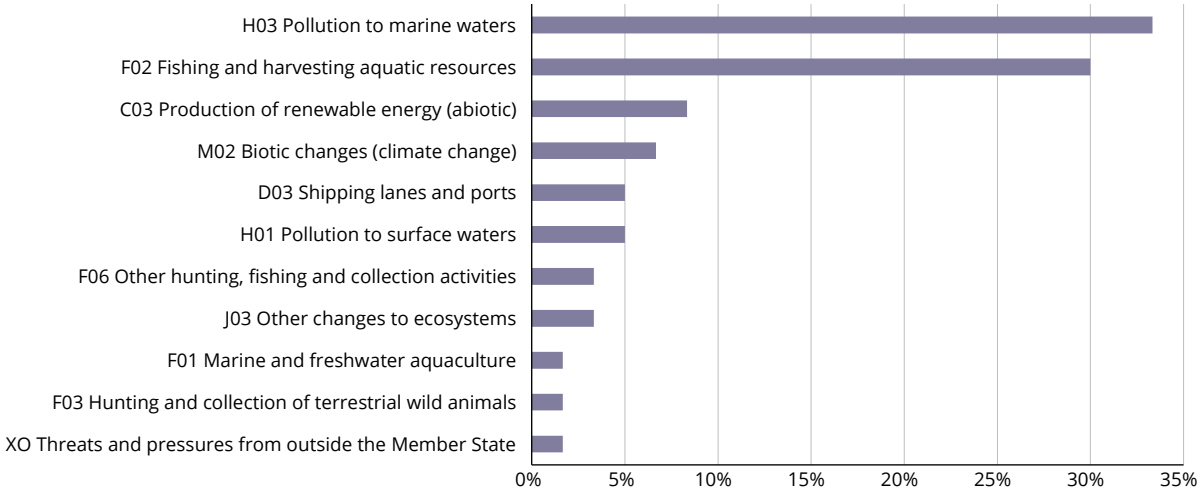
Source: EEA, 2015b, Article 17 reports and assessments.

up almost one-third of assessments (29%). As for trends in conservation status, unfavourable-declining assessments (22%) made up the largest share, while stable and improving assessments each make up 14% (see Figure 4.50).

As such, an even greater share of shelf assessments is assessed as unknown than for coastal areas, while the number of assessments for habitats is even smaller. Nonetheless, the overall picture for those assessments for which a conservation status and trend was provided is largely unfavourable, with non-bird species having a larger share of unfavourable-bad assessments and habitats showing a significant declining trend.

Bird species from the shelf ecosystem are most threatened by 'pollution' and the 'use of living resources (other than agriculture and forestry)' (comprising 38% and 37% of the total pressures/threats at Level 1, respectively). Accordingly, bird populations are at risk from pollution to marine

Figure 4.51 Top 10 (% of frequency) reported high-ranked pressures/threats for birds associated with shelf ecosystem



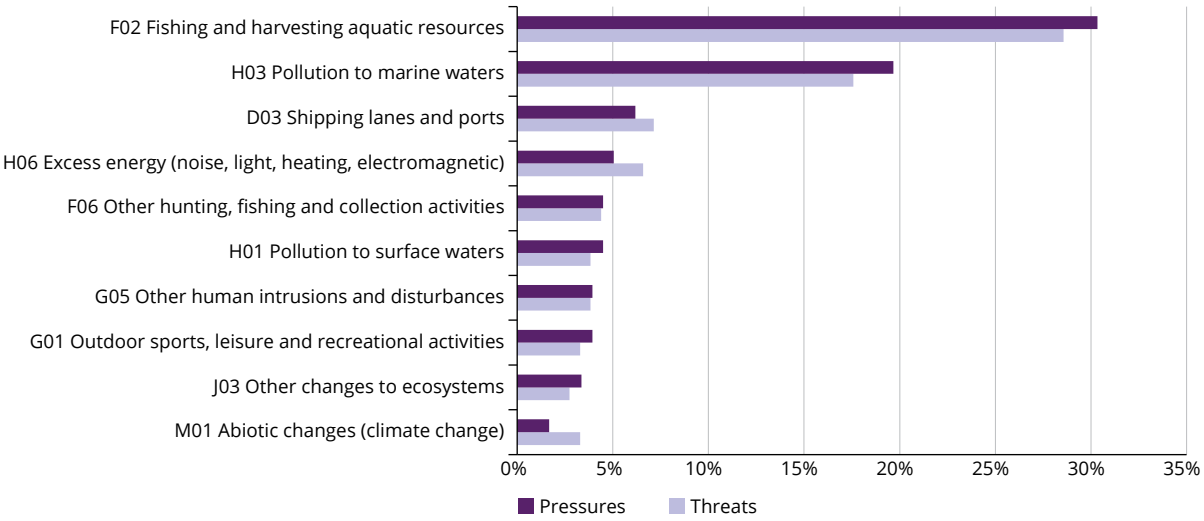
Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 60. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

waters and the fishing and harvesting aquatic resources (both listed in approximately a third of all reports). Within these categories, oil spills in the sea and netting are the most significant pressures/threats. The remaining Level 2 top-ranked pressures/threats are rather insignificant in comparison, and are reported with similar frequencies (see Figure 4.51).

There are two main pressures/threats to non-bird shelf ecosystem species: the 'use of living resources (other than agriculture and forestry)' (38% of the total reported pressures/threats at Level 1) and 'pollution' (28%). More specifically, the fishing and harvesting of aquatic resources is the most frequently reported Level 2 pressures/threat (in almost a third of cases), referring largely to netting, professional active/passive fishing and pelagic long lining (see Figure 4.52).

Figure 4.52 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with shelf ecosystem



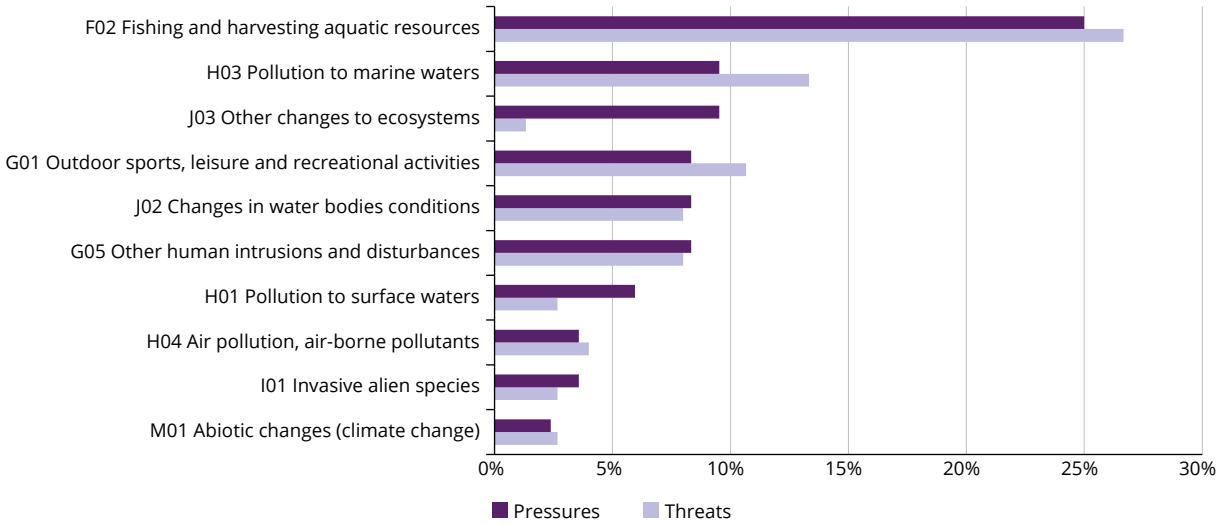
Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 178 and 182, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Pollution to marine waters is the second-ranked Level 2 pressure/threat, stemming largely from marine macro-pollution (i.e. plastic bags and styrofoam), synthetic and non-synthetic compound contamination, and oil spills in the sea.

The majority of threats/pressures to shelf habitats fall within the following categories: the 'use of living resources (other than agriculture and forestry)' (27% of the total reported pressures/threats at Level 1), 'pollution' (19%), and 'disturbances due to human activities' (16%). These categories also dominate the Level 2 pressures/threats ranking, with fishing and harvesting of aquatic resources being by far the most frequently reported (in over a quarter of all cases) it is trailed at much lower frequencies by pollution

Figure 4.53 Top 10 (% of frequency) reported high-ranked pressures and threats for habitats associated with shelf ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 84 and 75, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.12 Top five Level 2 conservation measures ranked high for species and habitats associated with shelf ecosystem

Top five	Birds			Non-bird species			Habitats		
		Measure	%		Measure	%		Measure	%
1.	6.1	Establish protected areas/sites	38.0	6.3	Legal protection of habitats and species	26.7	6.1	Establish protected areas/sites	21.3
2.	6.3	Legal protection of habitats and species	28.1	6.1	Establish protected areas/sites	15.5	6.3	Legal protection of habitats and species	15.7
3.	5.0	Other marine-related measures	11.6	7.3	Regulation/Management of fishery in marine and brackish systems	12.1	7.3	Regulation/Management of fishery in marine and brackish systems	11.8
4.	6.0	Other spatial measures	9.9	8.3	Managing marine traffic	8.6	4.1	Restoring/improving water quality	9.4
5.	9.2	Regulating/Managing exploitation of natural resources on sea	5.8	7.0	Other species management measures	7.8	5.0	Other marine-related measures	9.4
5							8.3	Managing marine traffic	9.4
5							9.2	Regulating/Managing exploitation of natural resources on sea	9.4

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 121, 116 and 127 for birds, non-bird species and habitats, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

to marine waters and outdoor sports, leisure and recreational activities. For the Level 2 pressure/threat 'other ecosystem modifications' (made up entirely of 'reduction or loss of specific habitat features'), it is noteworthy that the reporting of this factor as a pressure is seven times higher than as a threat, potentially indicating an expected improvement in this area (see Figure 4.53).

Table 4.12 lists the five most frequently reported conservation measures for shelf birds, non-bird species and habitats at Level 2 of the conservation measures categorisation. The two most common individual types of conservation measures are 'establish protected areas/sites' and 'legal protection of habitats and species', with 'establish protected areas/sites' playing a more important role for birds and habitats (ranked first, with 38% and 21%, respectively) and 'legal protection of habitats and species' playing a more important role for non-bird species (ranked first, with 27%). The measure 'regulation/management of fishery in marine and brackish systems' also plays a significant role for non-bird species and habitats, while 'other marine-related measures' is ranked third for birds.

4.4. Open ocean ecosystem

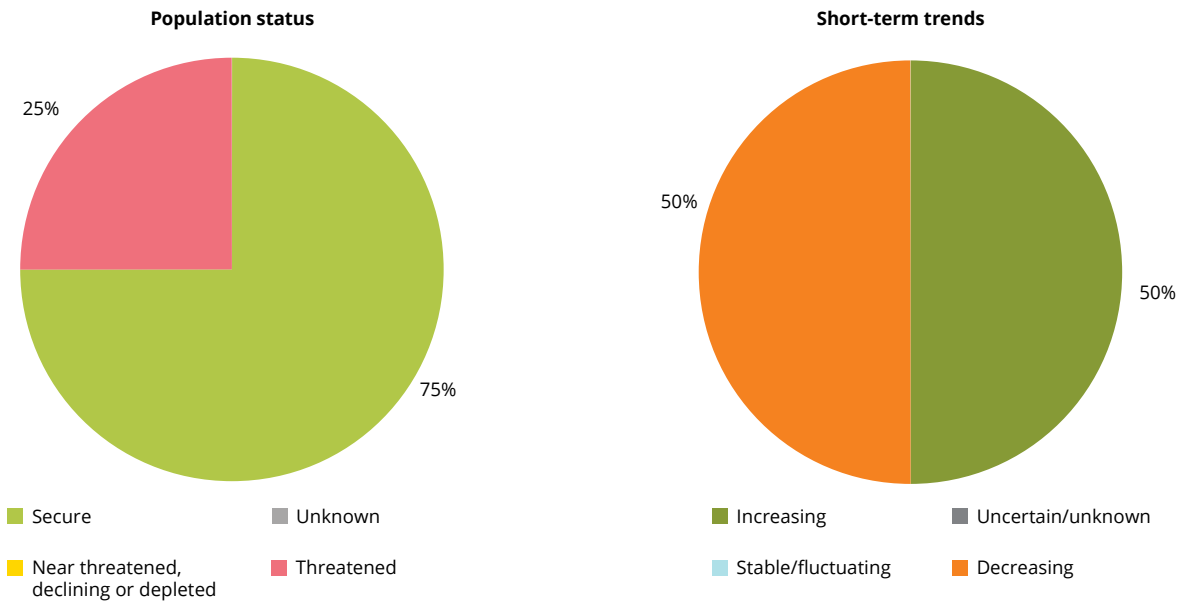
The open ocean ecosystem is located beyond the shelf break and has depths well beyond 200 m, very stable temperatures and salinity regimes; the deep seabed is particularly considered within the open ocean ecosystem. The marine ecosystem typology is generally applicable across European waters (and globally) and also relates to the use of the marine environment by different sectors, which helps support the assessment of ecosystem services delivered by marine ecosystems (EC, 2013b). There are only two Annex I habitat types included in this MAES ecosystem.

Figure 4.54 shows the population status of open ocean bird species. While 75% of birds are assessed as secure, 25% are assessed as threatened. As for short-term trends in EU population status, only two categories were reported. Exactly half were reported as decreasing, while the other half were reported as increasing.

As shown in Figure 4.55, the vast majority of assessments of open ocean ecosystem species of the Habitats Directive are assessed as unknown (83%). Moreover, all of the unfavourable assessments for trends in conservation status are classified as unknown (12%). Therefore, the small number of known assessments cannot be considered representative of this ecosystem (5% favourable and 12% unfavourable).

With regard to conservation status assessments for open ocean habitats, a significant share (50%) is assessed as unfavourable-inadequate, while 17% was

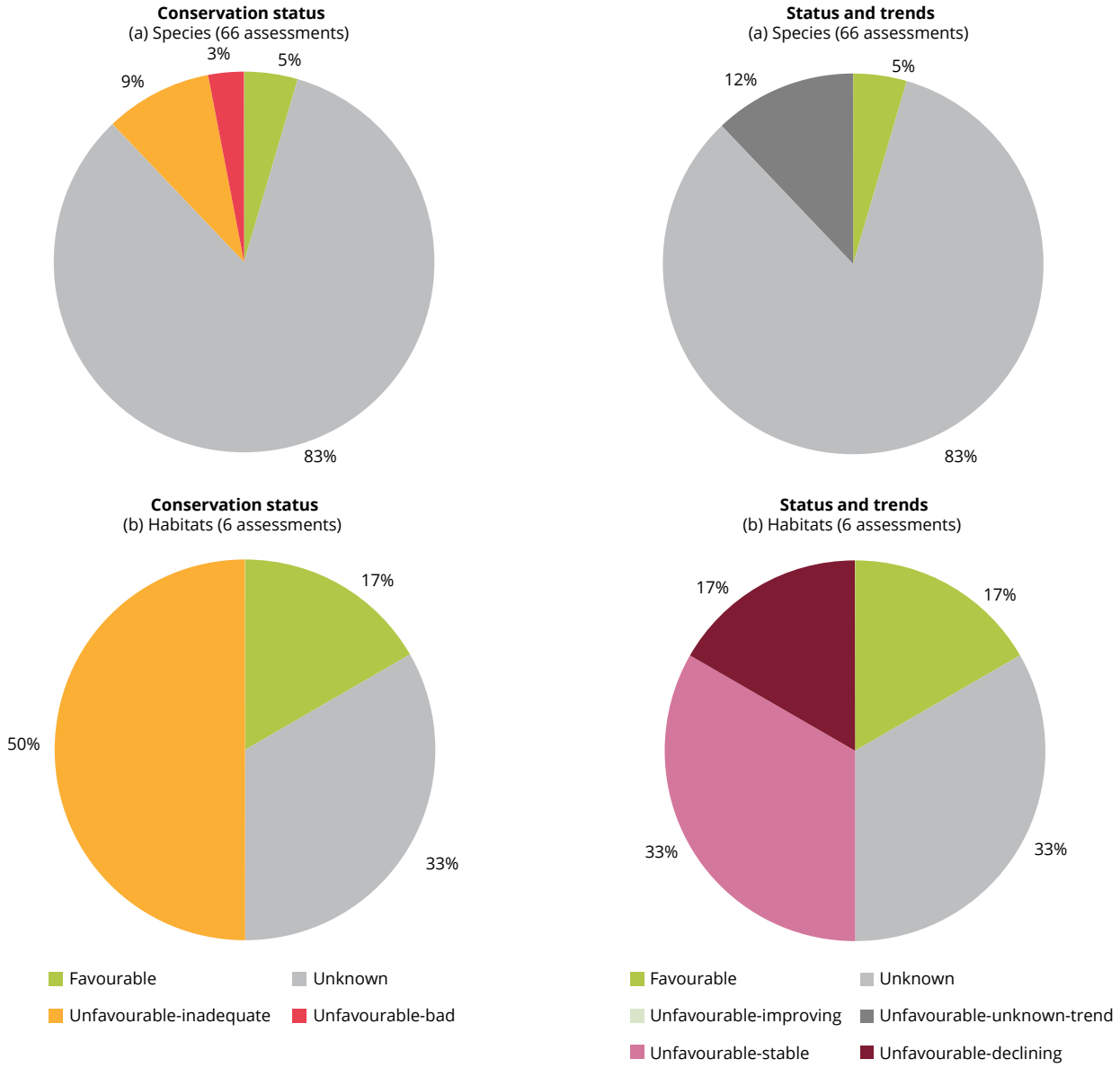
Figure 4.54 Population status and short-term trends of bird species associated with open ocean ecosystem



Notes: The total number of assessments is 8 for birds.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 4.55 Conservation status and trends of species (a) and habitats (b) (Habitats Directive) associated with open ocean ecosystem



Notes: The total number of assessments is 66 and 6 for species and habitats, respectively.

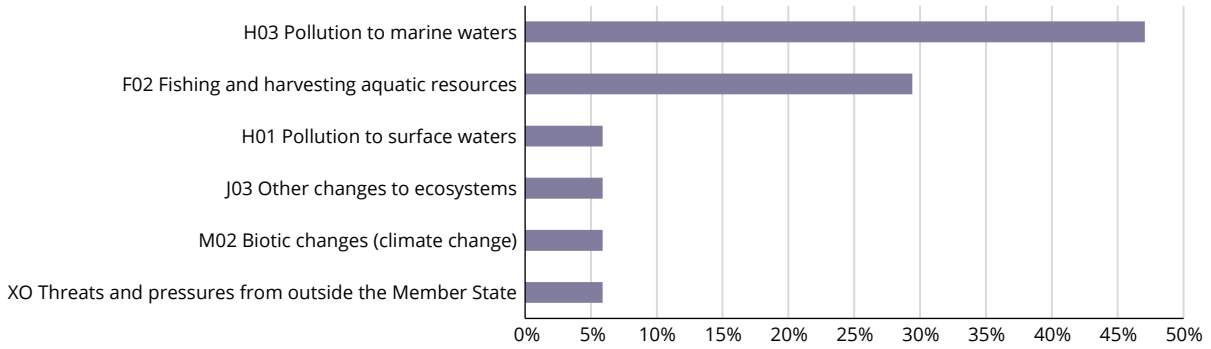
Source: EEA, 2015b, Article 17 reports and assessments.

assessed as favourable and 33% as unknown (see Figure 4.55). As for trends in conservation status, both unfavourable-stable (33%) and unfavourable-declining (17%) make up a significant share of assessments, while 33% are unknown. There are only seven assessments for open ocean habitats.

These figures, in particular for non-bird species (particularly cetaceans and marine turtles) again highlight the large share of unknown assessments for marine conservation status assessments and the small number of habitat assessments. As such, it is difficult to draw a definitive picture of the conservation status and trends for open ocean ecosystems, based on Article 12 and Article 17 data.

Over half of the reported pressures/threats to open ocean bird populations are related to 'pollution', followed by the 'use of living resources (other than agriculture and forestry)' (29% of all reported pressures/threats at Level 1). While only six Level 2 pressures/threats were reported, and are based

Figure 4.56 Top 6 (% of frequency) reported high-ranked pressures /threats for birds associated with open ocean ecosystem



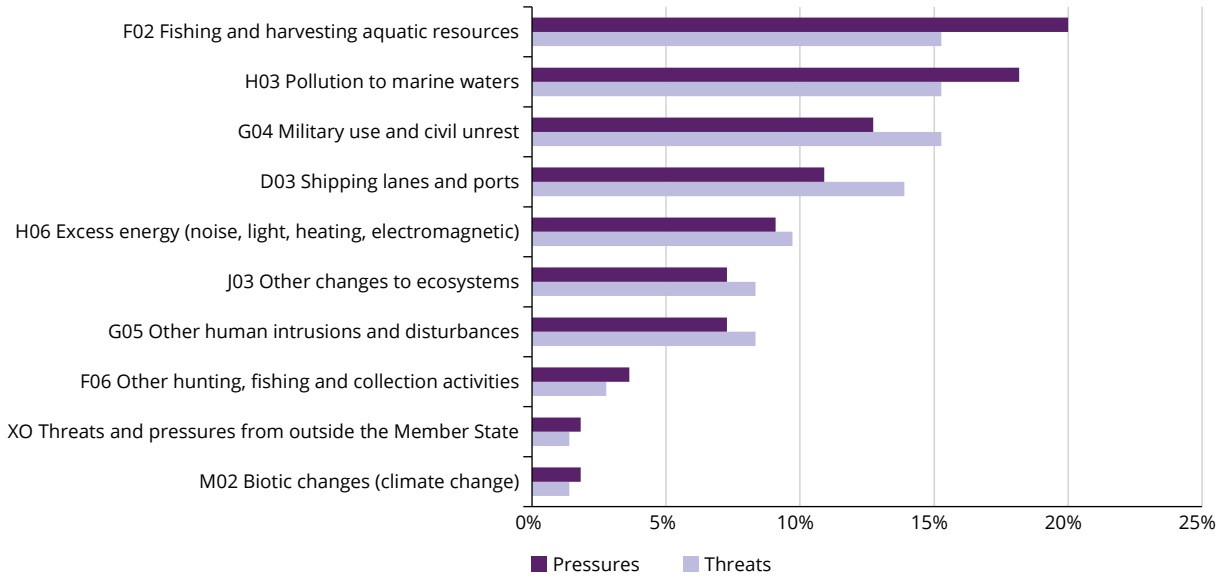
Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 17. Greece did not provide an Article 12 report.

Source: EEA, 2015a, Article 12 reports and assessments.

on a limited number of reports, it is nevertheless clear that the significant factor affecting open ocean bird populations is pollution (listed in almost half of all reports). The main contributing factors are oil spills in the sea, macro-pollution (i.e. plastic bags and styrofoam) and non-synthetic compound contamination (see Figure 4.56). The second significant Level 2 pressure/threat is fishing and the harvesting of aquatic resources (listed in almost a third of all reports). The remaining Level 2 pressures/threats are reported at similar frequencies, and are insignificant in comparison.

Three main pressure/threat categories are reported for non-bird ocean species, including 'pollution' and 'disturbances due to human activities' (both 26% of all reported pressures/threats at Level 1) and the 'use of living resources (other than agriculture and forestry)' (18%). These categories are also reflected in the Level 2 ranking (see Figure 4.57) and represent 6 of the top

Figure 4.57 Top 10 (% of frequency) reported high-ranked pressures and threats for species (Habitats Directive) associated with open ocean ecosystem



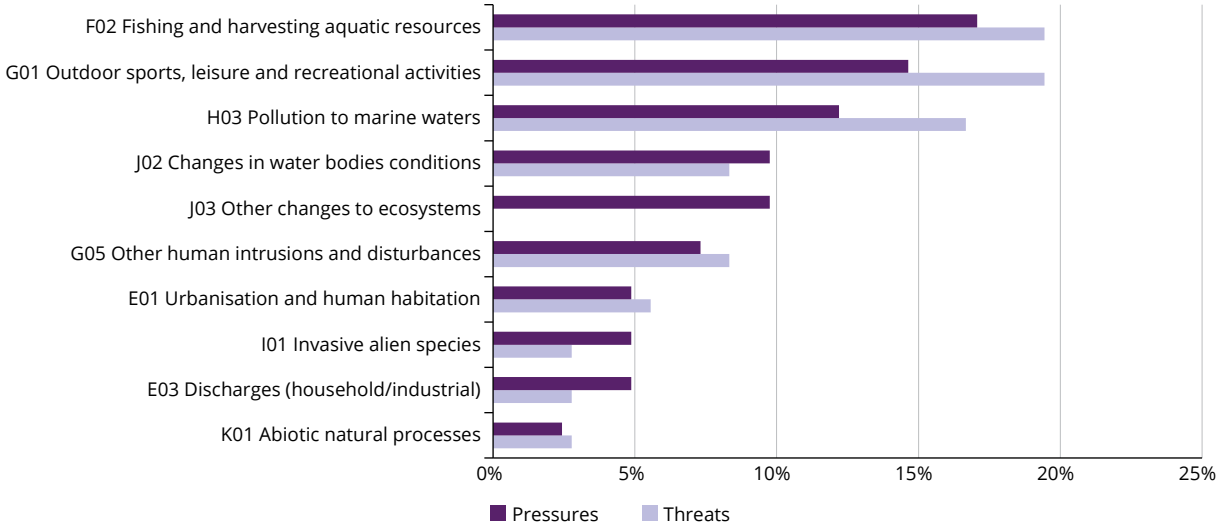
Notes: These are species from the Habitats Directive. Pressures and threats are reported at Level 2. The total number of pressures and threats is 55 and 72, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

10 pressures/threats. More specifically, the most frequently reported Level 2 pressures/threats (and the main contributing factors therein) are the fishing and harvesting of aquatic resources (netting), pollution of marine waters (macro-pollution) and military use and civil unrest (military manoeuvres), followed closely by shipping lanes and ports.

Open ocean habitats are affected by three main pressure/threat categories, namely 'disturbances due to human activities' and the 'use of living resources (other than agriculture and forestry)' (each 22% of all reported pressures/threats at Level 1), and 'pollution' (15%). The corresponding top-ranked Level 2 pressures/threats within these overarching categories are,

Figure 4.58 Top 10 (% of frequency) reported high-ranked pressures and threats for habitats associated with open ocean ecosystem



Notes: Pressures and threats are reported at Level 2. The total number of pressures and threats is 41 and 36, respectively. Greece did not provide an Article 17 report.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 4.13 Top five Level 2 conservation measures ranked high for species and habitats associated with open ocean ecosystem

Top five	Birds			Non-bird species			Habitats		
	Measure		%	Measure		%	Measure		%
1.	6.1	Establish protected areas/sites	36.4	5.0	Other marine-related measures	14.3	6.1	Establish protected areas/sites	23.4
2.	5.0	Other marine-related measures	18.2	6.1	Establish protected areas/sites	14.3	6.3	Legal protection of habitats and species	23.4
3.	6.0	Other spatial measures	18.2	6.3	Legal protection of habitats and species	14.3	4.1	Restoring/improving water quality	12.8
4.	6.3	Legal protection of habitats and species	18.2	7.0	Other species management measures	14.3	7.3	Regulation/Management of fishery in marine and brackish systems	10.6
5.	9.2	Regulating/Managing exploitation of natural resources on sea	6.1	7.3	Regulation/Management of fishery in marine and brackish systems	14.3	8.3	Managing marine traffic	8.5
5	n/a			7.4	Specific single species or species group management measures	14.3	9.2	Regulating/Managing exploitation of natural resources on sea	8.5
5	n/a			8.3	Managing marine traffic	14.3	n/a		

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 33, 7 and 47 for birds, non-bird species and habitats, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

respectively, fishing and harvesting aquatic resources; outdoor sports, leisure and recreational activities (see Figure 4.58); and pollution to marine waters. It is notable that these three Level 2 factors were more frequently reported as threats than as pressures, indicating an expected increase in their severity within the next two reporting periods.

Table 4.13 lists the five most frequently reported conservation measures for open ocean birds, non-bird species and habitats at Level 2 of the conservation measures categorisation. The most common type of conservation measure for birds, non-bird species and habitats is 'establish protected areas/sites' (36%, 14% and 23%, respectively). The additional top 5 ranked measures for non-bird species are distributed evenly between 'managing marine traffic', 'regulation/management of fishery in marine and brackish systems', 'other species management measures', 'other marine-related measures', 'legal protection of habitats and species' and 'specific single species or species group management measures' (together, at 14.3%).

5 Natura 2000 and conservation status

Article 17 paragraph 2 of the Habitats Directive requires the European Commission's composite report to 'include an appropriate evaluation of the progress achieved and, in particular, of the contribution of Natura 2000 to the achievement of the objectives set out in Article 3'. This chapter aims to help fulfil this requirement, and Chapter 6 examines progress under Target 1 of the EU's 2020 Biodiversity Strategy.

Covering more than 18% of the EU's terrestrial land area and a significant area of Europe's seas (approximately 4%), Natura 2000 represents the largest coordinated network of nature conservation areas in the world (EEA, 2012) (see Map 5.1). The main goal of the network is to contribute to the maintenance or restoration of a favourable conservation status for the target habitats and species, and it has a clear outcome-oriented focus.

The network is formed by sites classified as 'Special Protection Areas' (SPAs) under the Birds Directive and designated as 'Special Areas of Conservation' (SACs) under the Habitats Directive. Sites under the Habitats Directive are proposed by the Member States and initially known as 'Sites of Community Importance' (SCIs). Site proposals are evaluated by a series of 'biogeographical seminars' (Evans, 2012) and the terrestrial component of the network is considered to be close to complete, while further marine sites are required.

Since 2001, the European Commission has regularly published lists of sites accepted as SCIs. Once a site has been included on the Union List (formerly known as Community List), the Member State has 6 years to designate the site as a SAC. This change of designation carries additional responsibilities: the requirement to apply necessary conservation measures is only formally triggered by the designation of a site as a SAC.

Many sites are both SPAs and SACs, while a large proportion are also protected by other national or international designations, such as National Parks and United Nations Educational, Scientific and Cultural Organization (UNESCO) biosphere reserves; as SPAs cover migratory waterfowl, many SPAs are also Ramsar sites. Sites are not necessarily strict nature reserves, and many sites include farmlands or exploited forests. Moreover, much of the land included in the network is privately owned and managed, including privately owned strict reserves (e.g. some NGO-owned sites). However, use and management of the SACs and SPAs must comply with ecological requirements for the species and habitats in question ([44]).

Figures given below for site numbers and areas refer to the situation at the end of the reporting period in 2012, and include SPAs, SACs, SCIs and proposed SCIs (i.e. sites proposed but not yet included in a Union List).

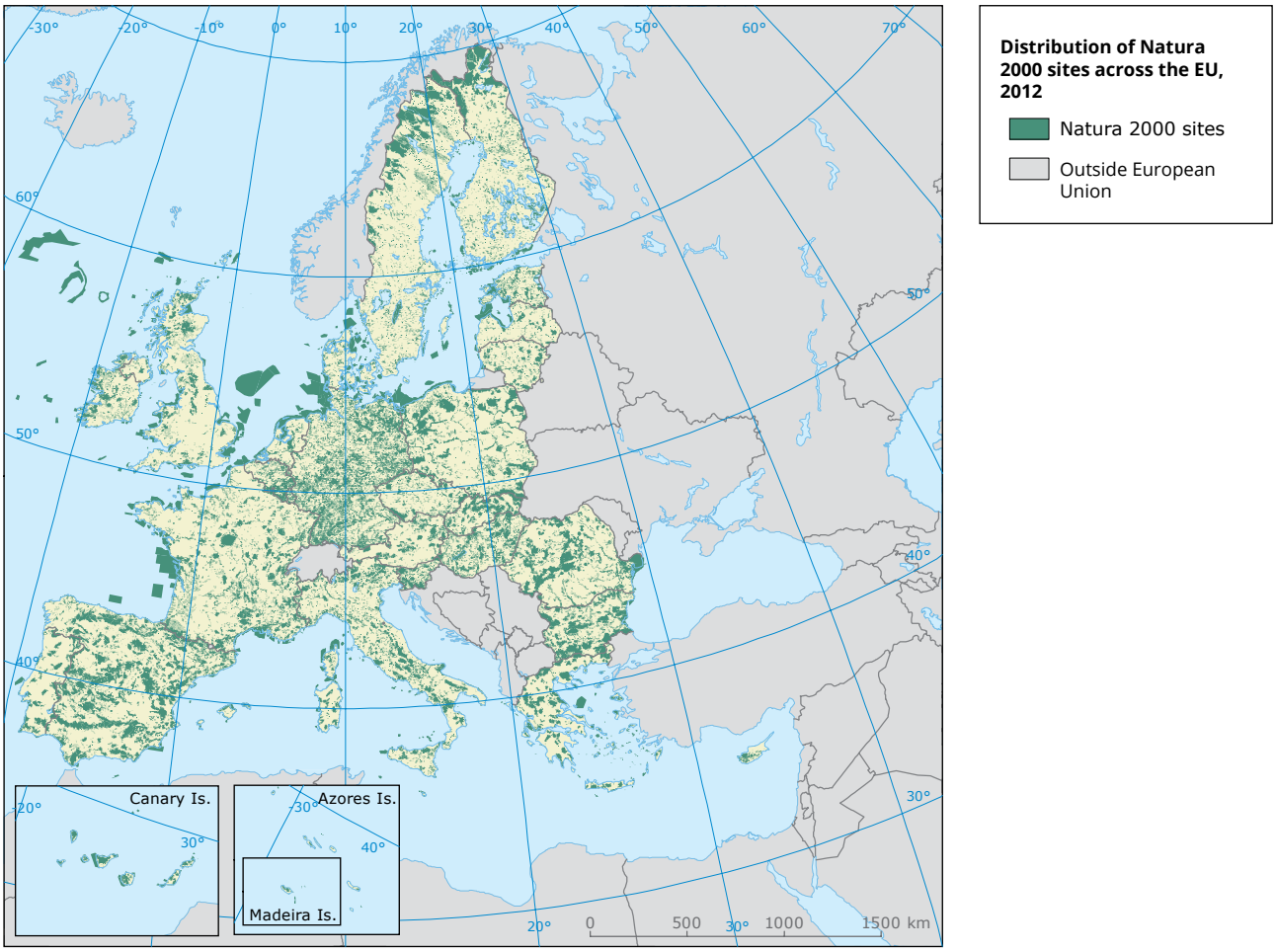
5.1 Site classification, coverage, management and the evolution of the Natura 2000 network

5.1.1 Growth of the network

The Natura 2000 network has grown rapidly since the early 1990s, rising from 50 000 km^2 in 1993 (equivalent to Luxembourg and Slovakia together), to 950 000 km^2 in 2010, and reaching over 1 million km^2 in 2012. This is an area equivalent to the combined area of France, Germany and Bulgaria. The designation of SPAs was very slow at first (see Figure 5.1), and led to legal action by the European Commission against many Member States (Evans, 2012). While both the area and number of sites has continuously increased, the network has largely grown in consecutive waves corresponding to the introduction of the Habitats Directive in 1992 and initial implementation in the EU-15, followed by the accession of 10 new Member States in 2004 and 2 others in 2007. As such, while nearly half of the network's area and sites were already proposed by 2000, the network has continued to grow. Since the end of the reporting period, there has been a further significant increase (when Croatia joined the EU in 2013), but this is not covered by the present report.

([44]) See http://ec.europa.eu/environment/nature/natura2000/index_en.htm.

Map 5.1 Natura 2000 at the end of the reporting period, 2012



Notes: The map shows SPAs, SACs, SCIs and proposed SCIs. Croatia did not join the EU until 2013.

Source: EEA Data Centre (see http://www.eea.europa.eu/data-and-maps/figures/distribution-of-natura-2000-sites-3/natura2000eu28_end2012/Natura2000EU28_End2012.eps.75dpi.gif/at_download/image).

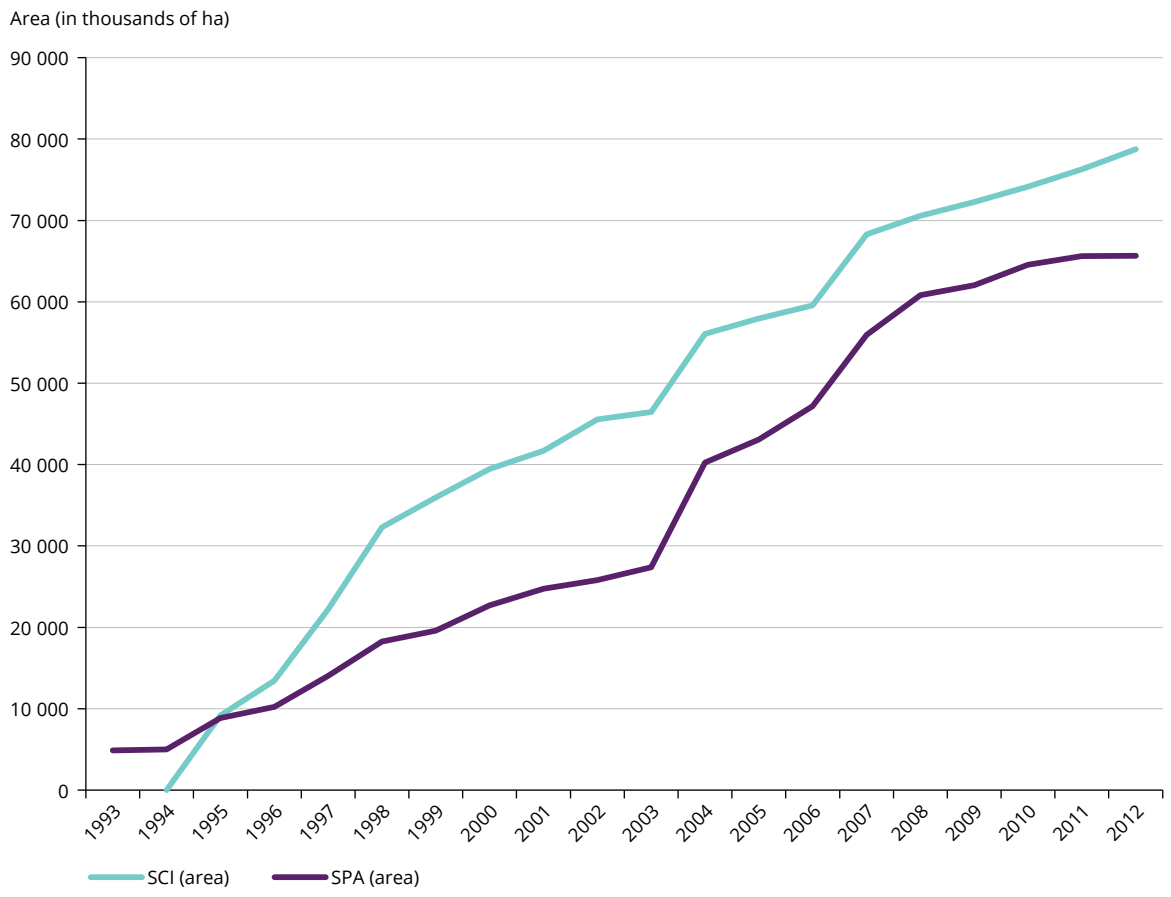
5.1.2 Number, area and coverage of SCIs, SACs and SPAs

As part of the Articles 12 and 17 reporting, Member States were asked to provide information on the total number and the total area of sites designated under the Birds Directive (SPAs) and proposed and designated under the Habitats Directive (SCIs and SACs), the terrestrial area of sites and the number and area of marine sites (i.e. any site with a marine component) at the end of the reporting period (i.e. 31 December 2012). For Habitats Directive sites, numbers and areas are reported separately for all SCIs and for SACs only. 'Proposed Sites of Community Importance' (pSCIs), are included in SCIs. The Natura 2000 database, which contains descriptions of all the sites using the Standard Data Form ([45]), holds similar information. However, there are often discrepancies between information reported under Articles 12 and 17: this is often due to the delay in sites being added to the Natura 2000 database, which is only updated once a year, although there are also missing values, particularly dates.

Table E.1 in Annex E shows the area and terrestrial coverage of the SCIs, SACs and SPAs, as reported by the Member States under Articles 12 and 17. The area for SCIs, SACs and SPAs is also divided into marine, terrestrial and total categories, whereas the percentage of coverage only refers to the percentage of the total terrestrial area covered.

([45]) See http://eur-lex.europa.eu/legal-content/EN/ALL/;ELX_SESSIONID=rQvsJHrP1rn7f6b31T1bRJ4rq4DQGd1K57JdlcYvMmlfGSkwy0dG!1423190359?uri=CELEX:32011D0484.

Figure 5.1 Cumulative surface area of the Natura 2000 network from 1993 to 2012



Source: Natura 2000 databases from 1993 to 2012. Numbers are for EU-27, without Croatia, and include SPAs, SACs, SCIs and proposed SCIs.

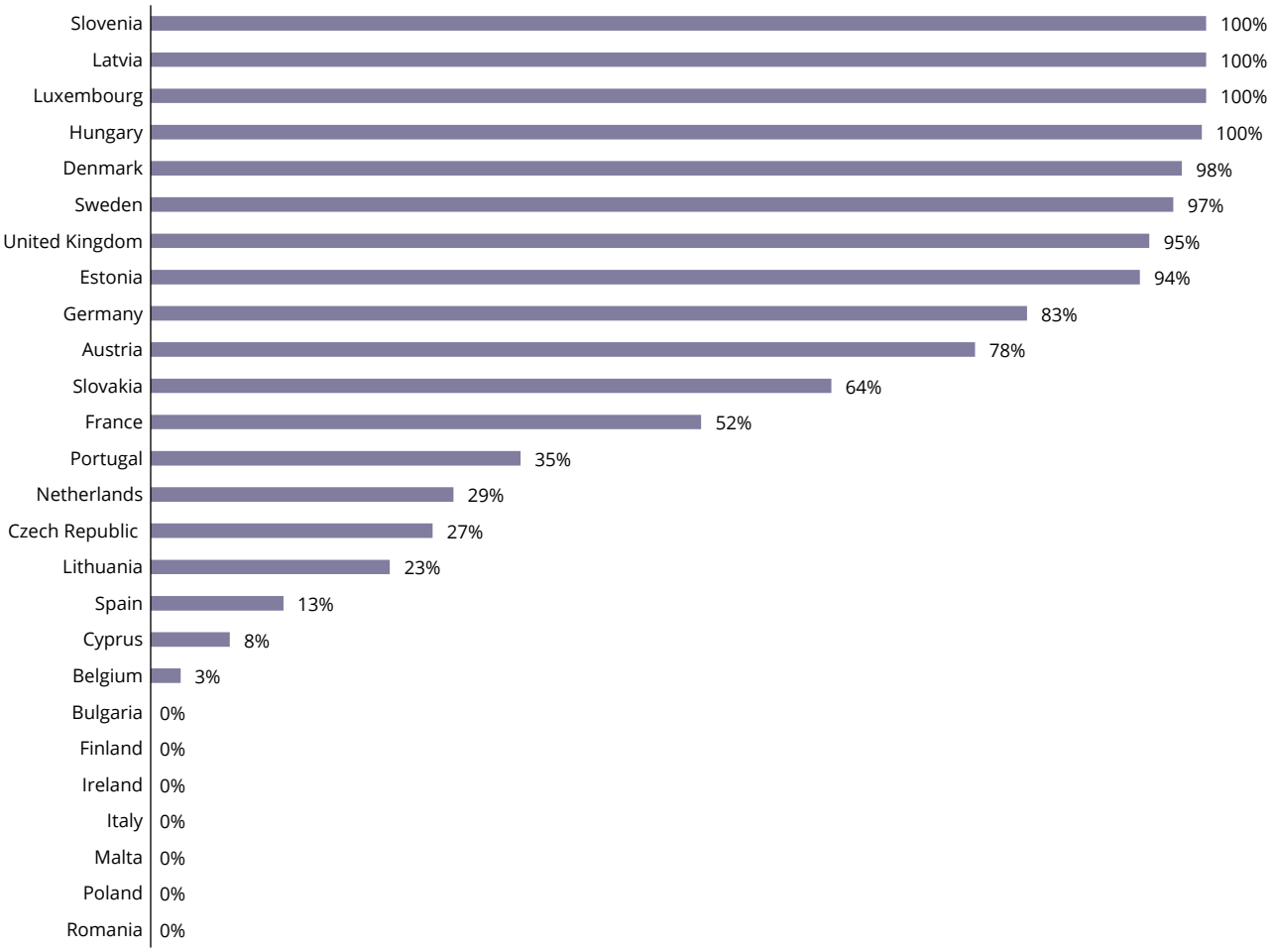
In total, Member States reported 22 877 SCIs with an area of 789 668 km² and covering 13.8% of the EU terrestrial area. However the number and area of SACs is much lower, with only 11 977 sites and 245 117 km², representing 4.1% of Member State territory. As the initial lists with SCIs were published in the early 2000s and are updated annually, we should expect most SCIs to now be formally designated as SACs, in particular for the EU-15 countries, since the maximum 6 years was passed several years ago. A number of Member States stand out as having a particularly low number of SACs relative to their total number of SCIs, and seven have no SAC, including Finland, Ireland and Italy, all 'older' Member States, and 'newer' Member States as Malta, Poland and Romania (see Figure 5.2).

While the largest number of reported SCIs are found in Germany (4 617), Sweden (3 975), and Italy (2 576), the largest reported SCI area (both terrestrial and marine) is found in Spain (127 390 km²), the United Kingdom (80 066 km²), and Italy (78 532 km²), and the highest terrestrial coverage is reported in Slovenia (31.6%), Bulgaria (30.0%), and Italy (24.0%). The lowest terrestrial coverage of SCIs/SACs was reported in the United Kingdom (5.1%), France (8.5%), Germany (9.3%) and the Netherlands (9.3%).

Germany has the largest number of SPAs (740) while Italy has the largest area (44 107 km²). The proportion of terrestrial area covered by SPAs ranges from 27% (Cyprus) to 5% (Luxembourg and Malta).

Site size varies greatly, from many sites recorded as 0 ha (many are entrances to cave systems; some are errors) to 12 331 km² (Dogger Bank, a British marine site which is complemented by the Dutch part (4 650 km²) and the Danish part (1 699 km²) of the bank. The largest terrestrial site is Vindelfjällen in Sweden, at 5 546 km². The most frequent size class for terrestrial sites is from 101 ha to 1 000 ha. There is some variation between regions with Boreal sites, most frequently in the 11 ha-to-100 ha class, while all other regions are either from 101 ha to 1 000 ha, or from 1 001 ha to 10 000 ha (see Figure 5.3).

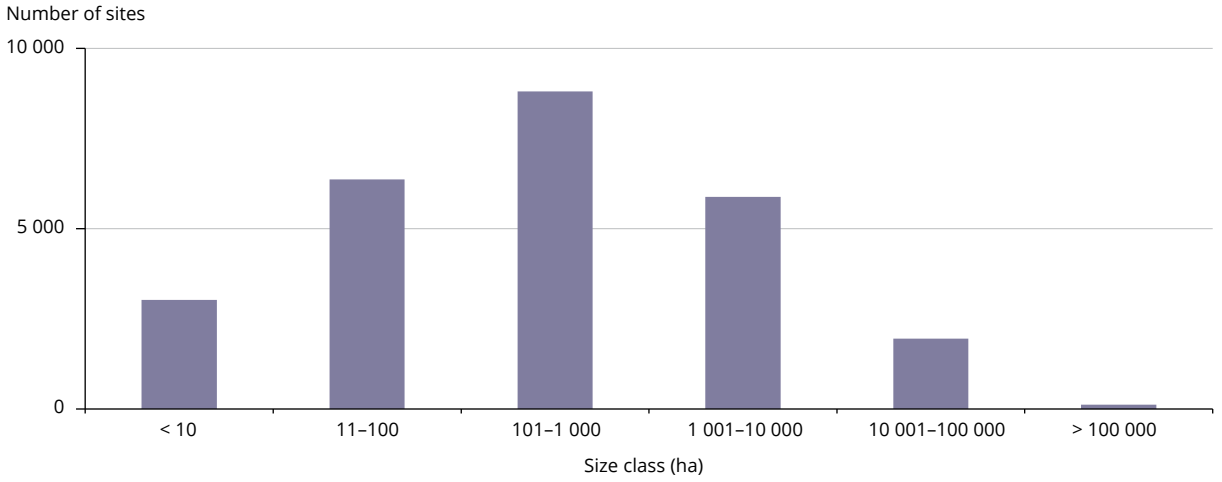
Figure 5.2 Proportion (%) of SCIs that have been designated as SACs, by Member State



Notes: Finland and Romania did not report the total number of SACs. Greece did not provide an Article 17 report within the agreed deadline for the production of this report.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 5.3 Distribution of terrestrial Natura 2000 sites, by size class (ha)



Source: Natura 2000 database (2012).

5.1.3 Growth of the network over the reporting period

When comparing Natura 2000 databases, the number of SCIs has increased by 1 949 sites over the reporting period (2007–2012) while the number of SPAs has increased by 587 over the reporting period (2008–2012), representing a 9.3% and 12.1% increase relative to 2006 and 2007, respectively. A large part of this increase is attributable to Bulgaria and Romania joining the EU in 2007, and making their first proposals soon after. Elsewhere, particularly large increases were seen in the Czech Republic, Lithuania, Poland and Slovakia for SCIs and in Germany, Greece, Ireland and Spain for SPAs. For further information, see Table E.2 in Annex E.

The area of the Natura 2000 network increased by 230 000 km^2 for SCIs over the Article 17 reporting period (2007–2012) and by 145 000 km^2 for SPAs over the Article 12 reporting period (2008–2012), representing a 41.2% and 28.9% increase relative to 2006 and 2007, respectively. For SCIs, particularly large increases were seen in the United Kingdom (mostly marine sites, see Table E.2 in Annex E), and to a lesser extent, France and Poland. For SPAs, large increases were seen in France, Germany, Greece and the United Kingdom (see Map 5.2).

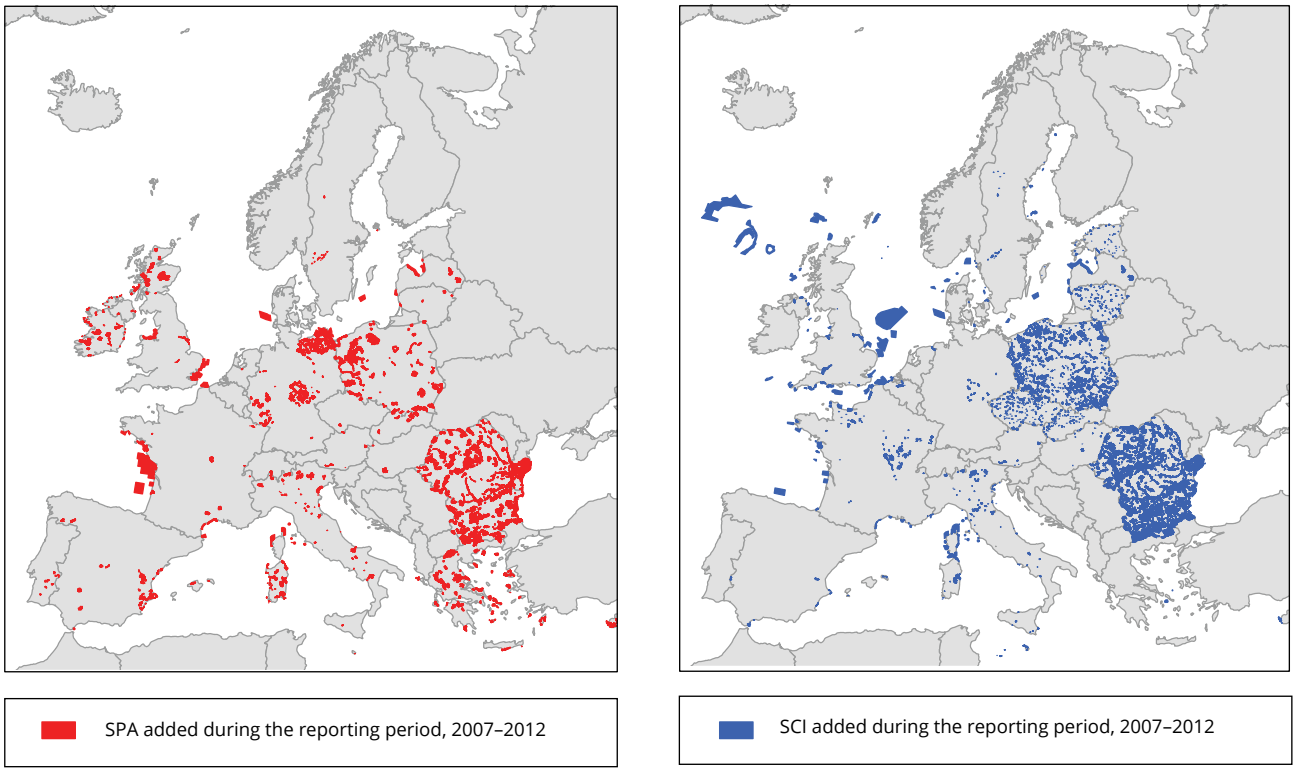
5.1.4 Marine SCIs and SPAs

The marine component of Natura 2000 grew slowly at first, partly due to lack of knowledge and partly as it was not until 2005 that it was agreed that the two nature directives apply offshore (EC, 2007). The growth has been helped by the series of marine biogeographical seminars held in Galway, Ireland and Sopot, Poland (both 2009) and Brindisi, Italy (2010). By 2014, Natura 2000 covered some 4% of the EU marine areas within 200 nautical miles of the coast.

Member States reported 1 573 marine SCIs with an area of 177 325 km^2. The largest number of marine SCIs was reported in Sweden (334), Italy (295) and France (207). The largest area of SCIs was reported by the United Kingdom (67 678 km^2), France (27 705 km^2) and Germany (21 222 km^2). Although not shown in the Article 17 reports, it is clear from Map 5.2 that only in the Atlantic are there significant areas offshore (i.e. more than 12 nautical miles from the coast).

As with the Natura 2000 network as a whole, the area and number of marine sites has grown significantly over time. However, unlike the terrestrial sites, the bulk of the growth has taken place over this reporting

Map 5.2 Sites added to the Natura 2000 network during the reporting period (2007–2012)



Notes: A site may be both an SPA and an SCI.

Source: Natura 2000 database and associated spatial files for end 2012. Sites shown are those where the SCI or SPA date is between 01/01/2007 and 31/12/2012.

period, with the marine area of SCI and SPA sites increasing by 127 192 km² and 66 865 km² over the Article 17 and 12 reporting periods, respectively. This represents a massive 163.5% and 113.2% increase in total area relative to 2006 for SCIs and 2007 for SPAs, respectively. For SCIs, particularly large increases were seen in the United Kingdom (plus 57 817 km²), and to a lesser extent France (plus nearly 22 338 km²), mirroring the patterns seen for SCIs as a whole. For SPAs, on the other hand, this order is reversed, with France adding nearly three times as much area (plus 32 071 km²) compared to the United Kingdom's (plus 10 591 km²). Thus, combined, the United Kingdom and France represent almost two-thirds of the total increase in marine area for both SCI and SPA sites during the reporting period. Due to these considerable additions in the area of marine sites, the United Kingdom (with 73 894 km²) and France (with 41 736 km²), rank 1st and 2nd highest in total marine site area, followed by Germany, Denmark, the Netherlands, Spain and Sweden, which also have sizeable marine areas.

5.2 Proportion of population/habitat area covered by the network

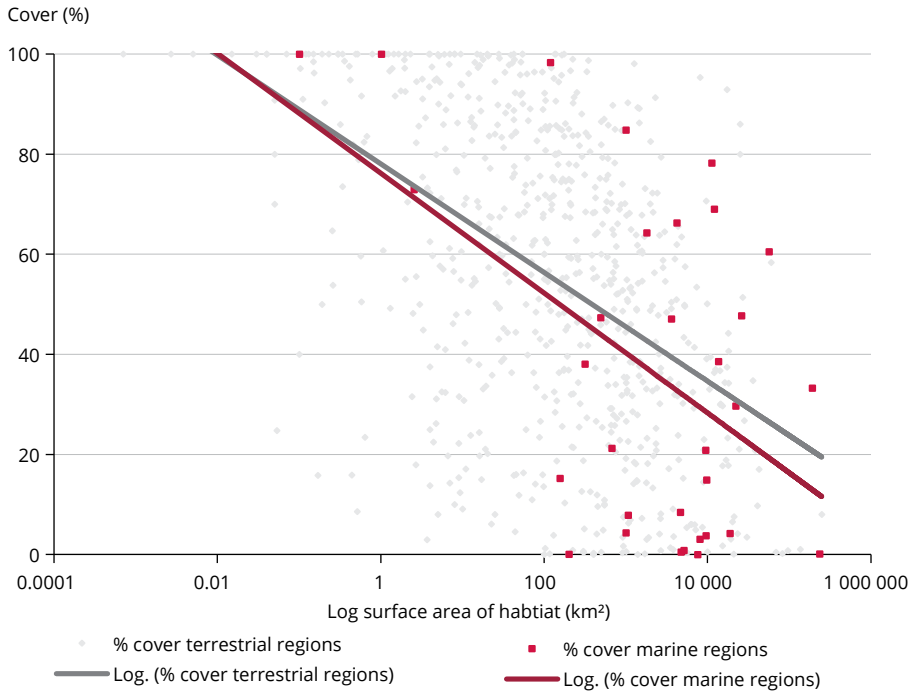
The proportion of the population of a species or area of a habitat from the Birds and the Habitats directives which is included in Natura 2000 varies, with single site endemic species being completely covered while wide ranging species or widely distributed habitats will only be partly covered by the network, although many such species are also protected by being listed in Annex IV. Member States were asked to indicate the habitat area or species population which is within the Natura 2000 network. For habitats where area is always reported as kilometres squared, it is easy to calculate the percentage of a given habitat which is in the network. However, it is not so simple for species where in many cases, a range of population units have been used. For example, in the Alpine biogeographic region, *Austropotamobius torrentium* is reported with a variety of population units including individuals (the agreed unit), localities, 10 km x 10 km grids and length (kilometres).

5.2.1 Habitats (Habitats Directive)

As expected, there is a clear negative correlation between the extent of habitat area and the percentage of habitat included in Natura 2000 (see Figure 5.4). There is some variation between regions, with habitats in the Atlantic area having a lower coverage for a given area, but none of these differences are statistically significant.

There is no statistically significant difference between habitats with different conservation status, although

Figure 5.4 Relation between the area of habitats (within the EU) and their coverage in Natura 2000 sites



Notes: Each point represents the habitat area for a biogeographical or marine region, with marine habitats indicated in red.

Source: EEA, 2015b, Article 17 reports and assessments.

habitats assessed as unfavourable whose trend (qualifier) is stable have a higher coverage than unfavourable habitats which have an improving or declining trend.

5.2.2 Species (Habitats Directive)

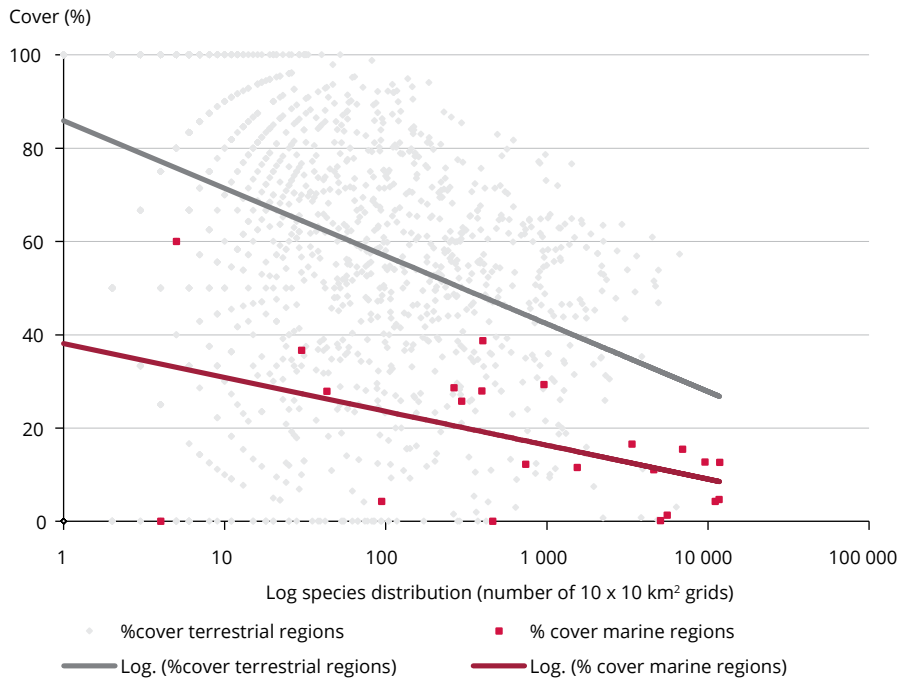
As noted above, a mix of population units has been used for reporting the population of Annex II species, and there is no clear relationship between reported population size and the coverage by Natura 2000 sites (not shown).

An alternative approach is to calculate the proportion of grid cells from the distribution map that are covered, at least partially, by a Natura 2000 site proposed for that species. This method is likely to overestimate coverage, as the locality of the species may be within the grid cell, but not the Natura 2000 site. As shown in Figure 5.5, the relationship between area of distribution (assumed to be proportional to the population size) to cover by Natura 2000 is much stronger than before. Each point represents the area of a species in a biogeographical region. When marine species are plotted separately, they show a lower cover for a given 'population'. The marine species with very low cover by Natura 2000 but large distributions are marine turtles and cetaceans. For example, the Green Turtle (*Chelonia mydas*) has a reported distribution of 5 065 10 km x 10 km grid cells in the Marine Mediterranean region, but only 7 cells overlap with Natura 2000 sites for this species.

5.2.3 Birds (Birds Directive)

Plotting coverage of bird species by Natura 2000 using Member State data does not reveal any clear patterns, either for all seasons combined or for each season separately; there is too much scatter to detect any trend. This is also the case if only reports for which the population unit was pairs or individuals are plotted. However bird species which have stable or fluctuating population trends at a national level tend to have a higher coverage by the network than those which are deteriorating.

Figure 5.5 Proportion of grid cells for each Annex II species which overlap with a Natura 2000 site designated for that species



Source: EEA, 2015b, Article 17 reports and assessments.

5.3 Trends and conservation status of species and habitat types

In this section, the habitats and species assessments have been divided into three groups based on percentage cover by Natura 2000: > 75%, 35% to 75% and < 35%. These classes were chosen using a statistical technique (k-medoids) which is designed to divide data into homogeneous groups.

Member State rather than EU regional assessments were used to investigate potential relationships between coverage by Natura 2000 and conservation status or trends, as they are more closely connected. The total population sizes and population sizes within the Natura 2000 sites per biogeographical region are frequently missing due to use of differing population units by Member States (see Section 3.4.6).

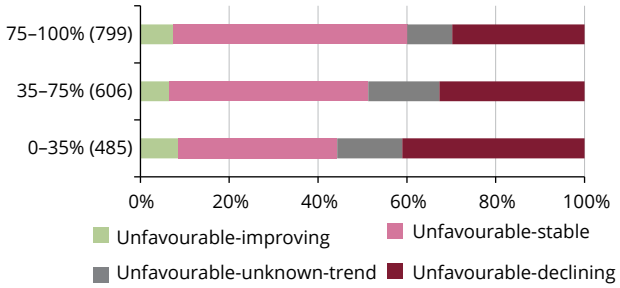
There is no significant association (chi-squared test) between habitats, conservation status and Natura 2000 coverage classes (see Figure 5.6). For habitats assessed as unfavourable, Natura 2000 coverage was significantly associated with the trend in conservation status (see Figure 5.7). The proportion of habitats assessments with declining unfavourable conservation status is higher in the 0–35% class than in the 75–100% class.

The proportion of assessments with stable trends is relatively higher in the 75%-to-100% class. Similar results were obtained using analysis of variance (ANOVA), where habitats assessed as unfavourable whose trend (qualifier) is stable or improving have a higher coverage (mean = 61%) than unfavourable habitats which are deteriorating (mean = 53%).

Similar results were obtained when analysing association between the coverage and trends in conservation status using EU biogeographical data (coverage by Natura 2000 in EU biogeographical regions and EU biogeographical trends in conservation status). Habitats with positive or equal qualifiers have significantly higher (P = 0.002) coverage in Natura 2000 sites (mean = 60%) than habitats with a negative conclusion qualifier (mean = 53%).

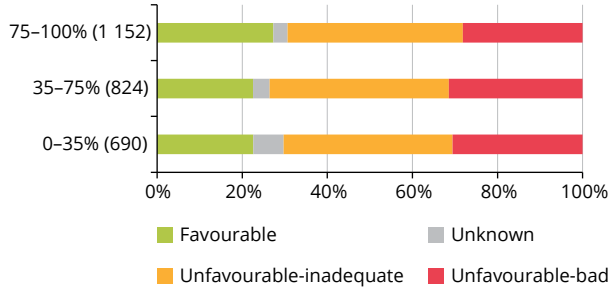
Where Member States used the same unit for both an overall species population and the share of this population included in Natura 2000, it is possible to calculate the coverage by Natura 2000 at a national scale and to compare it with conservation status and trends, since these are always ratios. As for habitats, there is no significant association (tested by chi-squared test) between conservation status of Annex II species and Natura 2000 coverage classes (see Figure 5.8). However, for species assessed as unfavourable, Natura 2000 coverage was significantly associated with the trend in conservation status (see Figure 5.9) and also with the short-term population trend (see Figure 5.10).

Figure 5.7 Trends in conservation status of Annex I habitats assessed by Member State as unfavourable with > 75%, 35–75% and < 35% of their area covered by Natura 2000



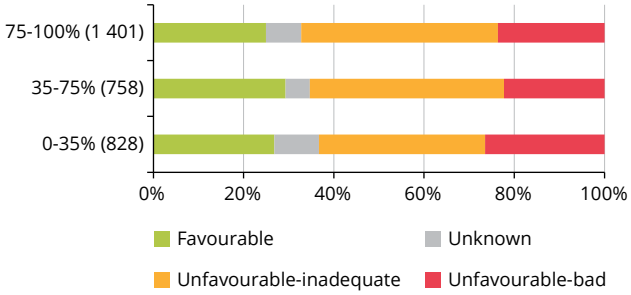
Source: EEA, 2015b, Article 17 reports and assessments.

Figure 5.6 Conservation status (Member State assessments) of Annex I habitats with > 75%, 35–75% and < 35% of their area covered by Natura 2000



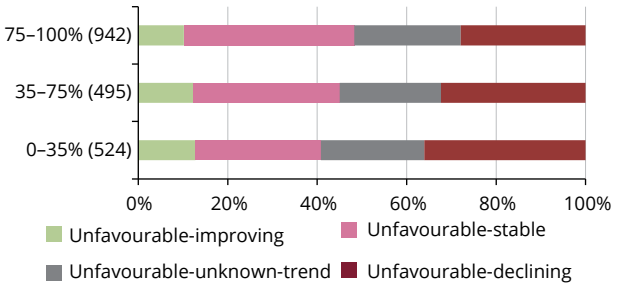
Source: EEA, 2015b, Article 17 reports and assessments.

Figure 5.8 Conservation status (Member State assessments) of Annex II species with > 75%, 35–75% and < 35% of their population covered by Natura 2000



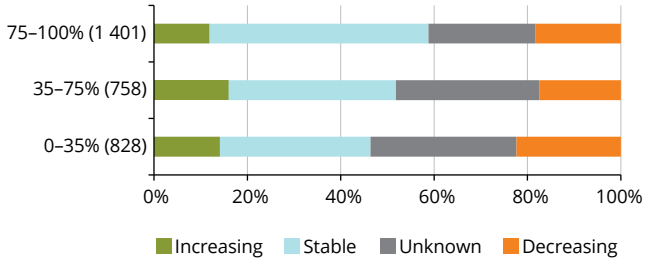
Source: EEA, 2015b, Article 17 reports and assessments.

Figure 5.9 Trends in conservation status of Annex II species assessed as unfavourable with > 75%, 35%–75% and < 35% of their population covered by Natura 2000



Source: EEA, 2015b, Article 17 reports and assessments.

Figure 5.10 Short-term population trends of Annex II species with > 75%, 35%–75% and < 35% of their population covered by Natura 2000



Source: EEA, 2015b, Article 17 reports and assessments.

The proportion of species assessments with decreasing population trends (see Figure 5.10) or declining unfavourable conservation status (see Figure 5.9) is higher in the 0–35% class than in the 75–100% class. The proportion of assessments with stable trends is relatively higher in the 75–100% class.

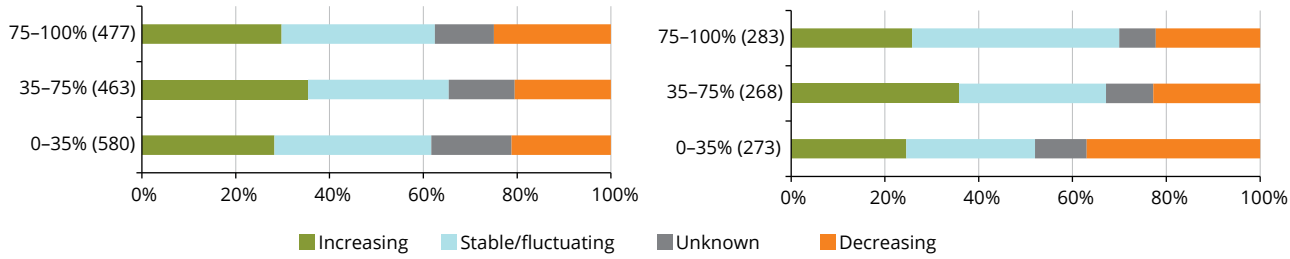
Similar patterns were obtained using ANOVA, where species assessed as unfavourable whose trend (qualifier) is stable and improving have a higher coverage (mean for stable trend = 60%, mean for improving trend = 54%) than unfavourable species which are declining (mean = 44%). The long-term population trend was optional and the data too incomplete to allow any analysis.

At the EU biogeographical level this type of analysis was not possible, as data from Member States do not allow estimates of population size or of the population within the Natura 2000 network at the biogeographical scale. But analyses based on a GIS approach (see Section 4.2.2 above) revealed similar association between the coverage and trends in conservation status. Species with positive or equal conclusion qualifiers have significantly higher (P = 0.012) coverage in Natura 2000 sites (mean = 71%) than species with a negative conclusion qualifier (mean = 67%).

For Annex I bird species, there is no significant association (tested by chi-squared test) between species short-term population trend and Natura 2000 coverage classes (see Figure 5.11). However, for the non-Annex I SPA trigger species, the Natura 2000 coverage class is significantly associated with the population trend. The species in the lowest coverage class (0–35%) seem more likely to have decreasing population trends than species in the other coverage classes (35–75%, and 75–100%). The frequency of stable population trend in the highest coverage class (57–100%) is higher than expected, and similarly the frequency of increasing trends is higher than expected in the middle coverage class (35–75%).

Similar types of findings concerning non-SPA trigger species were made as part of a survey carried out by Pellissier et al. (2013) when analysing the impacts of Natura 2000 on common bird (and butterflies) species, based on data from national or regional monitoring (see Box 5.1).

Figure 5.11 Short-term population trends of SPA trigger bird species listed in Annex I (Birds Directive) (left) and not listed in Annex I (right) with > 75%, 35%–75% and < 35% of their population covered by Natura 2000



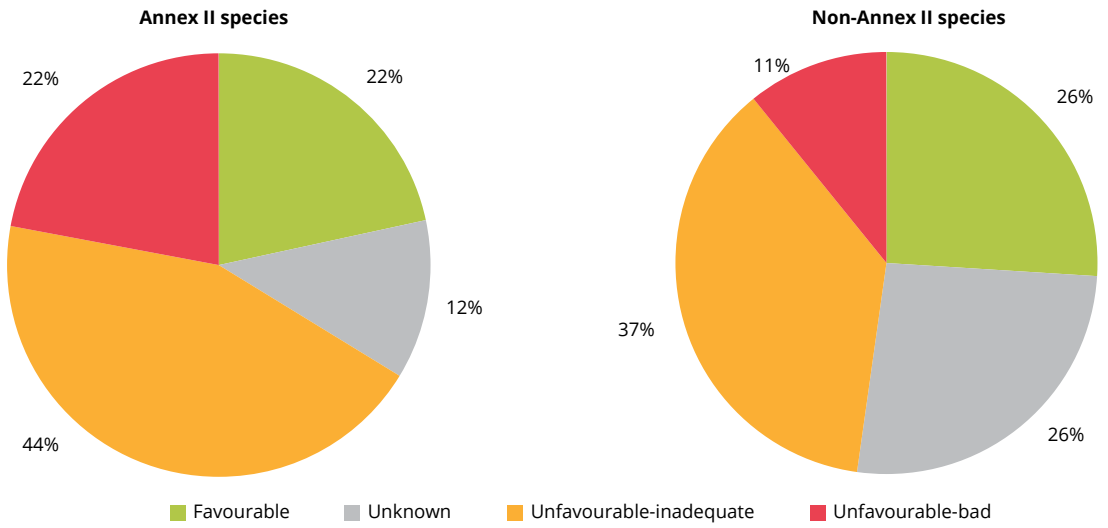
Source: EEA, 2015a, Article 12 reports and assessments.

The associations noted above between the trends and Natura 2000 coverage suggest that in many situations, Natura 2000 could play a role in stabilising trends and preventing further decline. The Habitats Directive concept of conservation status is complex, involving several components. Beside trends in range and population/area, it also incorporates distance to a target state (given by the favourable reference values) and requires considerable change before any improvement in conservation status. This could be a reason for the apparent lack of association between the conservation status and the Natura 2000 coverage observed. It may also be that many habitats and species require many years, maybe decades, to recover, due to conservation measures.

Only species listed in Annex II of the Habitats Directive are subject to the designation of Natura 2000 sites, so only these species can directly benefit from site designation and associated measures (non-target species can benefit indirectly — see Section 4.6 below). Annex II species have a lower proportion of EU regional assessments as favourable (22%), but higher proportions as unfavourable-inadequate and unfavourable-bad (44% and 22%) in comparison with the non-Annex II species (see Figure 5.12). However, it must be kept in mind that more than a quarter of assessments of Annex II species are unknown. Regarding trends in conservation status, a higher proportion of Annex II species have unfavourable-improving or unfavourable-stable status, in comparison to non-Annex II species (49% compared to 44%), but also, a higher proportion of Annex II species have an unfavourable-deteriorating trend (24% compared to 17%) (see Figure 5.13).

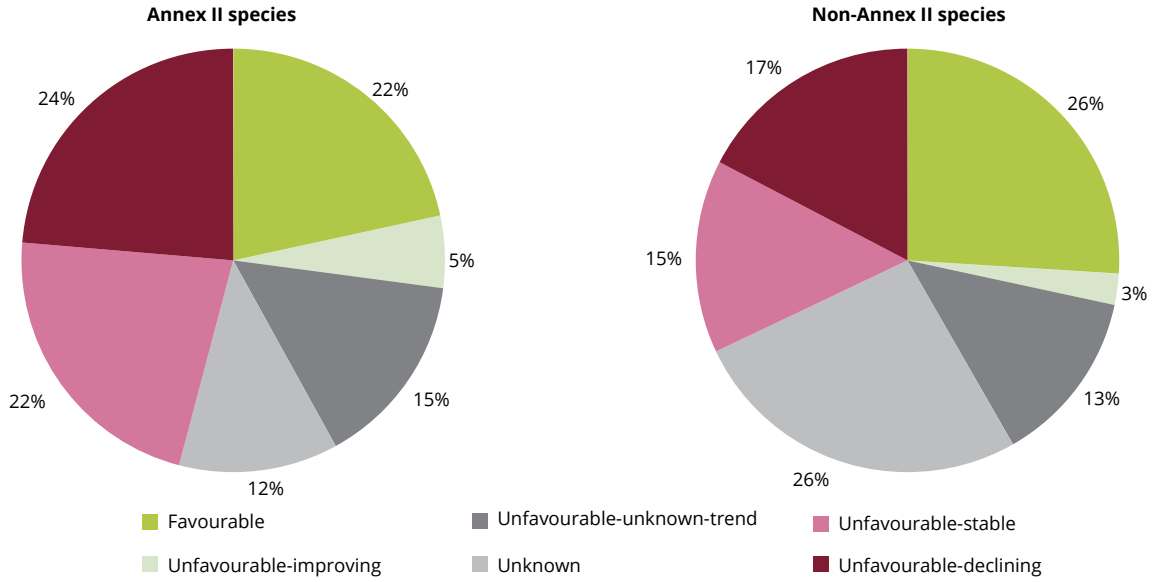
The list of SPA classification triggering species are specific for each Member State. Listing the species as an SPA trigger-species does not seem to have an important influence on its population trends, when comparing population trends between Member States where the species is listed as the SPA trigger and Member States where the species is not listed as such (see Figure 5.14). However, the proportion of species populations with increasing population trend is slightly higher in Member States in which the species is listed as the SPA trigger.

Figure 5.12 Conservation status and trends for Annex II (left) and non-Annex II (right) species



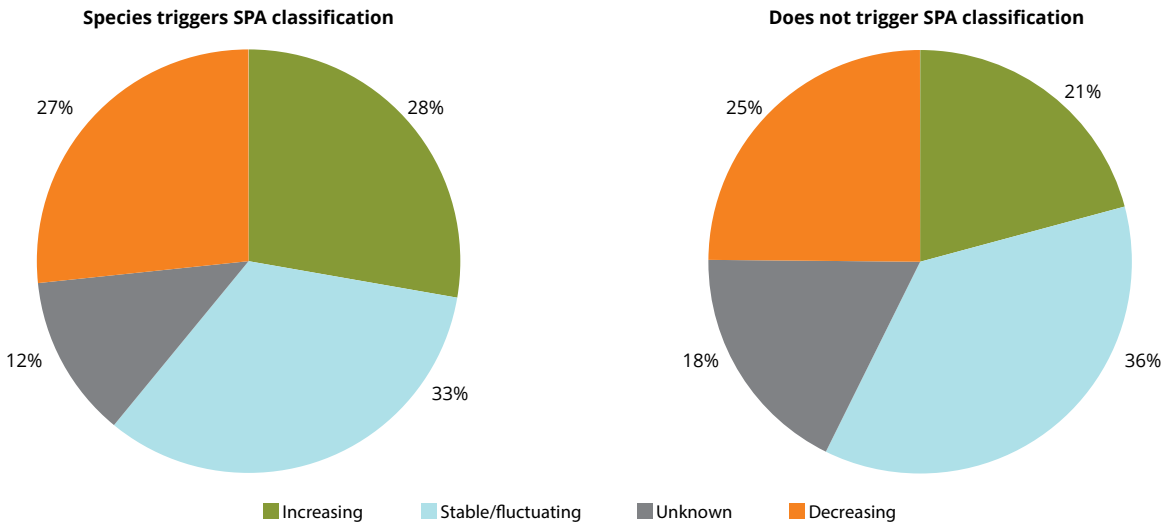
Source: EEA, 2015b, Article 17 reports and assessments.

Figure 5.13 Conservation Status and trends for non-bird species listed in Annex II (left) and non-Annex II (right)



Source: EEA, 2015b, Article 17 reports and assessments.

Figure 5.14 Short-term population trends in Member States, where a species triggers SPA classification (left) and in Member States where it does not trigger SPA classification (right)



Source: EEA, 2015a, Article 12 reports and assessments.

5.4 Conservation measures and their results

5.4.1 Management Plans (MPs)

Although MPs are not obligatory, their use is strongly recommended by the European Commission, and it is a requirement under national legislation in some countries (e.g. Denmark, France, the Netherlands and some German *Länder*).

Member States were asked to give the number of sites for which MPs have been adopted or are in preparation for SPAs and SACs. MPs are considered operational instruments that outline practical measures to achieve the conservation objectives for the sites in the network. These figures include the number of plans according to Article 6(1) of the Habitats Directive and the percentage of the network area covered by these MPs. In addition, the number of sites for which MPs are under preparation is provided. While the provisions of Article 6(1) do not apply to SPA, analogous provisions of the Birds Directive require Member States to ensure that species under Annex I and regularly occurring migratory bird species are subject to special conservation measures ([46]).

The total number of sites with plans under the Habitats Directive for the EU-27 was 9 271 in 2012, with an additional 4 229 plans under preparation (Table 5.1). Slovenia reports that all of its SCIs are covered by plans, while Sweden, Denmark, Cyprus, Finland and France all report that more than 75% of the area of SCIs have plans. Bulgaria, Ireland and Poland all reported that they have no plans finalised. Spain, the Czech Republic, Italy and Germany reported the highest number of plans under preparation (each reporting more than 500), whereas Spain, the Czech Republic, Poland, Belgium and Romania reported the highest number of plans under preparation relative to the existing number of sites with plans.

There were 1 624 SPAs with MPs, with a further 1 360 plans in preparation at the end of 2012. As for SCIs, Slovenia has MPs for all its SPAs, while Denmark, Finland and Sweden reported coverage above 80%. Bulgaria, Ireland, Poland and Slovakia all reported that they have no plans. Spain, Belgium and Germany reported the highest number of plans under preparation, with Spain reporting more than 500.

5.4.2 Conservation measures

The responsibility for managing Natura 2000 sites lies with the countries and regions concerned. Once the SACs are designated, Member States are also required under Article 6 of the directive to draw up conservation measures applying to all habitats and species on the sites. Similar measures are required for SPAs. They must also ensure appropriate steps are taken to avoid their deterioration and disturbance, taking into account the ecological needs of the particular habitats and species involved. If needed, conservation measures can include MPs, either particularly designed for the site or integrated into other development plans. Alternative conservation measures include statutory, administrative or contractual measures ([47]). Moreover, plans or projects likely to have a significant effect on the management of a SAC must be made the subject of an appropriate assessment, and when proceeding, all compensatory measures necessary to ensure the coherence of the Natura 2000 network must be taken.

In close cooperation with Member States and stakeholders, the European Commission has published a range of guidance documents on the management of Natura 2000 sites, providing information on a large variety of approaches, and a considerable amount of experience and best practice ([48]).

Experience from the 2001–2006 reports showed that the format used — a free text field — did not allow any analysis of the information reported; consequently, for 2007 through 2012, it was agreed to use a standard list of conservation measures for reporting under both Articles 12 and 17 (see Table 5.2). Member States were asked to report up to 20 measures for each habitat or species, indicating up to 5 as the most important ('H'), and for each measure reported, to note if it was primarily applied within or outside the network, or equally in and outside. For birds, information was only reported for SPA trigger species.

Member States also reported on the broad impacts of implemented conservation measures (e.g. maintaining grasslands and other open habitats) for each conservation measure category.

The following categories are used for the broad evaluation of measures.

([46]) See http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/commission_note.pdf.
([47]) See 'Commission note on establishing conservation measures for Natura 2000 sites', September 2013, at http://ec.europa.eu/environment/nature/natura2000/management/docs/comNote%20conservation%20measures.pdf.
([48]) For more information see http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm.

- **Maintain**: This is used when the conservation measure is required to maintain FCS, i.e. the favourable status would not be maintained if the measure would not be implemented.
- **Enhance**: This is used when the conservation measure is required to enhance conservation status or reach FCS, i.e. when species has an unfavourable conservation status and the measure — alone or in conjunction with others — is needed to improve it.
- **Long-term**: This is used for a measure without short-term effect — one reporting cycle or less — but where a long-term positive effect is expected.
- **No effect:** This is used for a measure without effect, or that needs adaptation and that is not delivering any conservation benefit, i.e. the measure failed in achieving its objectives or had adverse effects.
- **Unknown effect.**
- **Not evaluated.**

Figure 5.15 shows the percentage of reported conservation measures assessments for habitats, non-bird species and birds at Level 1 of the conservation measures categorisation, ranked as highly important. The figure shows that conservation measures related to

Table 5.1 Number and coverage of sites with management plans

Member State	No of sites with plans		No of sites with plans under preparation (*)		Proportion of network area with plans (%)	
	BD	HD	BD	HD	BD	HD
Austria	68	117			68.0	53.0
Belgium	3	9	230	318	9.4	12.0
Bulgaria	0	0	8	3	0.0	0
Cyprus	0	39	30	1	20.0	79.7
Czech Republic	21	287	7	788	55.0	37.7
Germany	143	1 740	158	591	22.2	20.4
Denmark	112	255	1	6	99.0	93.0
Estonia	33	105	33	233	52.2	45.0
Spain	90	217	508	1 231	15.1	18.1
Finland	145	314			80.0	78.0
France	142	591	110	264	63.0	76.0
Hungary	13	27		243	30.4	5.0
Ireland	0	0		0		0
Italy	162	1 011		692	28.0	42.7
Lithuania	34	53	32	107	41.5	13.1
Luxembourg	3	14	3	4	13.9	28.3
Latvia	58	53	2	3	75.0	18.5
Malta	4	7	13	28	30.8	22.0
Netherlands	4	1	73	142	8.0	6.0
Poland	0	15	104	378	0.0	0
Portugal	6	14	1		10.7	3.0
Romania	7	4	7	272	4.7	2.0
Sweden	518	3 988	3	25	88.0	97.0
Slovenia	26	260		0	100	100
Slovakia	0	8	37	131	0.0	0.7
United Kingdom	32	142			6.0	13.7
EU	1 624	9 271	1 360	4 229		

Notes: (*) 'Number of sites with plans under preparation' was an optional field and was not reported by all countries.

BD = Birds Directive; HD = Habitats Directive. A zero indicates a Member State reported no sites, and an empty cell indicates that no information was reported. This means that no value can be given for the EU. It is not possible to estimate a percentage cover for the EU from the Member State data. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments and EEA, 2015b, Article 17 reports and assessments.

'spatial planning' (i.e. 'establish protected areas/sites', 'legal protection of habitats and species', and 'other spatial measures') dominate the reported conservation measures. Additional significant categories include measures related to 'wetland, freshwater and coastal habitats', 'agriculture and open habitats' and 'forests and wooded habitats'. The low values for marine habitats and species is a reflection of the low number of marine habitats and species covered by the directives.

Table 5.3 lists the 10 most frequently reported habitat conservation measures at Level 2, providing a more detailed view of measures taken by Member States for habitats, non-bird species and birds. Four measures (6.1 Establish protected areas/sites, 6.3 Legal protection of habitats and species, 4.2 Restoring/improving the hydrological regime and 2.1 Maintaining grasslands and other open habitats) appear in the top five for all three groups, with 6.1 and 6.3 always occupying the top two positions. These are measures which apply to all species and habitats, whereas other measures are mostly associated with a particular group of habitats and species, for example forests. One major difference between habitats and both species groups is that species management measures (Measure 7) including hunting, occurs twice in the top 10 for both birds and non-bird species, but not at all for habitats.

When looking at habitat groups and associated species, the order changes considerably, as discussed in Chapter 4 (Results by ecosystem).

Figure 5.16 shows how the impact of the top 10 measures for each habitat, non-bird species and birds has been reported. Few measures are reported as 'unknown' or 'no effect', while 'long term' seems less frequently reported for birds compared to the other two groups. Use of 'not evaluated' is often quite high, suggesting that the impact of many measures is unknown and may even be negative.

Table 5.2 List of conservation measures with a full list of Level 1 measures (left) and an example of Level 2 (right)

Level 1

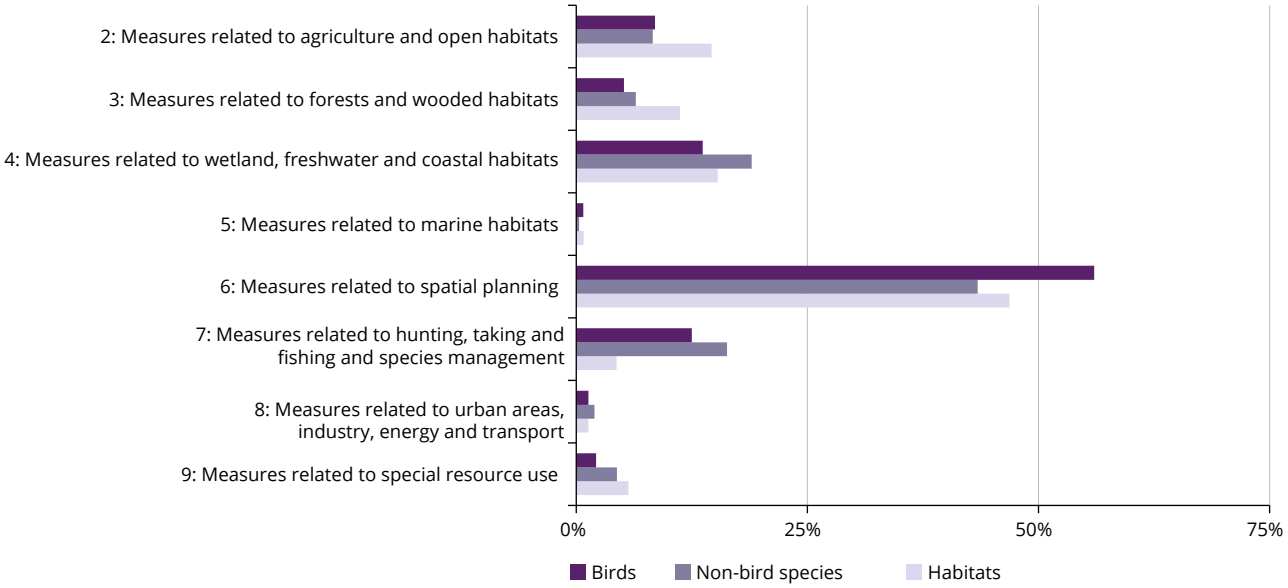
Code	Measure
1	No measures
2	Measures related to agriculture and open habitats
3	Measures related to forests and wooded habitats
4	Measures related to wetland, freshwater and coastal habitats
5	Measures related to marine habitats
6	Measures related to spatial planning
7	Measures related to hunting, taking and fishing and species management
8	Measures related to urban areas, industry, energy and transport
9	Measures related to special resource use

Examples of Level 2

Code	Measure	
2.0	Other agriculture-related measures	
2.1	Maintaining grasslands and other open habitats	Mowing, burning, grazing, removal/control of shrubs and other woody plants
2.2	Adapting crop production	Adapting input of nutrients and pesticides/herbicides; adapting crop timing (advance/delay harvest dates)
4.0	Other wetland-related measures	Restoring alluvial situations,
4.1	Restoring/improving water quality	Reducing pollutants in water
4.2	Restoring/improving the hydrological regime	Restoring river dynamics, removal of barriers and artificial margins, managing water levels (e.g. in bogs and mires)
4.3	Managing water abstraction	Managing periods and/or quantity of water abstracted for irrigation, energy production
4.4	Restoring coastal areas	Stabilisation of dunes, re-establishing dune dynamics, removing coastal infrastructures

Source: Article 17 Reference Portal; see http://bd.eionet.europa.eu/activities/Natura_2000/Folder_Reference_Portal/Conservation_measures_20_April.pdf.

Figure 5.15 Proportion (%) of Level 1 conservation measures ranked high



Notes: The total number of assessments for high-ranked conservation measures is 5 741, 6 932 and 5 137 for birds, non-bird species and habitats, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments and EEA, 2015b, Article 17 reports and assessments.

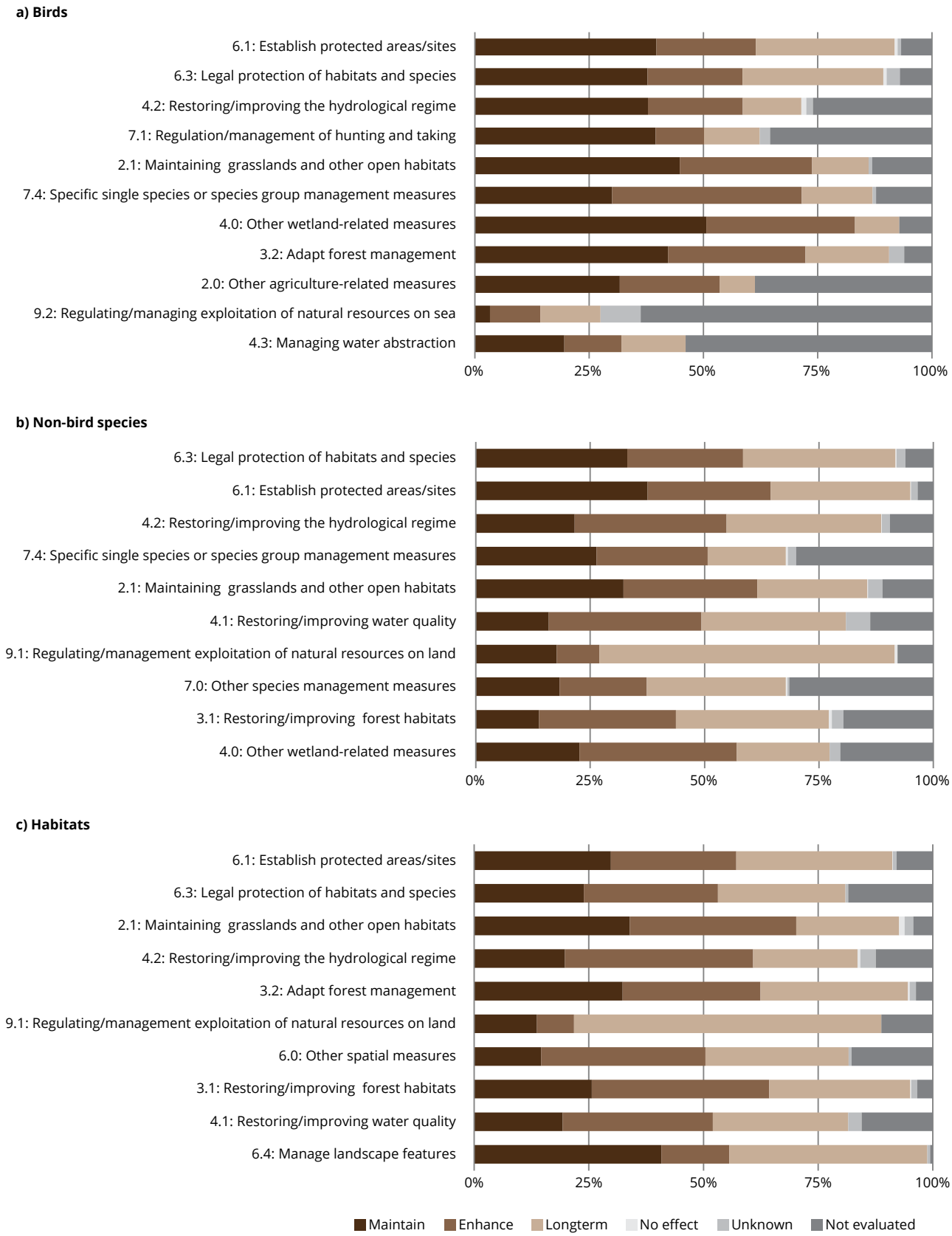
Table 5.3 Top 10 Level 2 conservation measures ranked high for habitats, birds and other species

Top ten	Birds			Habitats			Non-bird species		
		Measure	%		Measure	%		Measure	%
1.	6.1	Establish protected areas/ sites	28.6	6.1	Establish protected areas/ sites	24.7	6.3	Legal protection of habitats and species	21.9
2.	6.3	Legal protection of habitats and species	24.0	6.3	Legal protection of habitats and species	11.3	6.1	Establish protected areas/ sites	15.9
3.	4.2	Restoring/improving the hydrological regime	7.7	2.1	Maintaining grasslands and other open habitats	11.2	4.2	Restoring/improving the hydrological regime	7.6
4.	7.1	Regulation/Management of hunting and taking	6.2	4.2	Restoring/improving the hydrological regime	6.1	7.4	Specific single species or species group management measures	7.4
5.	2.1	Maintaining grasslands and other open habitats	5.2	3.2	Adapt forest management	4.9	2.1	Maintaining grasslands and other open habitats	6.2
6.	7.4	Specific single species or species group management measures	5.0	9.1	Regulating/Management exploitation of natural resources on land	4.8	4.1	Restoring/improving water quality	5.8
7.	4.0	Other wetland-related measures	2.6	6.0	Other spatial measures	4.8	9.1	Regulating/Management exploitation of natural resources on land	4.0
8.	3.2	Adapt forest management	2.4	3.1	Restoring/improving forest habitats	4.8	7.0	Other species management measures	3.5
9.	2.0	Other agriculture-related measures	1.9	4.1	Restoring/improving water quality	3.9	3.1	Restoring/improving forest habitats	3.1
10.	4.3	Managing water abstraction	1.6	6.4	Manage landscape features	3.0	4.0	Other wetland-related measures	3.1
10.	9.2	Regulating/Managing exploitation of natural resources on sea	1.6						

Notes: Non-bird species are species from the Habitats Directive. The total number of conservation measures is 5 741, 5 137 and 6 932, for birds, habitats and non-bird species, respectively. Greece did not provide any Articles 12 and 17 reports.

Source: EEA, 2015a, Article 12 reports and assessments and EEA, 2015b, Article 17 reports and assessments.

Figure 5.16 Assessment of impacts of the top 10 Level 2 conservation measures ranked high for birds (a), non-bird species (b) and habitats (c)

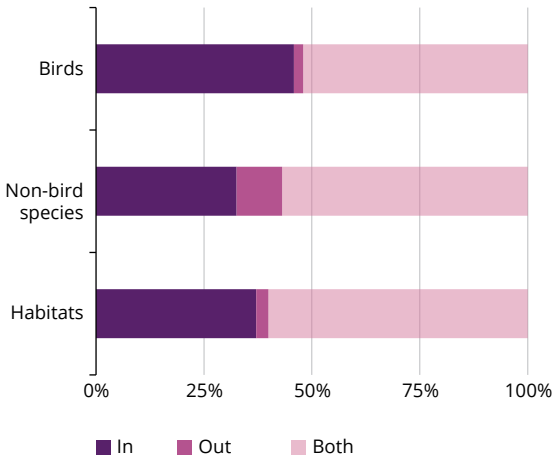


Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

The majority of measures are applied both inside and outside the network (see Figure 5.17). Relatively few measures (10% or less) are applied outside the network only.

Member States were asked to describe the types of measures by classifying them in one or more of the following five classes: legal, administrative, contractual, recurrent or one-off. Legal and administrative measures are most frequent across all three groups (see Figure 5.18). It should be noted that an individual measure can be placed in all five classes, for example, three Member States noted measure '4.2 Restoring/improving the hydrological regime' in all five classes for a range of habitats.

Figure 5.17 Proportion of reported conservations measures inside or outside Natura 2000



Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

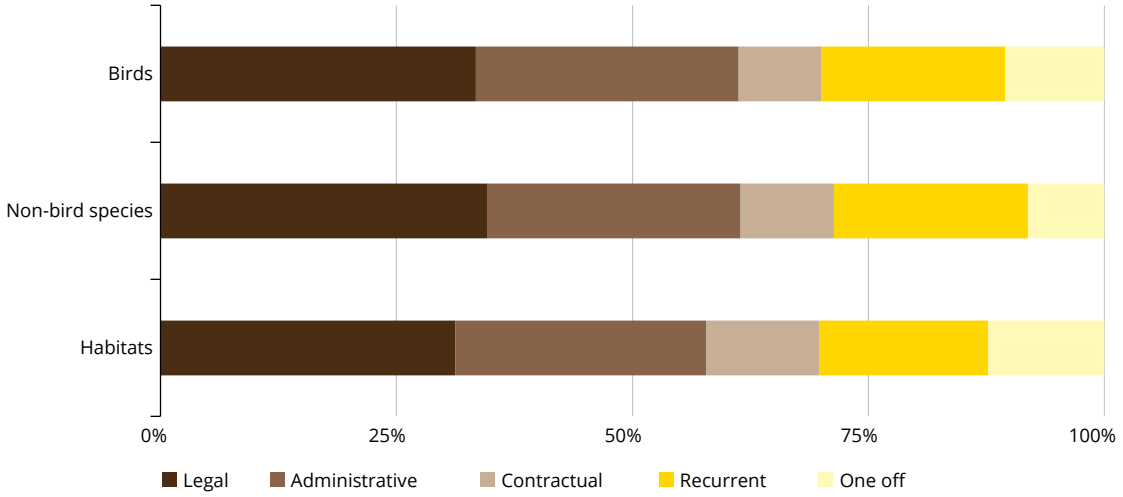
5.5 Land cover and the Natura 2000 network

The terrestrial part of the Natura 2000 network is predominately covered by woodland, cropland and grassland (see Figure 5.19). There are some differences between SICs/SACs and SPAs with a higher proportion of SPA as cropland and a higher proportion of SCI as forests (see Annex E, Table E.3). The area of some ecosystems which often occur as small patches or narrow linear features (e.g. rivers) will be under-reported due to the resolution of Corine Land Cover.

The proportion of each major ecosystem covered by the network varies greatly, with high proportions of sparsely vegetated habitats (56%) and wetlands (41%) and low proportions of urban (3%). However there are variations between the regions, for example 45% of forests is covered by Natura 2000 in the Boreal biogeographical region, but only 19% in the Atlantic biogeographical region.

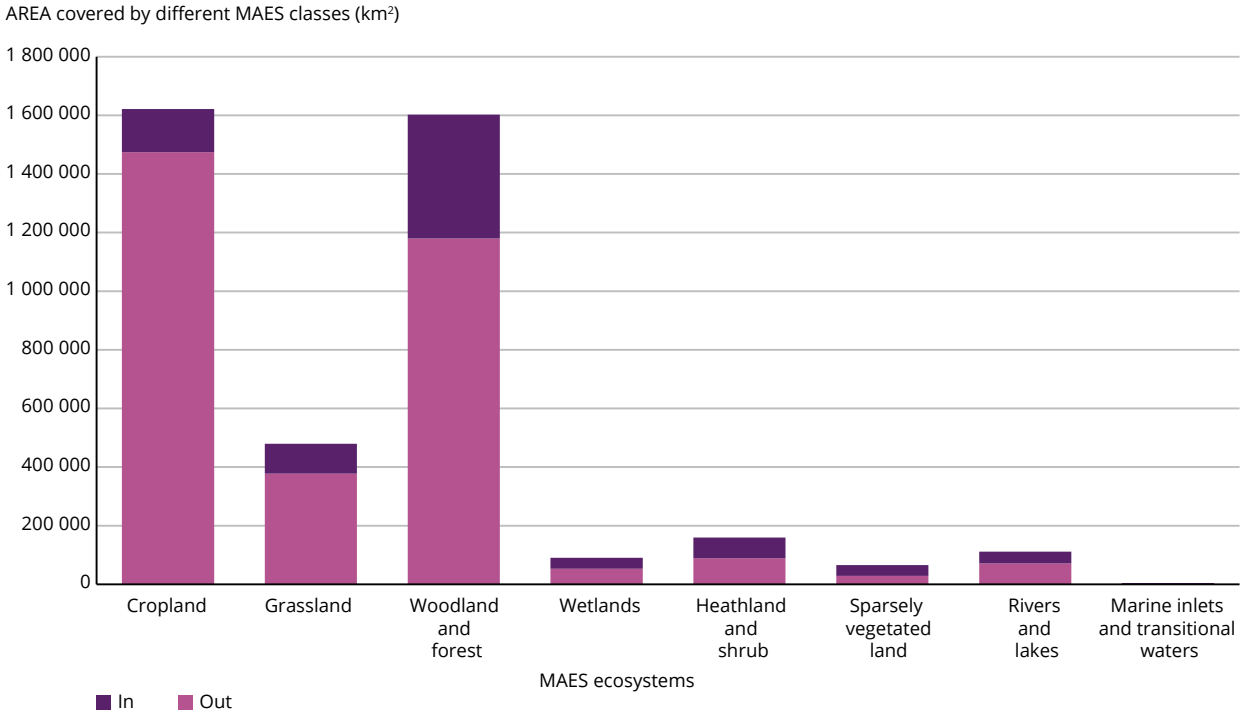
There are differences in changes in land use inside and outside the Natura 2000 network, with less change within the network than outside it (see Figure 5.20). This is particularly the case for urban and cropland ecosystems, the latter possibly due to less abandonment in sites being actively managed.

Figure 5.18 Type of conservation measures



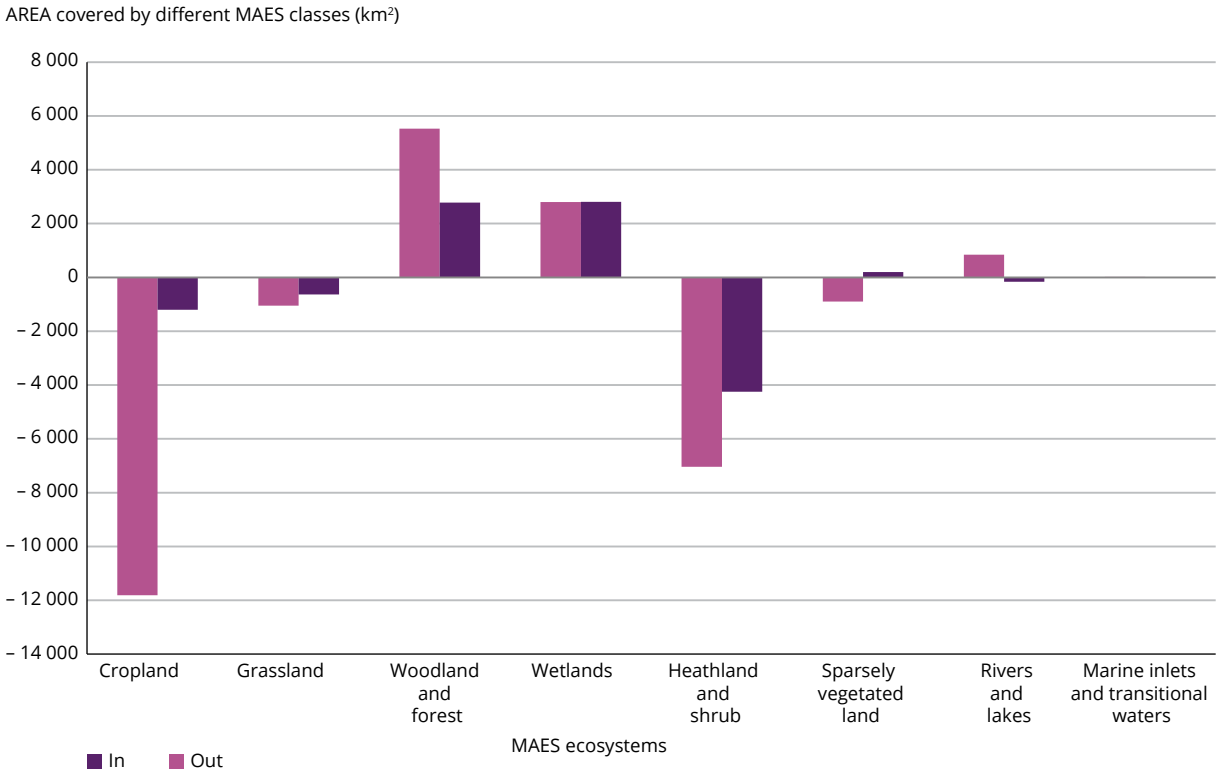
Source: EEA, 2015a, Article 12 reports and assessments; EEA, 2015b, Article 17 reports and assessments.

Figure 5.19 Coverage of major ecosystems by terrestrial Natura 2000 sites (based on Corine Land Cover 2006)



Source: Corine land cover, 2000 and 2006; Natura 2000 database, 2012.

Figure 5.20 Changes in broad ecosystem types between 2000 and 2006 inside and outside the Natura 2000 network (based on Corine Land Cover)



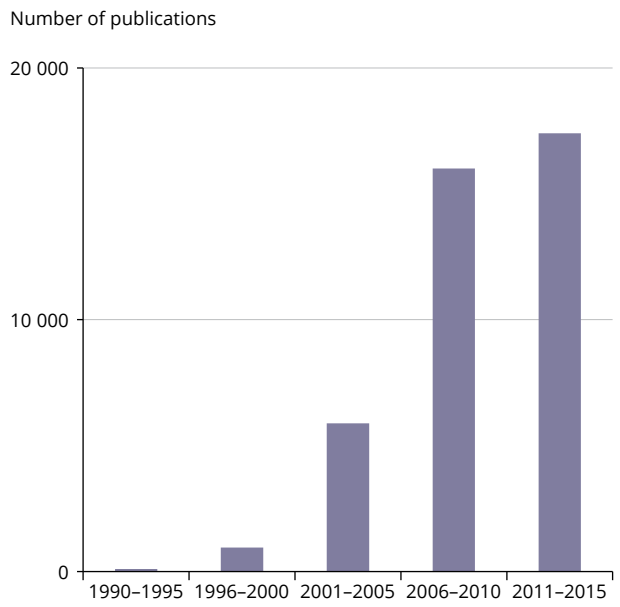
Source: Corine land cover, 2000 and 2006; Natura 2000 database, 2012.

5.6 Literature review

There is an extensive literature on protected areas (see, for instance, EEA (2012a)) that, particularly since 2000, includes Natura 2000 (see Figure 5.21). The published studies on Natura 2000 cover a very wide range of themes, including ecological, sociological, political and legal aspects (Popescu et al., 2014).

Measuring the ecological effectiveness of any network of protected areas is difficult, and there have been very few published studies of international networks (Kleijn et al., 2014). It is rare to find any baseline data, and it is very difficult to find controls. Also, as many sites have two or more designations (for example, many Natura 2000 sites are also protected under national legislation as nature reserves or national parks), it is very difficult to assign any measured change to a particular designation or other conservation measure. Even when populations of species protected by Natura 2000 are increasing, it is difficult to know if this is due to Natura 2000 or other measures. For example, the Spanish Imperial Eagle (Aquila adalberti) listed in Annex I of the Birds Directive and present in some 90 SPAs in Spain and Portugal was close to extinction in the 1960s, but has since recovered and there are now more than 300 breeding pairs. This recovery was partly due to protected areas which were managed for this species, but also to the stopping of persecution (Deinet et al., 2013).

Figure 5.21 Number of Natura 2000 publications, per 5-year period (based on a Google Scholar search for 'Natura 2000')



Source: Google Scholar (accessed 25 November 2014).

A recent review by the ETC/BD on papers published since 2006 which are relevant to assessing the ecological effectiveness of the network found almost 150 papers. The review only covered publications in English, but found that most studies concerned either all of the EU (36% of publications) or one of the countries of southern Europe (30% of publications, mostly from Italy and Spain). Popescu et al. (2014) in a wider-ranging review, covering a longer period, also found a large proportion of publications from Italy and Spain. Studies typically cover a single species or habitat group (e.g. insects or wetlands) and a single country, although some do cover the entire EU. Publications on ecological effectiveness can be divided into two major groups: ecological requirements (including 'gap' analysis), and ecological condition (see Table 5.4).

'Gap analysis' is a well-established approach, and it has been widely applied to protected area networks including Natura 2000; the majority of publications on the ecological effectiveness of Natura 2000 use this approach. Within the conservation context, the Convention on Biological Diversity defines gap analysis as 'an assessment of the extent to which a protected area system meets protection goals set by a nation or region to represent its biological diversity'. In short, gap analyses determine ecological effectiveness based on whether the site or network of sites provide the necessary requirements or coverage of a species/

Table 5.4 A typology of assessments of ecological effectiveness

Type of assessment		Criteria to define ecological effectiveness
Measuring the delivery of ecological requirements	Representation gap analysis	Meets geospatial requirements: Does the geospatial coverage of protected areas/ protected area systems (PAs) sufficiently represent a given species/habitat to ensure its long-term survival?
	Ecological gap analysis	Meets ecological requirements: Does the geospatial coverage of PAs include adequate ecological conditions and/or account for species movements necessary for long-term species/habitat survival?
Measuring ecological condition	Conservation status analysis	Favourable conservation status, as defined by the Habitats Directive, is ensured: In what condition are species (individuals or populations) or habitats and what have PAs contributed to this state?

habitat for achieving favourable conservation status in the long term. The second approach is to examine the conservation status (or similar measure such as Red List status or population trends) of the species or habitats being studied. A widely cited example of this approach is Donald et al. (2007), who demonstrate that European policies, including Natura 2000, have benefited birds. There are many studies of the role of Natura 2000 in protecting non-target species, i.e. those not listed on the annexes of the Habitats Directive or birds other than those considered 'SPA trigger species'.

In an assessment of protected areas in England, Lawton et al. (2010) proposed the following criteria to assess resilience and coherence of an ecological network:

- the network supports the full range of the area's biodiversity;
- the network and its component sites will be of adequate size;
- the network sites will receive long-term protection and management;
- sufficient ecological connections will exist between sites;
- sites will be valued by and be accessible to people.

These criteria would form a good foundation for an examination of Natura 2000.

5.6.1 Annex I habitats

Published gap analyses of Annex I habitats show that marine habitats offshore (beyond 12 nautical miles from the coast) are underrepresented (Evans et al., 2011; EEA, 2013a) while, as with other protected area networks, lowland habitats are in general underrepresented (Metzger et al., 2010). The impact of Natura 2000 in maintaining or restoring Annex I habitats at favourable conservation status is not clear, with contradictory studies existing. For example, Lawton et al. (2010) demonstrated an improvement in the conservation status for English habitats, while Iojă et al. (2010) showed no improvement for Romania, although as Romania only joined the EU in 2007, this may not be surprising. Restoring habitats often takes many years, especially for habitats such as forests; in some cases, protected areas, although effective in preventing change of land use, cannot address pressures such as climate change on habitats like palsa mires and glaciers (both unfavourable-bad in all regions). Even when a functioning habitat has been restored, it may not have the same species composition of non-disturbed stands. For example, Mossman et al. (2012) showed that although many species typical of salt marshes were present after only 1 year following habitat creation or restoration, even after many years (25 to 131 years), the species composition was not the same as on reference sites.

There is evidence that Natura 2000 prevents changes in land use. Kallimanis et al. (2014) studied land use changes between 2000 and 2006 using Corine Land Cover data within and outside Natura 2000 sites across the EU. Cover by forest and semi-natural areas (e.g. grasslands) increased within the network, but decreased outside it, while the opposite was found for urban and agricultural areas. The authors suggest this was due, at least partly, to EU conservation measures such as Natura 2000. Similarly, Maiorano et al. (2008) found that in Italy, protected areas (including Natura 2000) have been effective at protecting their habitats, even in regions of major changes in land use, from 1990 to 2000. They also found that large sites were more effective than small sites.

5.6.2 Birds

There have been relatively few published gap analyses of the network of SPAs. Albuquerque et al. (2013) examined the distribution patterns of 495 bird species (i.e. the majority of species), and found a poor association between SPAs and areas rich in species diversity, and poor coverage with partial gaps for some Annex I species. A study of Bonelli's Eagle (*Aquila fasciata*) suggested that the SPA network is not sufficient to adequately protect this Mediterranean species (López-López et al., 2007). In Romania, Sandor and Domsa (2012) reported that large proportions of some Annex I species were outside the Natura 2000 network. There is some evidence that larger sites are more effective both for target and non-target bird species (Abellán et al., 2011; Pellissier et al., 2013). There is no equivalent for the Natura 2000 biogeographical seminars to examine sites designated as SPA and identify gaps in the network, although the European Commission has taken legal proceedings against many Member States for lack of appropriate site designations.

As noted above, Donald et al. (2007) found that Natura 2000 had a measurable and positive impact on bird conservation in the EU when they compared population trends before and after 1990, between Annex I and non-Annex I species within the EU, and between Annex I species in the EU and the same group of species outside the EU. Although there was no difference in population trends within or outside the EU before 1990, between 1990 and 2000, Annex I bird

species in the EU had higher population trends than the same species outside the EU. There was no difference for non-Annex I species.

In France, Natura 2000 sites have been found to have mostly positive impacts on non-target bird species (Pellissier et al., 2013). Additionally, the status of common bird species with negative population trends tended to decline more slowly within protected areas than elsewhere (Devictor et al., 2007; Brodier et al., 2014). More recently, the same methodology has been used for 166 common breeding birds across Europe: 50% of the species studied showed higher abundance in Natura 2000 sites than outside, and most of these species are not SPA trigger species. This suggests that Natura 2000 is also beneficial for non-target species (see Box 5.1).

5.6.3 Species (Habitats Directive)

Although the major gaps in the coverage of Annex II species have been identified by the Natura 2000 biogeographical seminars, some have yet to be addressed (Evans, 2012; Gruber et al., 2012). Several publications highlight problems at regional or national scale, suggesting that for some Annex II species, the network is not adequate. For example, Chefaoui and Lobo (2007) suggest that the sites for the Moth *Graellsia isabelae* in Spain (conservation status reported as unknown by Spain for both Alpine and Mediterranean regions) are not sufficient to maintain its populations. Bosso et al. (2013) report that more than half the potential habitat for the beetle *Rosalia alpina*) in Italy (reported as 'unfavourable-inadequate' by Italy for all three regions) is outside Natura 2000. A study of

Box 5.1 The impact of Natura 2000 on non-target birds and butterflies

Following an earlier study on the impact of Natura 2000 on common birds in France, a study by the Museum National d'Histoire Naturelle (as a partner of the ETC/BD) used data on 166 common breeding birds from 13 national or regional (Catalonia) monitoring schemes to examine the impact of Natura 2000 on the population of these bird species. Data on 103 species of butterfly were also examined, but information was only available from 6 countries or regions, and can only be considered preliminary. Both data sets are derived from volunteer-based recording schemes (Pellissier, 2014).

The spatial variations in abundance were analysed in relation to the proportion of Natura 2000 in the landscape around the sampling sites. Half of the 166 bird species have a higher abundance when the coverage of Natura 2000 is higher, with woodland birds in particular having higher abundance (see Figure 5.22). A similar pattern was found for butterflies, although the number of 'neutral' species was higher (see Figure 5.23).

Figure 5.22 Number of bird species with a higher (Pos.), neutral or lower (Neg.) abundance with increasing Natura 2000 coverage around the survey site

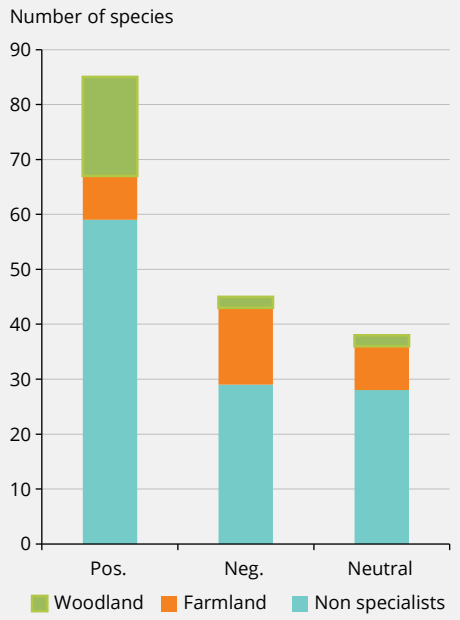
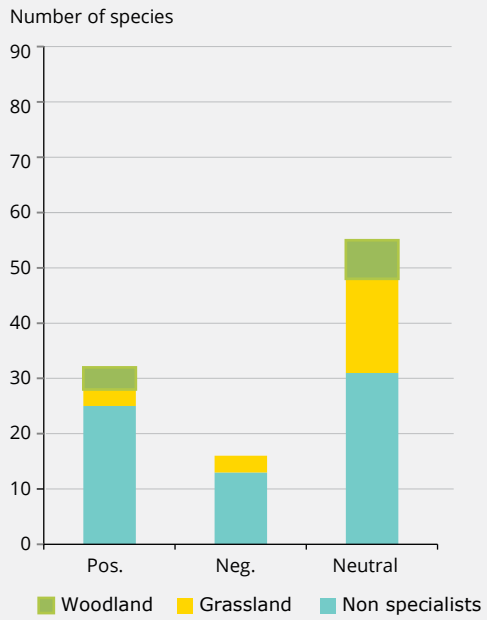


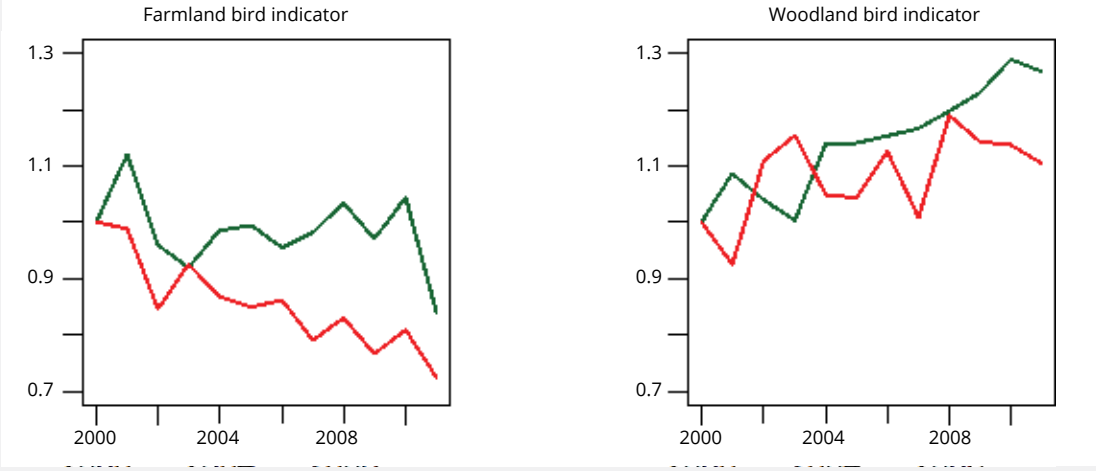
Figure 5.23 Number of butterfly species with a higher (Pos.) neutral or lower (Neg.) abundance with a larger Natura 2000 coverage around the survey site



Box 5.1 The impact of Natura 2000 on non-target birds and butterflies (cont.)

Farmland bird populations slightly decrease over the study period in the network, but they have a much steeper decrease outside it. There is no significant difference for forest birds (see Figure 5.24). There was no detectable difference in trends inside and outside Natura 2000, for either woodland or farmland butterflies.

Figure 5.24 European farmland and woodland bird indicator, within (green line) and outside (red line) the Natura 2000 network



Notes: The green line indicates inside the Natura 2000 network, and the red line indicates outside the Natura 2000 network.

There were other important survey findings.

- Species with more abundant populations within Natura 2000 than outside it are more often specialist species than generalist species.
- Bird species communities within Natura 2000 have longer trophic chains and are less biologically homogeneous than outside it. Thus, bird communities appear to be more functional within Natura 2000 than outside it.

wetland species across Europe by Jantke et al. (2011) found that most of the 70 Annex II species examined were adequately covered by Natura 2000, but suggested that additional sites would be beneficial for five species.

The coverage of non-target species seems to vary between groups, and possibly between regions of Europe. Trochet (2013) found good coverage of Red Listed mammals and reptiles by Natura 2000, but also found that fish species were poorly covered. Other non-target groups which are poorly covered by Natura 2000 include Spanish freshwater macro-invertebrates (Sánchez-Fernández et al., 2006; Hernández-Manrique et al., 2012) and Mediterranean lichens (Rubio-Salcedo et al., 2013). Abellán and Sánchez-Fernández (2015) found that while nationally designated sites gave the same coverage of amphibians and reptiles as a random selection, Natura 2000 covered significantly more than a random selection.

There has been no published study comparable to Donald et al. (2007) for species protected by the Habitats Directive; however, Deinet et al. (2013) give an overview of 18 mammals with positive population trends. Eight are listed in Annex II, and certain subspecies of another two. For some of these species, although the population trend is positive, the species are still far from attaining favourable conservation status, e.g. the Iberian Lynx (*Lynx pardinus*). Van der Meij et al. (2014) report that 9 of 16 species (many Annex II, all Annex IV) of bat studied across 24 European countries had positive population trends, and only 1 was negative. In both of these studies, as noted above, it is difficult to know if Natura 2000 is responsible for the positive population trends, as

most of the species are also listed in Annex IV and/or protected by national legislation.

Pellissier et al. (2014) examined the population trends of 103 species of butterflies, mostly not listed in Annex II, using data from citizen science-based monitoring schemes in six countries. While 32 species have higher abundance in areas with high cover by Natura 2000, 16 show lower abundance, and 55 showed no response to the network (see Box 5.1).

Many publications discuss the limitations to such studies; the most frequently cited problem is the absence of reliable data, particularly when covering long periods of time. The resolution of data also causes problems, as distribution data are often available only at coarse scales such as 50 km x 50 km grids.

5.6.4 Factors influencing the ecological effectiveness of the Natura 2000 network

In order to be fully effective as a 'coherent European ecological network', sites must be managed appropriately, and there is evidence to suggest this is not always the case for a variety of reasons (Kati et al., 2014). As already mentioned, lack of reliable information can be a problem, particularly for 'less charismatic species' (e.g. bryophytes, many insects and molluscs) and is often accompanied by insufficient exchanges between researchers, policymakers and site managers (Henle et al., 2014; Grodzinska-Jurczak et al., 2014; Müller and Opgenoorth, 2014). Inadequate resources (personnel, administrative and financial) is noted as an important factor leading to ineffective management for some countries, for example Greece (Apostolopoulou and Pantis, 2009; Apostolopoulou et al., 2012) and Romania (Iojă et al., 2010).

Conflicts between conservation and economic interests are frequently mentioned, often together with a lack of support by local administrations. For example, Grodzinska-Jurczak and Cent (2011) note that local authorities in Poland are often worried by the impact of Natura 2000 on economic and infrastructure development. In Greece, Apostolopoulou and Pantis (2009) discuss the lack of clear policy leading to 'bureaucratic interpretations of conservation objectives and distortion of decision processes in favour of satisfying economic and development interests'. In some cases, multiple designations, each with their own aims, can be a problem.

Lack of appropriate management is particularly important for the many semi-natural habitats noted in Annex I, and for the species which depend on these habitats; these are often dependent on extensive agriculture (Halada et al., 2011). Heywood (2014) notes that 'no adequate conservation measures have been taken or are planned' for many plants listed in Annex II. However, management alone may not be sufficient: a study of Annex I semi-natural habitats (dunes, fens and grassland) in Danish Natura 2000 sites showed that even when grazed, there was a change in species composition favouring more competitive plant species as a result of atmospheric nitrogen deposition (Timmermann et al., 2014). Several publications suggest that the importance of low-intensity agriculture and forestry is not reflected in national policies or site management (e.g. Maiorano, Falcucci and Boitani, 2006; Miklín and Čížek, 2014).

There is some evidence of the need for better coordination between different sectors, for example the Joint Nature Conservation Committee JNCC (2014) note that a compartmentalised approach fails to address the role of terrestrial ecosystems on the coastal and marine environment, with particular consequences for migratory species that use both marine and freshwater habitats.

The scientific literature appears to address problems more often than success; Popescu et al. (2014) note 28 examples of negative conclusions, but only 11 of positive conclusions in their literature review. Almost half of their negative conclusions concern inadequate policy or poor social acceptance of Natura 2000.

5.6.5 Natura 2000 and climate change

Climate change is relatively infrequently reported as a pressure or threat in the 2007-to-2012 Article 17 reports (in 3% of habitat and 2% of Member State species assessments it is reported as a pressure, and 5% and 4%, respectively, as a threat); land use changes are considered more important. However, there is a large and growing literature on the impact of climate change on protected areas, including Natura 2000. To date, research has focused on a few species groups (vascular plants, insects and birds), and relatively little on habitats (Ellwanger, Ssymank and Paulsch, 2012; Jaeschke et al., 2014) and studies using modelling are more common than those describing observed changes.

Although the impact of climate change on the network's connectivity is predicted to be rather small (Mazaris et al., 2013), the literature demonstrates that climatic shifts will affect habitats and species, and in some cases shifts in distribution can already be observed (Hardy et al., 2014; Hickling et al., 2006; Parmesan, 2006). In particular, species and habitat range shifts and population declines due to climate impacts are predicted

to negatively impact the effectiveness of the Natura 2000 network across the EU (Gardiner et al., 2007; Normand, Svenning, and Skov, 2007; D'Amen et al., 2011; Araújo et al., 2011; EEA, 2012b; Ellwanger, Ssymank and Paulsch, 2012). Of particular concern is the possibility that many Natura 2000 sites will become unsuitable for the species for which they have been designated (Brambilla et al., 2014), although it is possible they may be colonised by other Annex II species.

Coastal and freshwater habitats, bogs, mires and fens, and alpine habitats are expected to be the most vulnerable habitats groups within the Natura 2000 network; highly affected species groups include amphibians and fish, but potentially also many invertebrates ([49]) (EC, 2013a). For both habitats and species, climate change is expected to affect not only those that currently have an unfavourable conservation status, but also those that are considered favourable today. Anecdotal evidence on the envisioned effects of climate change on selected species and habitat types within the network is provided in Box 5.2 below.

Several recommendations for adapting the Natura 2000 network to climate change are included in Box 5.2. The European Commission (2013) also published a targeted guidance document specifically on climate change and Natura 2000, to optimally address the impacts of climate change in managing the network's protected sites. The necessity of including surrounding landscapes in vulnerability assessments and management decisions (i.e. ensuring connectivity), in order to maximise the ability of species and habitats to adapt to climate change, is noted in several publications.

Additional sources from the literature complement these recommendations and suggest the following:

- creation of additional policy or changes to existing policy (Araújo et al., 2011);
- designation of new sites (D'Amen et al., 2011);
- flexibility of site designation, and targeted management based on habitat and species range change (i.e. adaptive management) (Mazaris et al., 2013; Gies and Albrecht, 2013),
- the creation of site restoration plans (Verschuuren, 2010).

Box 5.2 Potential effects of climate change on selected species and habitat types within the Natura 2000 network

In England, Gardiner et al. (2007) found that sea level rise driven by climate change threatens several coastal habitat types from the Habitats Directive. Local compensation for the loss of these habitats is possible through the protection of similar habitats (e.g. lost coastal grazing marshes are compensated with fluvial grazing marshes), though habitat functionality may change (Gardiner et al., 2007). This will have an effect on the species dependent on these habitats.

Papanikolaou et al. (2014) evaluated the projected performance of the Natura 2000 network against future changes, focusing on grassland ecosystems and a group of species sharing similar traits. The findings indicate that the efficiency of the network regarding grassland avian fauna will be severely affected by climate and land use changes. Model projections further show a substantial reduction of grasslands within Natura 2000, suggesting that the current the Natura 2000 network configuration may be insufficient to protect grassland birds in upcoming years. Therefore, it is suggested that additional protected areas be established that could sufficiently protect grasslands, and reduce the danger of range contractions and local extinctions to their species.

The potential effect of temperature increases on the distribution of Pygmy Owls (*Glaucidium passerinum*) and Boreal Owls (*Aegolius funereus*) was explored in the Italian Alps, as was the relative effectiveness of the Natura 2000 network at regional level (Brambilla et al., 2014). The study concluded that the potential regional distribution of both species will be greatly reduced (boreal owl by 52% to 54%, and pygmy owl by 23% to 34%), given the particular vulnerability of mountainous habitats. While the network currently covers over 30% of suitable sites for these species, a significant 64% of suitable sites in future scenarios are not included in any SCIs or SPAs. As has been previously mentioned, increased network coverage and ensuring sufficient forest management outside the Natura 2000 sites will be necessary to conserve these species in the future.

([49]) For many invertebrates (with the exception of butterflies, dragonflies, moths, for instance), not much is known about their response to climate change, due to limited knowledge about their ecology or their present distribution (EC 2013a).

Adapting the Natura 2000 network to climate change based on current policy requires voluntary action by the Member States, which may not be timely or ambitious enough (Verschuuren, 2010).

There is evidence that protected areas enhance the resilience of the populations of species of conservation interest (Virkkala et al., 2014) while protected areas, including Natura 2000, act as establishment centres for species which are changing their distribution as a response to changing climate (Hiley et al., 2013). Appropriate management of protected areas can also help maintain populations (Lawson et al., 2014).

Climate change is not acting in isolation, and there is some evidence for species and habitats benefiting from warmer climates (it allows them to increase their range), while at the same time being affected by land use changes, for example moths in the United Kingdom (Fox, 2013) and forests in Norway (Penniston and Lundberg, 2014).

5.6.6 Conclusions

There is a large and growing literature on many aspects of Natura 2000, although it focuses on problems rather than successes. The network adequately covers the terrestrial species and habitats listed on the two directives, although in places the network could be improved; the marine part of the network is far from complete. The network also helps protect a large number of other species, though their coverage varies widely. Although the role of Natura 2000 in improving the status of birds has been clearly shown, there are no similar studies for habitats or non-bird species. There is a clear need for better and more regular monitoring of the habitats and species covered by the two directives.

Many publications stress the need for appropriate management and the necessary knowledge, and this is clearly a challenge if the EU 2020 Biodiversity Strategy targets are to be met. Although climate change is not having a major impact at present, it is expected to have an increasing impact in the future, and many authors propose measures to 'future proof' the network.

6 Measuring progress in implementing the EU 2020 Biodiversity Strategy

The EU 2020 Biodiversity Strategy includes 6 targets and 20 actions. Two of the targets make specific mention to species and habitats conservation status: Target 1 addresses nature conservation objectives through proper implementation of the nature directives, and Target 3 aims at increasing the contribution of agriculture and forestry to maintaining and enhancing biodiversity. Progress in the implementation of the EU Biodiversity Strategy will be assessed as part the midterm review report due to be published in the second half of 2015 by the European Commission.

This chapter provides quantitative elements in support of assessing progress under Target 1 and Target 3, using the EU biogeographical assessments of habitat types and species listed in the Habitats Directive and the EU population status assessments of bird species from the Birds Directive.

Regarding the Habitats Directive component of Target 1, it seems that very little progress can be noted: no real changes in the number of favourable assessments (16.4% for habitats and 22.7% for species ([50])) and only small improvements for unfavourable assessments (4.4% for habitats and 4.7% for species. In addition, significant proportions of the unfavourable assessments have further deteriorated (30% for habitats and 22% for species); even higher proportions of unfavourable assessments did not improve or deteriorated (42% for habitats and 33% for species).

Regarding the Birds Directive component of Target 1, it appears that little progress was achieved: there are no additional secure assessments (these remained at 52% of the total), and the number of improved assessments only accounts for 8% of non-secure assessments. In addition, over 16% of bird species have both short-term and long-term population trends that are declining.

Concerning Target 3 (Agriculture), habitats and species from the Habitats Directive related to 'agricultural ecosystems' ([51]) are doing worse than those related to other terrestrial and freshwater ecosystems and there is no real improvement in their conservation status. Only 11% of habitat assessments and 20% of species assessments are favourable; among the unfavourable habitats and species, only 4% (for both habitats and species) have improved, while 39% of habitat assessments and 22% of species assessments have deteriorated, and over 40% neither improved nor deteriorated. Near half (48%) of the bird species from the Birds Directive associated with the agricultural habitats have a secure status; 8% are not secure but improved, and 28% are not secure and have deteriorated.

For Target 3 (forestry), habitats and species from the Habitats Directive related to the 'woodland and forest ecosystem' (see Chapter 4) have similar conservation status as all other habitats and species, and habitat types have worse status than species. While 15% of habitat assessments and 26% of species assessments are favourable, 80% of habitat assessments and 60% of species assessments are unfavourable. Of the unfavourable assessments, only 3% of habitats and 6% of species have improved, 28% of habitats and 17% of species have deteriorated, and around 40% neither improved nor deteriorated. Almost two-thirds (64%) of the bird species from the Birds Directive associated with the woodland and forest habitats hold secure status, 7% are not secure but improved, and 13% are not secure and have deteriorated.

The following sections provide further details and illustrate the above results with graphs and tables.

6.1 Measuring progress to Target 1

Target 1 concerns nature conservation and restoration, and is based on improving the conservation status of species covered by the Habitats Directive and species covered by the Birds Directive.

([50]) The figure was 17% from 2001 to 2006, but this was most likely underestimated, due to the high proportion of unknown assessments (see Section 6.1.1 and Box 6.2 for details).
([51]) Cropland and grassland from the MAES ecosystem typology (see Chapter 4).

Box 6.1 Target 1

The target 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:

(a) 100% more habitat assessments and 50% more species assessments under the Habitats Directive show (a favourable or) an improved conservation status;

(b) 50% more species assessments under the Birds Directive show a secure or improved status.

To quantitatively measure this target, a methodology was developed by the Expert Group on Reporting under the Nature Directives and further validated by the Group of Experts on the Birds and the Habitats Directive ([52]). It is based on a changes matrix which displays the different possible combinations of changes in EU conservation status assessments (for Article 17) between the two reporting periods (i.e. 2001 through 2006, and 2007 through 2012), or changes in bird population status (for Article 12) since 2004 when *Birds in the European Union* (BirdLife, 2004) was published.

6.1.1 Habitats Directive

The target requires that 50% more species are either favourable or improving, and that 100% more habitat types are favourable or improving, as compared to the 2001–2006 reporting period.

From 2001 through 2006, 17% of both habitat and species assessments were favourable, so Target 1 requires that by 2020:

- 34% or more of habitat assessments be favourable or improving;
- 25% or more of species assessments be favourable or improving.

To assess progress to this target, it is necessary to identify the assessments which:

- are favourable for 2007 through 2012, or
- have improved compared to the 2001 to 2006 period.

The possible combinations of changes between the two reporting rounds are shown in Table 6.1; these include changes between conservation status categories (e.g. from U2 to U1) and changes within the unfavourable categories (positive or negative). Each EU biogeographical or marine region assessment was assigned to one of the five change classes by the assessor when the EU regional assessment was made. When comparing assessments between the two periods, assessors were asked to take into account the nature of change (see Table 3.5) as reported by Member States, and if the change was non-genuine, to 'backcast' the assessment from the first reporting round, in order to make comparisons more reliable.

Table 6.1 Matrix for measuring progress under Target 1

Change in conservation status between reporting periods		Conservation status (2007–2012)							
		FV	U1 +	U1	U1 –	U2 +	U2	U2 –	XX
Conservation status (2001–2006)	FV	A (=)	C (–)	C (–)	C (–)	C (–)	C (–)	C (–)	E (x)
	U1	A (+)	B (+)	D (=)	C (–)	C (–)	C (–)	C (–)	E (x)
	U2	A (+)	B (+)	B (+)	B (+)	B (+)	D (=)	C (–)	E (x)
	XX	A (=)	B (+)	D (=)	C (–)	B (+)	D (=)	C (–)	D (=)

Notes: The signs in parentheses indicate the type of change in conservation status between the two reporting periods: (=) no change, (+) improvement, (–) deterioration, (x) not known.

Note that 'A' indicates 'favourable' assessments, 'B' 'improved' assessments, 'C' 'deteriorated' assessments, 'D' unfavourable and unknown assessments that did not change, and 'E' assessments that became 'unknown'.

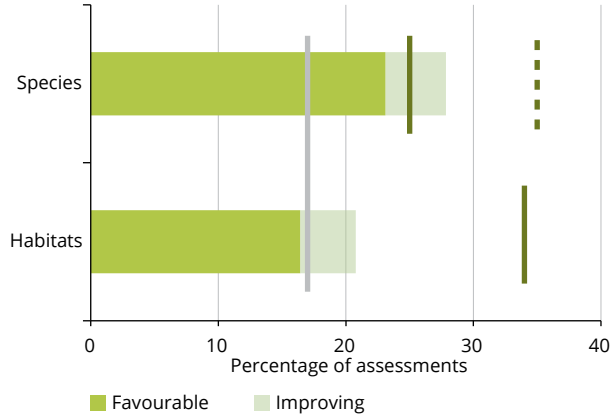
([52]) See Measuring progress under Target 1 of the EU biodiversity strategy, at https://circabc.europa.eu/sd/a/7591acf1-746f-49ff-b162-84e08874ee1f/Point%203%20-%20Measuring%20progress%20target%201-v%205.pdf.

As shown in Table 6.2, overall, 21% of habitat assessments and 28% of species assessments are favourable or improving.

Figure 6.1 shows the comparative results of assessments between the two reporting periods against Target 1, as indicated by the vertical green bars.

Target 1 for species has already been reached, as 28% of species assessments are either favourable (23%) or have improved (5%); the target is 25%. However, this apparent progress is mostly due to changes resulting from better data or changes in methodology: for example, many species previously assessed as unknown are now favourable, see Box 6.2 on 'backcasting'. In reality, and taking into account the genuine changes in conservation status, over 99% of the favourable assessments for species in the 2007–2012 period were already favourable in the 2001–2006 period; this means that only 0.4% (11 assessments) truly changed from unfavourable to favourable (see Table F.1 in Annex F).

Figure 6.1 Progress in meeting the 2020 target for habitats and species of the Habitats Directive: proportion of EU regional assessments that are favourable or improving



Notes: The vertical green bar indicates the target (34% for habitats and 25% for species) and the grey bar the proportion in 2001–2006 (17% for both species and habitats); the dashed green line for species indicates the target adapted for species (35%), to take into account a more accurate baseline of 23% (see Box 6.2 below).

Source: EEA, 2015b, Article 17 reports and assessments.

Habitat types show that over 16% of assessments are favourable and over 4% have improved. This means that only 21% reached a target condition; the 2020 target is 34%. It is widely recognised that restoration of habitats can often take a long time: for example, restoring forests to a more favourable age structure could take many decades.

However, and as shown in Table 6.2 and Figure 6.2, a large number of unfavourable assessments showed further deterioration from 2001 to 2012: over 30% for habitats and near 22% for species. A very high percentage of unfavourable assessments did not show either an improvement or a deterioration — over 42% for habitats and more than 33% for species. The number of unknown assessments decreased for both habitats and species, but it is still very high, particularly for species (17%).

In comparing the conservation status of habitats from the two reporting periods at the EU biogeographical level (see Figure 6.3), the following points are observed:

- all of the assessments favourable in the 2007–2012 period were already favourable in the 2001–2006 period, indicating that no assessments became favourable during the most recent reporting period;
- the majority of unfavourable-inadequate assessments (68%) and approximately a third of the unfavourable-bad assessments (35%) did not change between the reporting periods;

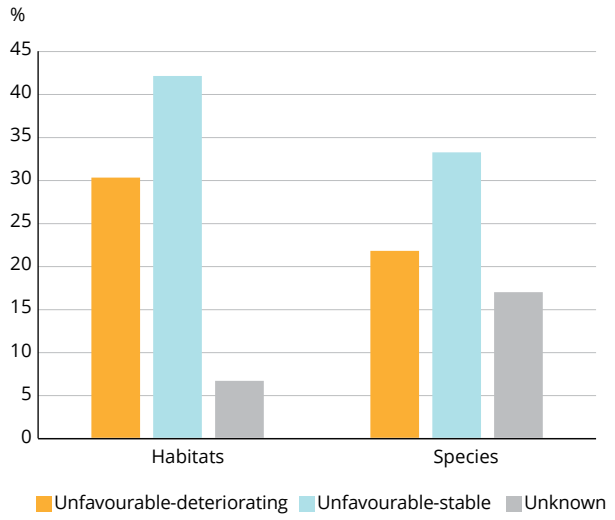
Table 6.2 Proportion of habitats and species in each change class, including favourable assessments

Type of change	Habitats		Species	
	No of assessments	% of assessments	No of assessments	% of assessments
A (favourable)	132	16.4	616	23.1
B (unfavourable-improving)	35	4.4	126	4.7
C (unfavourable-deteriorating)	244	30.3	582	21.8
D (unfavourable-stable)	339	42.2	887	33.3
D (unknown-no change)	46	5.7	428	16.1
E (became unknown)	8	1.0	26	1.0

Source: EEA, 2015b, Article 17 reports and assessments.

- improvements were seen in 5% of the unfavourable-inadequate assessments (i.e. either from U2 to U1 or are U1+) and 7% of the U2 assessments (U2+): a total of 12%;

Figure 6.2 Proportion of unfavourable assessments that are stable or deteriorating and unknown assessments for habitats (left) and species (right) of the Habitats Directive



Source: EEA, 2015b, Article 17 reports and assessments.

- there was also a 28% deterioration in the unfavourable-inadequate assessments (from FV to U1, or are U1-) and a 58% deterioration in the unfavourable-bad assessments (U1 to U2 or U2-), as compared to the 2001–2006 period;

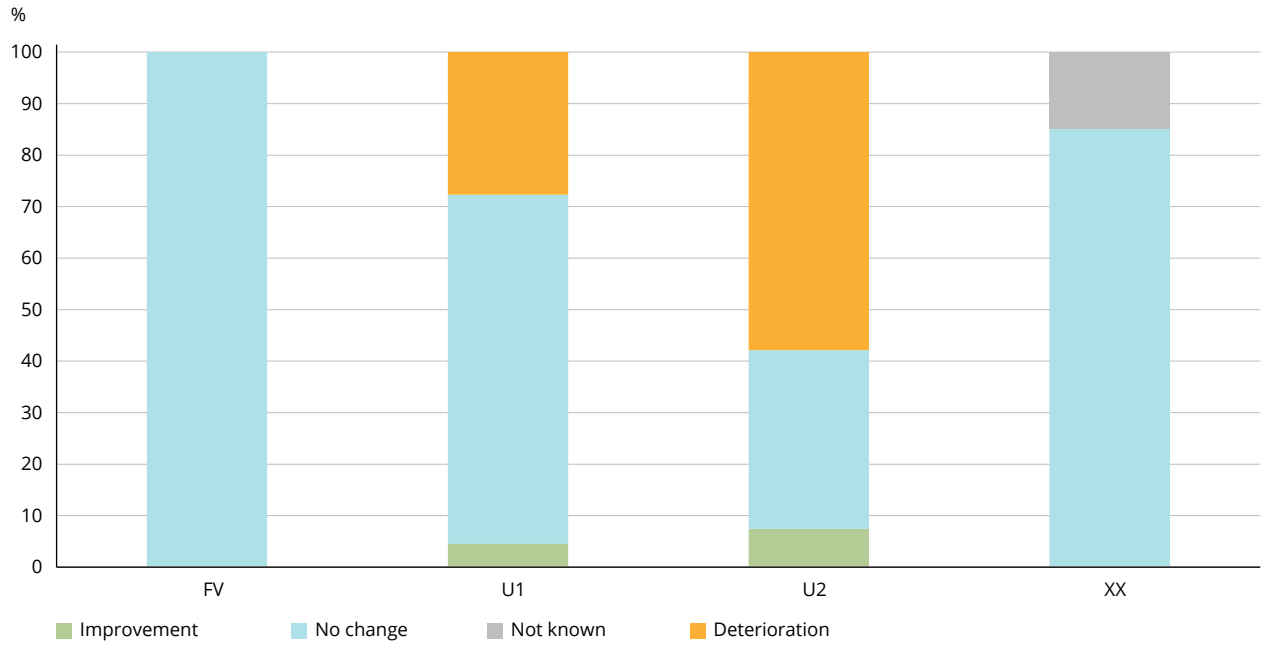
- the vast majority of the unknown assessments (85%) in the 2007–2012 were already unknown in the 2001–2006 period.

Changes in the conservation status of species from the Habitats Directive between the two reporting periods followed similar trends to those already described for habitats (see Figure 6.4).All but 2% of the favourable assessments in the 2007–2012 period were already favourable from 2001 through 2006; the rest became favourable in the most recent reporting period. Thirty assessments which are now favourable were previously unknown.

- The majority of unfavourable-inadequate assessments (62%) and unfavourable-bad assessments (42%) did not change between the reporting periods.

- Improvements were seen in 8% of unfavourable-inadequate species assessments (either from U2 to U1 or are U1+) and in 7% of unfavourable-bad assessments (U2+).

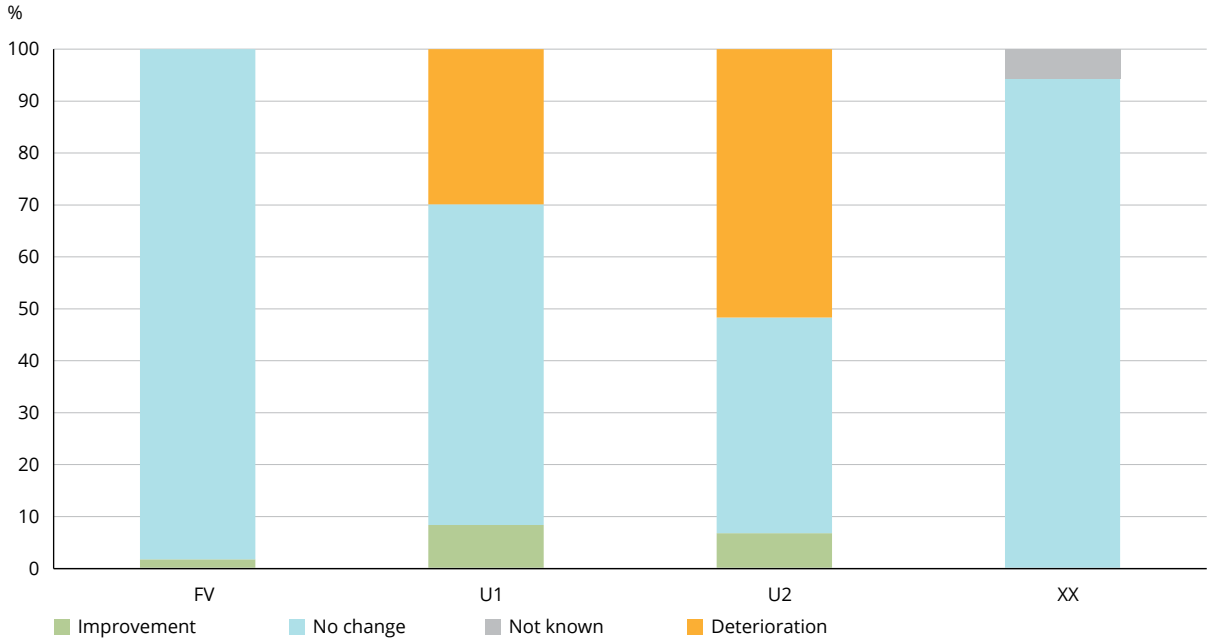
Figure 6.3 Changes and trends in conservation status of habitats between the two reporting periods for each category



Source: EEA, 2015b, Article 17 reports and assessments.

- There was also a 30% deterioration in unfavourable-inadequate assessments (from FV to U1, or are U1-) and a 52% deterioration in unfavourable-bad assessments (U1 to U2 or U2-), as compared to the 2001–2006 period.
- the vast majority of the unknown assessments (94%) in the 2007–2012 were already unknown in the 2001–2006 period.

Figure 6.4 Changes and trends in conservation status of species between the two reporting periods for each category



Source: EEA, 2015b, Article 17 reports and assessments.

Box 6.2 'Looking back at 2001 to 2006': accounting for missing data in the previous report

The majority of changes in conservation status reported by the Member States for both habitats and species were due to better data or changes in the methodology used (see Table 3.5 and Chapter 3), with many habitats and species previously reported as unknown now being reported under one of the three conservation status classes. This in turn means that many of the EU assessments for biogeographical and marine regions also changed. As the nature of change was noted by the assessor for each EU regional assessment, it is possible to identify which assessments have changed due to different methods and improved data, and to 'backcast' the previous conservation status using the new data. For example, habitats and species assessed as unknown from 2001 through 2006 would have the same conservation status as in 2007 through 2012. This is particularly important for the many habitats and species only found in Bulgaria and Romania which did not enter the EU until 2007, or for Spain, which had a high proportion of species reported as unknown from 2001 through 2006, but which now have a conservation status.

A comparison of the 2007–2012 assessments with the 'backcast' 2001–2006 assessments indicates that little has changed in terms of conservation status classes; this is not surprising, as only some 3% of changes were reported as genuine (i.e. not due to change in methods, better data, etc.).

The baseline for measuring progress to Target 1 is based on the proportion of assessments which were 'favourable' from 2001 to 2006 (17% for both habitats and species). Backcasting suggests that no change would be needed for the habitat baseline; however, the baseline for species should rather be 23%, meaning that to reach Target 1, 34.5% (23+23/2) of assessments must be favourable or improving. This means that instead of having already passed the target for species (see Figure 6.1 above), progress has been made (23% to 28%), but further improvement is still required.

Box 6.3 Natura 2000 and Aichi Target 11

Apart from the EU targets, there are also global biodiversity targets under the Convention on Biological Diversity which were agreed at the 10th Conference of the Parties in 2010 ([53]).

Target 11 is as follows.

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

In the EU, Natura 2000 already covers 18% of the terrestrial area, making a considerable contribution towards the Aichi target; when combined with national protected areas, the EU will easily meet this target. However, Natura 2000 only covers about 4% of the EU marine areas within 200 nautical miles of the coast (EEA, 2014). Given that few marine habitats and species are listed in Annexes I and II of the Habitats Directive, it is unlikely that Natura 2000 alone could meet the 10% target, but there are complimentary networks of protected areas under the regional marine conventions. Examples are the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and the Baltic Marine Environment Protection Commission (HELCOM), and many Member States have national designations as well. However at present, marine protected areas in the EU only cover some 6% of the EU marine area.

6.1.2 Birds Directive

As noted above (in Section 6.1) the target for birds is for a 50% increase in the number of species which are secure or improving. In the only EU-level assessment conducted to date for the EU-25 (BirdLife International 2004), 52% of species were assessed as secure; when this is taken as the baseline, the target becomes for 78% of bird species to be secure or improving in 2020. To measure progress towards the target it is necessary to use the data reported under Article 12: (a) to determine which species are secure, and (b) to define the conditions under which non-secure species will be classified as improving. This is very important, as many species are a long way from being secure, but some are recovering, others remain depleted and yet others are still declining.

The method used for habitats and species of the Habitats Directive cannot be used for birds, as the data available differ; however, a method using a similar logic has been agreed, as described in the paper *Measuring progress under Target 1 of the EU biodiversity strategy* ([54]).

The EU population status assessments described in Chapter 2 identify which species are considered 'secure'. Species that are 'improving' can be identified using information on changes in trend direction using both long- and short-term trends, as shown in Table 6.3. This method makes use of the national population data provided by Member States under Article 12. It combines the direction and magnitude of species trends in each country, taking into account the relative size of each national population, to produce overall short- and long-term trends at EU level. If a

Table 6.3 Identifying non-secure species which are 'improving'

Long-term EU population trend (1980–2012)	Short-term EU population trend (2001–2012)			
	Increasing	Stable/fluctuating	Declining	Unknown
Increasing	Improving	Not improving	Not improving	Not improving
Stable/fluctuating	Improving	Not improving	Not improving	Not improving
Declining	Improving	Improving	Not improving	Not improving
Unknown	Improving	Not improving	Not improving	Not improving

Note: 'Improving' species are highlighted in green.

([53]) See https://www.cbd.int/sp/targets/default.shtml.
([54]) See https://circabc.europa.eu/sd/a/7591acf1-746f-49ff-b162-84e08874ee1f/Point%203%20-%20Measuring%20progress%20target%201-v%205.pdf.

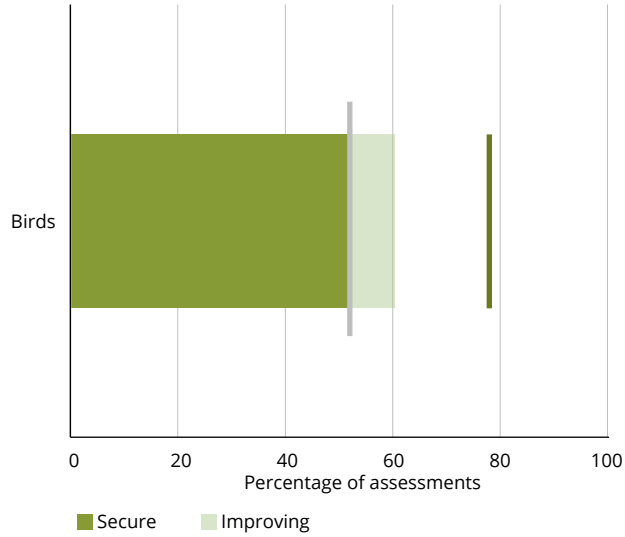
species has stopped declining but remains depleted (and is thus non-secure), it contributes towards the 2020 target, because the loss of this particular element of biodiversity has been halted (i.e. improvement). Conversely, if a species is still declining, albeit at a slower rate than previously, it does not contribute towards the 2020 target, because it represents ongoing biodiversity loss (i.e. deterioration).

As described in Chapter 2, 52% of the bird species naturally occurring in the EU (and protected by the Birds Directive) hold 'secure' status. Table 6.4 gives the number and percentage of non-secure species that are improving (8.5%) or not improving (23.9%) according to their combined short and long-term population trends. As noted in Chapter 2, no population assessment was possible for 70 species.

Adding the 8.5% of non-secure species that are improving to the 52% of species which are secure gives approximately 61% of species in the target condition (see Figure 6.5). This means that a further 17% of species need to become secure or improving by 2020, in order to meet the birds component of Target 1 (i.e. 78%).

In addition to the 16% population status assessments that are unknown, there are nearly 24% that do not meet the target condition; these include 72 species (16%) that show a combination of declining short-term and declining long-term population trends.

Figure 6.5 Progress to the 2020 target for birds (Birds Directive): proportion of EU population assessments that are secure or improving



Notes: The vertical green bar indicates the target (78%), and the grey bar the baseline used for the target (52%).

Source: EEA, 2015a, Article 12 reports and assessments.

Table 6.4 Proportion of non-secure bird species that are improving or not improving

Long-term EU population trend (1980–2012)	Short-term EU population trend (2001–2012)			
	Increasing (N° /%)	Stable/fluctuating (N° /%)	Declining (N° /%)	Unknown (N° /%)
Increasing	11 / 2.5%	3 / 0.7%	0	3 / 0.7%
Stable/fluctuating	2 / 0.4%	4 / 0.9%	5 / 1.1%	0
Declining	6 / 1.3%	19 / 4.3%	72 / 16.1%	2 / 0.4%
Unknown	0	2 / 0.4%	12 / 2.7%	4 / 0.9%

Note: 'Improving' species are highlighted in green.

Source: EEA, 2015a, Article 12 reports and assessments.

6.2 Target 3 — agriculture and forestry

Target 3 of the 2020 Biodiversity Strategy includes two sub-targets; both make reference to conservation status of habitats and species.

The sub-targets are as follows.

A) Agriculture: By 2020, maximise areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity and to bring about a measurable improvement ([55]) in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services as compared to the EU2010 Baseline, thus contributing to enhance sustainable management.

B) Forests: By 2020, Forest Management Plans or equivalent instruments, in line with Sustainable Forest Management (SFM) ([56]), are in place for all forests that are publicly owned and for forest holdings above a certain size ([57]) (to be defined by the Member States or regions and communicated in their Rural Development Programmes) that receive funding under the EU Rural Development Policy so as to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by forestry and in the provision of related ecosystem services as compared to the EU 2010 Baseline.

6.2.1 Agricultural ecosystems

Land used for agriculture covers more than two-thirds of the EU's land surface and forms a large proportion (38%) of Natura 2000 (ETC/BD 2011).

As a proxy for Target 3A (Agriculture), the following analysis considers both the cropland and grassland ecosystem types defined by MAES as 'agricultural ecosystems' (see Chapter 4 and Annex D). This is obviously an approximation, because apart from Annex I grassland habitat types of the Habitats Directive, the 'grassland' MAES category also includes some dunes, salt marshes and wooded pastures (see Section 4.2.2). On the other hand, although some heathlands depend on farming practices for their maintenance, the MAES category 'Heathlands and scrubs' is not considered under this section related to agricultural ecosystems. It should be noted that this approach thus differs slightly from that used in previous analyses performed by EEA ETC/BD or the Joint Research Centre (JRC), which were based on a list of 'habitats of European importance dependent on agricultural practices' published in Halada et al. (2011). In this list, in addition to most habitats included under the 'grassland' MAES category, a few Annex I heathland and wetlands habitat types are also considered. To allow comparisons with previously published work, assessments of conservation status and their trends based on this list is also presented (see Box 6.3).

Compared to all Annex I habitats (see Section 3.2.2), habitats included in the 'cropland' and 'grassland' ecosystems defined by MAES have a lower proportion as favourable (11% compared to 16%) and a higher percentage as unfavourable-bad (49% compared to 30%) (see Figure 6.6 (left)).

In comparing the conservation status of agricultural habitats between the two reporting periods, the following conclusions can be drawn.

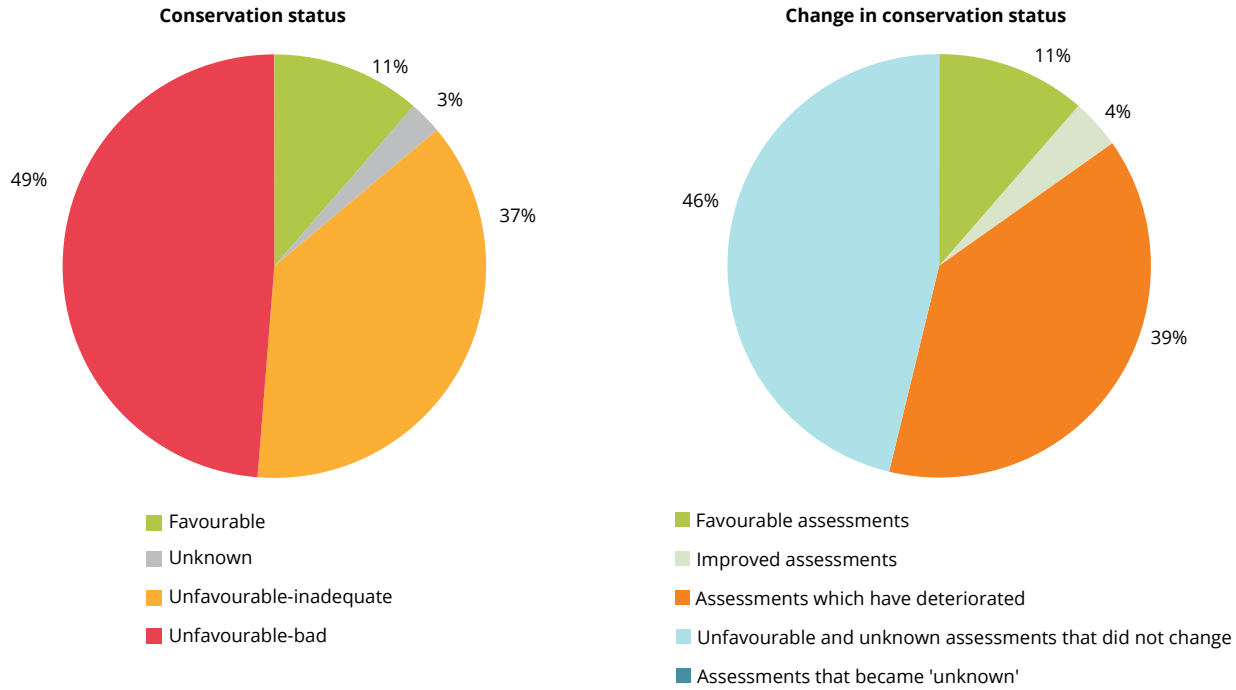
- The increase of favourable assessments, from less than 5% from 2001 to 2006 to over 11% from 2007 to 2012, is apparent, since the increase is purely due to the fact that a substantial number of assessments were unknown from 2001 to 2006 (over 30%, compared to 3% from 2007 to 2012). This means that their status is somewhat better than estimated in the 2001–2006 period, but no real improvement was noted in the 2007–2012 period.
- The vast majority of assessments remain unfavourable (over 86%), and did not change between the two reporting periods.

When assessing changes in the conservation status of agricultural habitats between the two reporting periods according to Table 6.1, almost half of assessments show no change (46%), 39% are unfavourable and getting worse (22% for all habitats), and only 4% are unfavourable and improving (see Figure 6.6 (right)).

The conservation status of habitats associated with agricultural ecosystems varies between the biogeographical regions (see Figure 6.7): the proportion of favourable assessments are particularly low in

([55]) For both targets, improvement is to be measured against the quantified enhancement targets for the conservation status of species and habitats of EU interest in Target 1 and the restoration of degraded ecosystems under target 2.
([56]) As defined in SEC(2006) 748.
([57]) For smaller forest holdings, Member States may provide additional incentives to encourage the adoption of Management Plans or equivalent instruments that are in line with SFM.

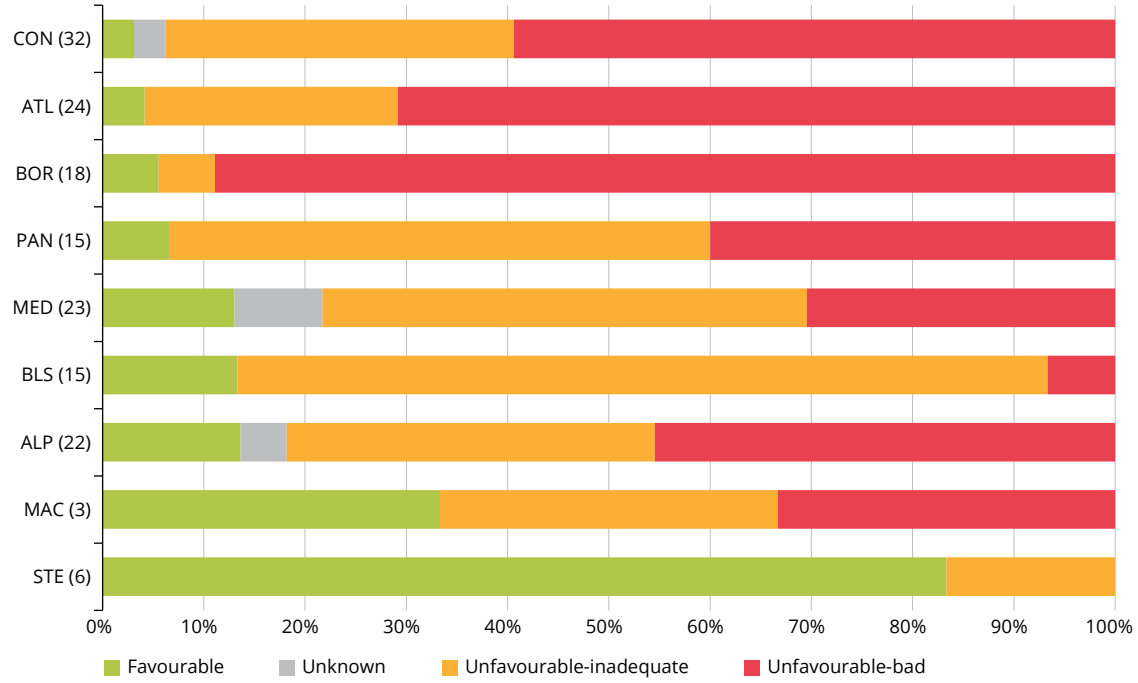
Figure 6.6 **Conservation status (left) and changes in conservation status (right) of Annex I habitats associated with MAES agricultural ecosystems (cropland and grassland). The changes are based on the classes in Table 6.1**



Notes: The total number of assessments is 158.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 6.7 **Conservation status for Annex I habitats associated with agricultural ecosystems, by biogeographical region**



Notes: The number of assessments in the region is indicated in parentheses. The total number of assessments is 158.

Source: EEA, 2015b, Article 17 reports and assessments.

the Continental (3%), Atlantic (4%), Boreal (6%) and Pannonian (7%) regions, and are above 20% only in the Macaronesian (33%) and Steppic (83%) regions, but these concern a very limited number of habitats (3 and 6, respectively). The unfavourable-bad assessments are very numerous in the Boreal (89%), Atlantic (71%) and Continental (59%) regions.

When comparing the status in the 2001–2006 period with that from 2007 to 2012 (Table 6.5 and Figure 6.8), it is also evident that the four biogeographical regions mentioned above show the highest proportion of unfavourable assessments that are further deteriorating; the figures for the Boreal (near 78%) and the Continental (50%) regions are particularly

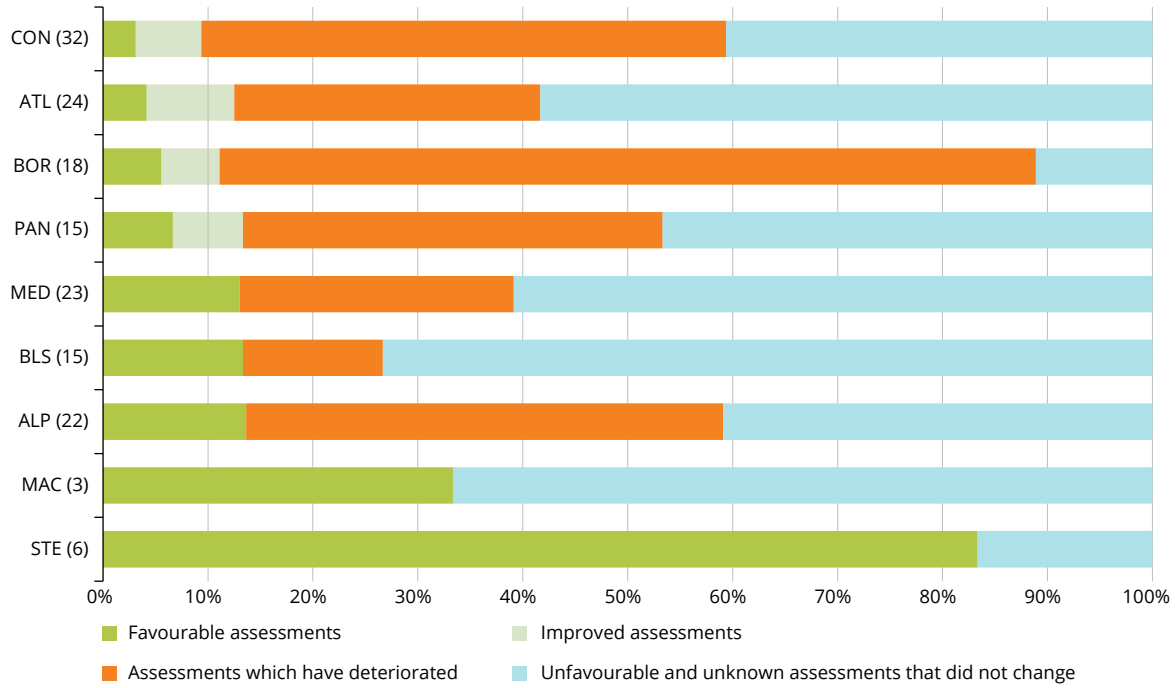
Table 6.5 Proportion of assessments of habitats associated with MAES agricultural ecosystems (cropland and grassland) in each change class, by biogeographical region

Region	Favourable assessments	Improved assessments	Assessments which have deteriorated	Unfavourable and unknown assessments that did not change	Total no of assessments
Steppic	83.3	0	0	16.7	6
Macaronesia	33.3	0	0	66.7	3
Alpine	13.6	0	45.5	40.9	22
Black Sea	13.3	0	13.3	73.3	15
Mediterranean	13.0	0	26.1	60.9	23
Pannonian	6.7	6.7	40.0	46.7	15
Boreal	5.6	5.6	77.8	11.1	18
Atlantic	4.2	8.3	29.2	58.3	24
Continental	3.1	6.3	50.0	40.6	32

Notes: The total number of assessments is 158.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 6.8 Changes in conservation status for Annex I habitats associated with agricultural ecosystems, by biogeographical region



Notes: The number of assessments in the region is indicated in parentheses. The total number of assessments is 158.

Source: EEA, 2015b, Article 17 reports and assessments.

high. The Alpine region also has a high proportion of unfavourable assessments that got worse in the 2007–2012 period (over 45%).

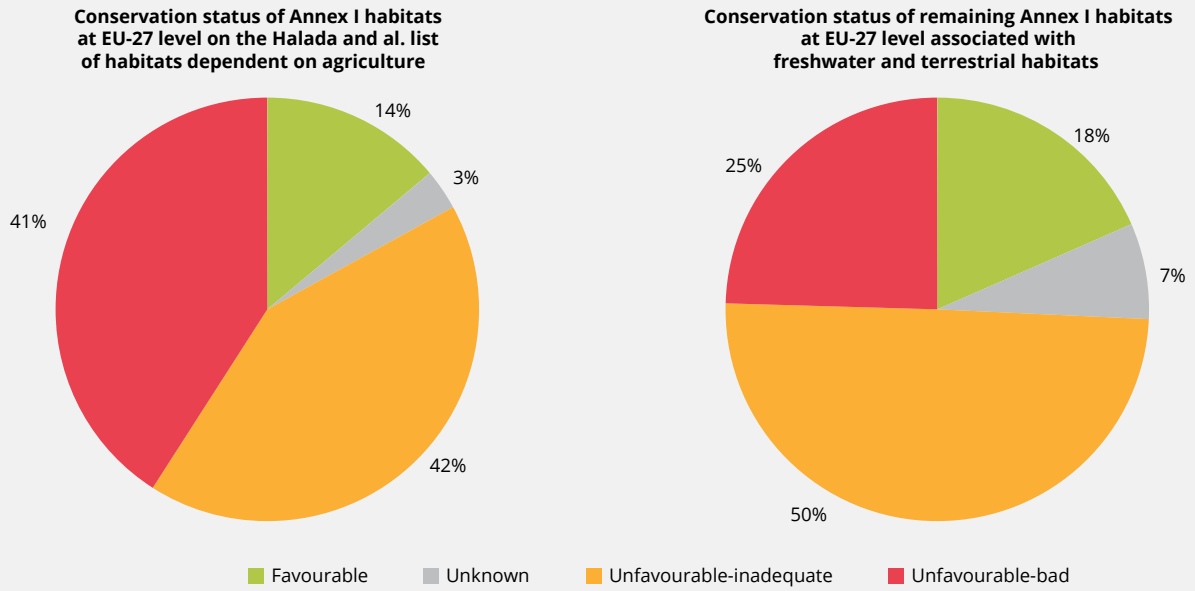
A total of 20% of non-bird species associated with MAES agricultural ecosystems are favourable, and 17% are unfavourable-bad, which is similar to the proportions for all species (23% and 18%, respectively; see Section 3.2.3). Changes in the conservation status of species from the Habitats Directive between the two reporting periods are only apparent due to the drastic reduction of unknown assessments: from near 35% from 2001 to 2006, to 16% from 2007 to 2012 (see Figure 6.10).

When assessing changes to non-bird species associated with agricultural ecosystems between the two reporting periods, according to the matrix (Table 6.1), changes are also very similar to those found for all species (see Table 6.2 above). During the reporting period (2007–2012), only a small proportion of species with unfavourable status improved (4%), and a much larger proportion is in a worse condition (22%) (see Figure 6.10 (right)). Compared to other terrestrial and freshwater habitats, agricultural Annex I habitats tend to be more unfavourable and more likely to be deteriorating; however, the same pattern is not visible for species associated with the agricultural ecosystem when compared to all others from the Habitats Directive.

Box 6.4 Conservation status and trends of habitats considered dependent on agriculture by Halada et al. (2011)

Many habitats listed in Annex I can be considered as cultural habitats which have been produced by the interaction of humans and their environment, and which depend on appropriate management for their continued existence. A first list of Annex I habitats dependent on agriculture (often as traditional management such as hay production or extensive grazing) was published by Ole Ostermann in 1998; an updated list taking account of 2004 and 2007 EU enlargement was published by the ETC/BD and EEA in 2011 (Halada et al., 2011). This list, which has been widely used by the EEA and others, includes several habitats which are not grassland in the MAES ecosystem typology, such as some forms of heath.

Figure 6.9 Conservation status of Annex I habitats on the Halada et al. list of habitats dependent on agriculture (left) and other terrestrial and freshwater habitats (right)

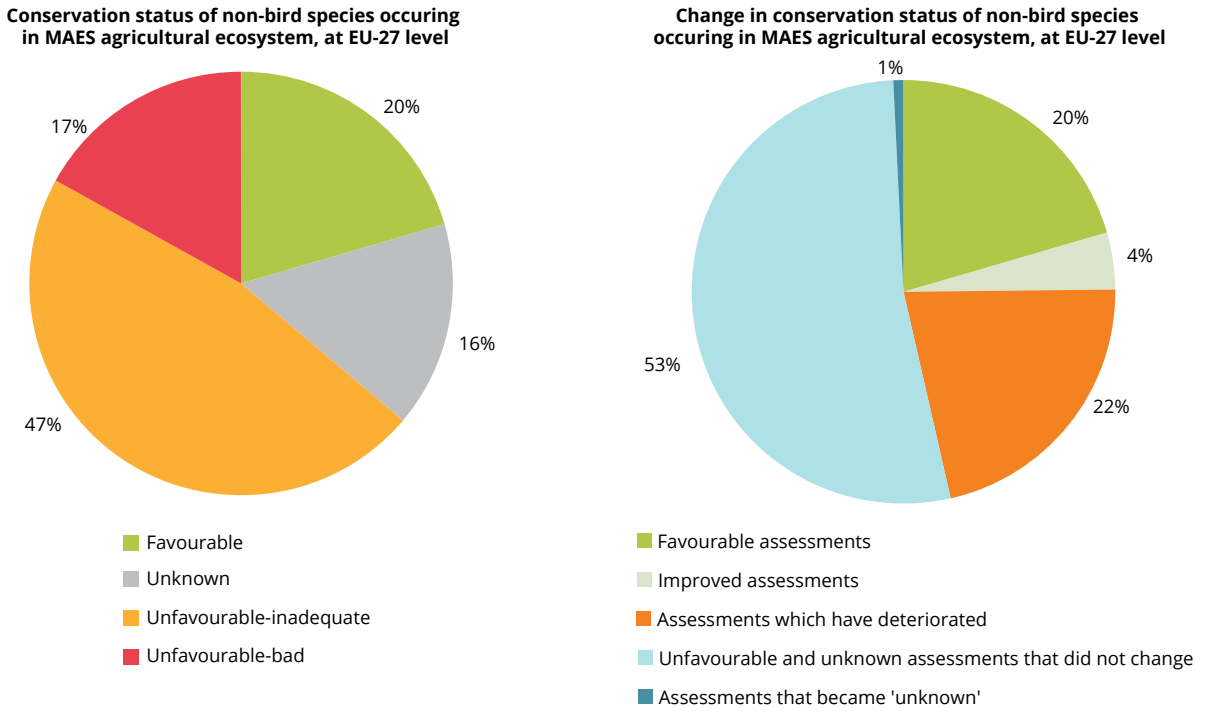


Notes: The total number of assessments is 259 for habitats dependent on agriculture, and 505 for other terrestrial and freshwater habitats.

Source: EEA, 2014, Article 17 reports and assessments.

There are fewer Annex I habitats on the Halada et al. (2011) list assessed as favourable, and many more assessed as unfavourable-bad compared to remaining terrestrial and freshwater habitats. There is considerable variation across regions: from 2001 to 2006, there were no habitats assessed as favourable in the Atlantic region, while five assessments are now favourable which were all unknown before, mostly habitats found only in Spain and Portugal.

Figure 6.10 Conservation status (left) and changes in conservation status (right) of Habitats Directive species associated with MAES agricultural ecosystems (cropland and grassland)



Notes: The changes are based on Table 6.1. Non-bird species are species from the Habitats Directive. The total number of assessments is 644.

Source: EEA, 2015b, Article 17 reports and assessments.

About 48% of bird species associated with agricultural ecosystems are assessed as secure, and 38% as non-secure (16% are assessed as threatened, and 22% as near threatened, declining or depleted) (see Figure 6.11 (left)). In addition, 28% of the non-secure species are decreasing, while only 8% are increasing and the other 1% are stable in the short term (see Figure 6.11 (right)). These figures indicate that these bird species have a worse population status compared to all bird species (see Chapter 2).

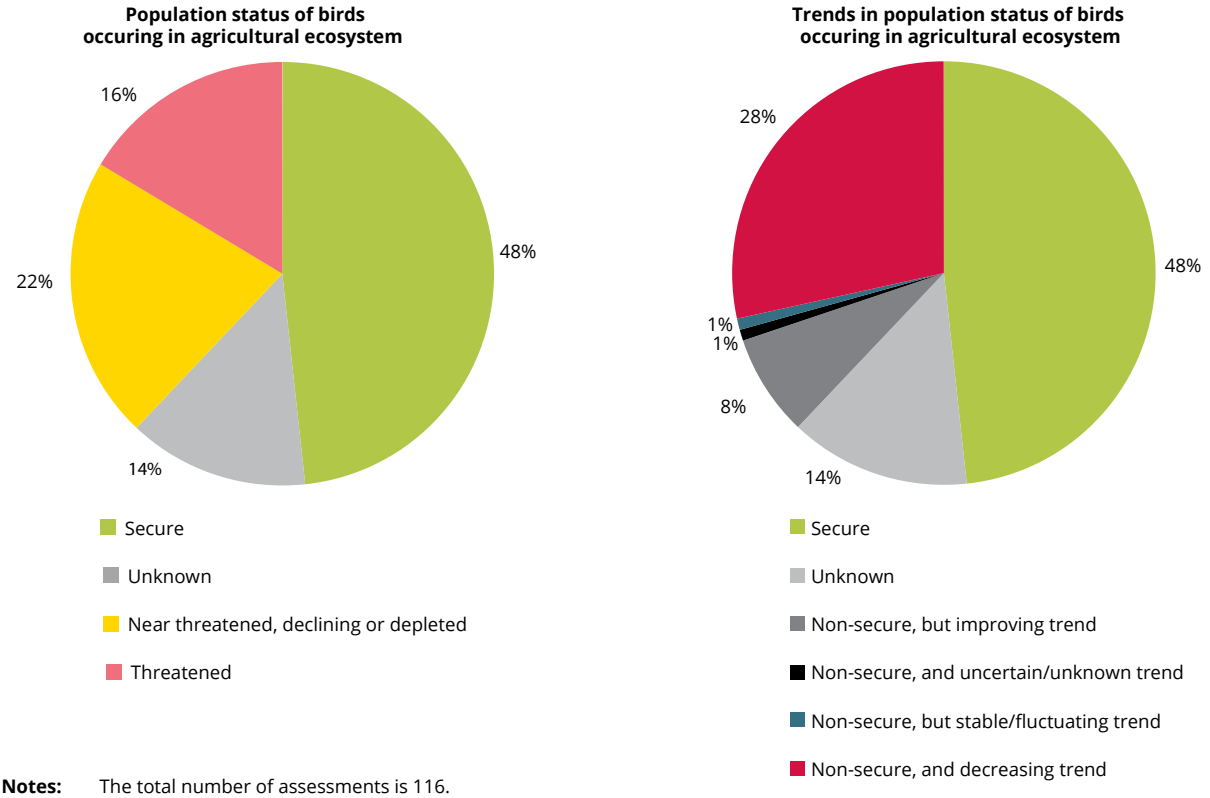
There is considerable variation between the biogeographical regions in the conservation status and trends of species associated with the MAES agricultural ecosystem (see Figure 6.12). The Black Sea and Alpine regions have more than 25% of favourable assessments, while Macaronesian, Continental, Pannonian and Steppic regions have less than 20%. All regions have more than 50% of unfavourable assessments, and the unknown assessments are particularly high in the Mediterranean and Macaronesian regions (close to 40%).

In all regions other than the Macaronesian, the number of assessments which are improving is always less than the number which are deteriorating; the largest proportion in each region (and often greater than 50%) corresponds to assessments that remained unknown or unfavourable and are not improving or getting worse (Table 6.6 and Figure 6.13).

The 10 most frequently reported 'highly important' pressures for these species are shown in Table 6.7. Not surprisingly, 4 of the 10 pressures are related to agriculture. The top five pressures for non-bird species include four of the top five 'highly important' pressures for grassland habitats (see Figure 4.13).

Both agricultural intensification and abandonment can have significant impacts on biodiversity. Unfortunately, the typology used to record threats and pressures only distinguishes abandonment and intensification at Level 3, and many countries only reported at Level 2. For example, 'A04.03 abandonment of pastoral systems, lack of grazing' is included under 'A04 Grazing by livestock' by several countries. However, for the countries that did report at Level 3, there is clear regional variation, with abandonment being a particular concern in the Boreal region (see Table 6.8).

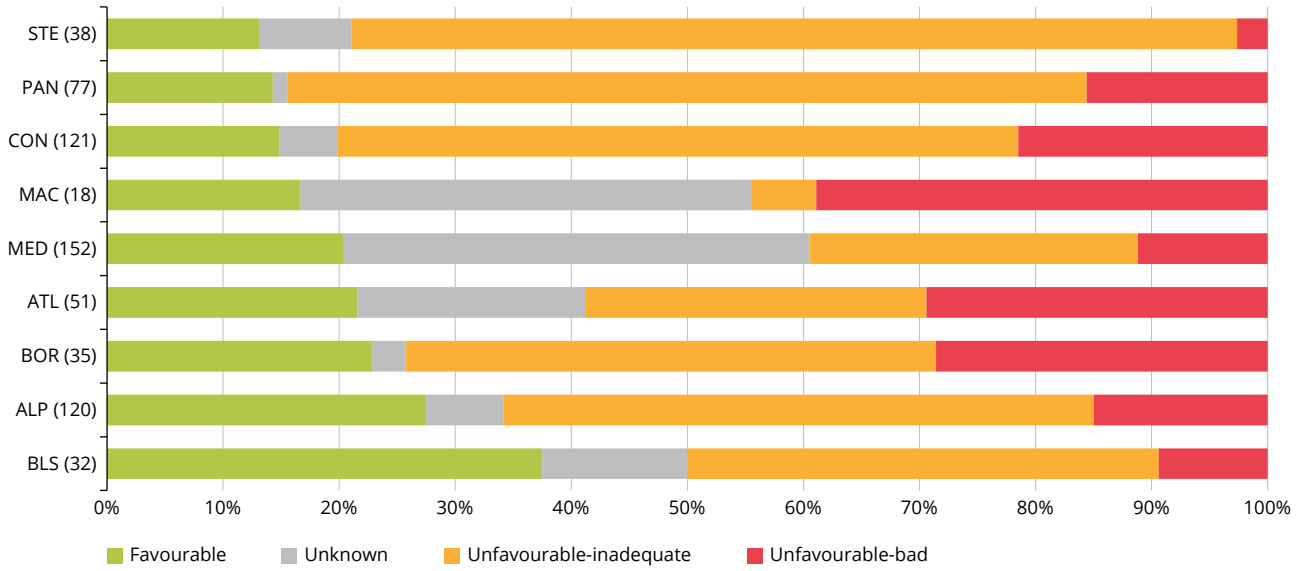
Figure 6.11 EU population status (left) and trends in population status of bird species (right) associated with MAES agricultural ecosystems (cropland and grassland)



Notes: The total number of assessments is 116.

Source: EEA, 2015a, Article 12 reports and assessments.

Figure 6.12 Conservation status of species (Habitats Directive) associated with MAES agricultural ecosystems (cropland and grassland), by biogeographical region



Notes: Non-bird species are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 644.

Source: EEA, 2015b, Article 17 reports and assessments.

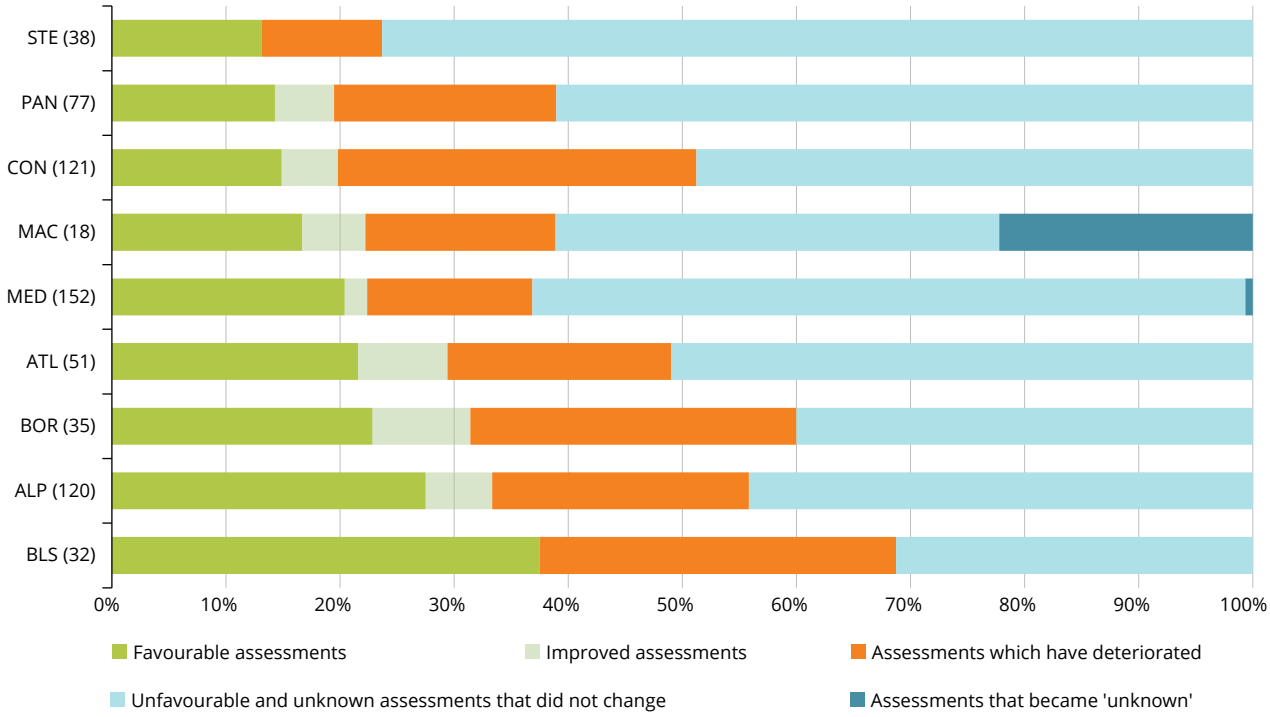
Table 6.6 Proportion of assessments of species from the Habitats Directive associated with MAES agricultural ecosystems (cropland and grassland) in each change class, by biogeographical region

Region	Favourable assessments	Improved assessments	Assessments which have deteriorated	Unfavourable and unknown assessments that did not change	Assessments that became 'unknown'	Total n° of assessments
Black Sea (32)	37.5	0	31.3	31.3	0	32
Alpine (120)	27.5	5.8	22.5	44.2	0	120
Boreal (35)	22.9	8.6	28.6	40.0	0	35
Atlantic (51)	21.6	7.8	19.6	51.0	0	51
Mediterranean (152)	20.4	2.0	14.5	62.5	0.7	152
Macaronesia (18)	16.7	5.6	16.7	38.9	22.2	18
Continental (121)	14.9	5.0	31.4	48.8	0	121
Pannonian (77)	14.3	5.2	19.5	61.0	0	77
Steppic (38)	13.2	0	10.5	76.3	0	38

Notes: Non-bird species are species from the Habitats Directive. The total number of assessments is 644.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 6.13 Changes in conservation status of species (Habitats Directive) associated with MAES agricultural ecosystems (cropland and grassland), by biogeographical region



Notes: Non-bird species are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 644.

Source: EEA, 2015b, Article 17 reports and assessments.

Table 6.7 The 10 most frequently reported 'highly important' pressures for Habitats Directive species linked to MAES agricultural ecosystems

Level 2 category		Frequency	%
A02	Modification of cultivation practices	207	9.8%
A04	Grazing by livestock	185	8.8%
K02	Vegetation succession/Biocenotic evolution	163	7.7%
J03	Other changes to ecosystems	149	7.1%
A03	Mowing or cutting grasslands	134	6.4%
A07	Use of 'pesticides' in agriculture	100	4.7%
J02	Changes in waterbodies conditions	90	4.3%
E01	Urbanisation and human habitation	88	4.2%
E06	Other urban/industrial developments	81	3.8%
D01	Roads, railroads and paths	70	3.3%

Notes: Pressures are reported at Level 2. The total number of pressures is 2 107.

Source: EEA, 2015b, Article 17 reports and assessments.

Map 6.1 shows intensity of agricultural land use across the EU, and it can be seen that the intensity is particularly high in north-west Europe, together with the Continental biogeographical region of Italy, corresponding to the Atlantic and Continental biogeographical regions. These are regions with high proportions of assessments as unfavourable-bad (Map 6.2).

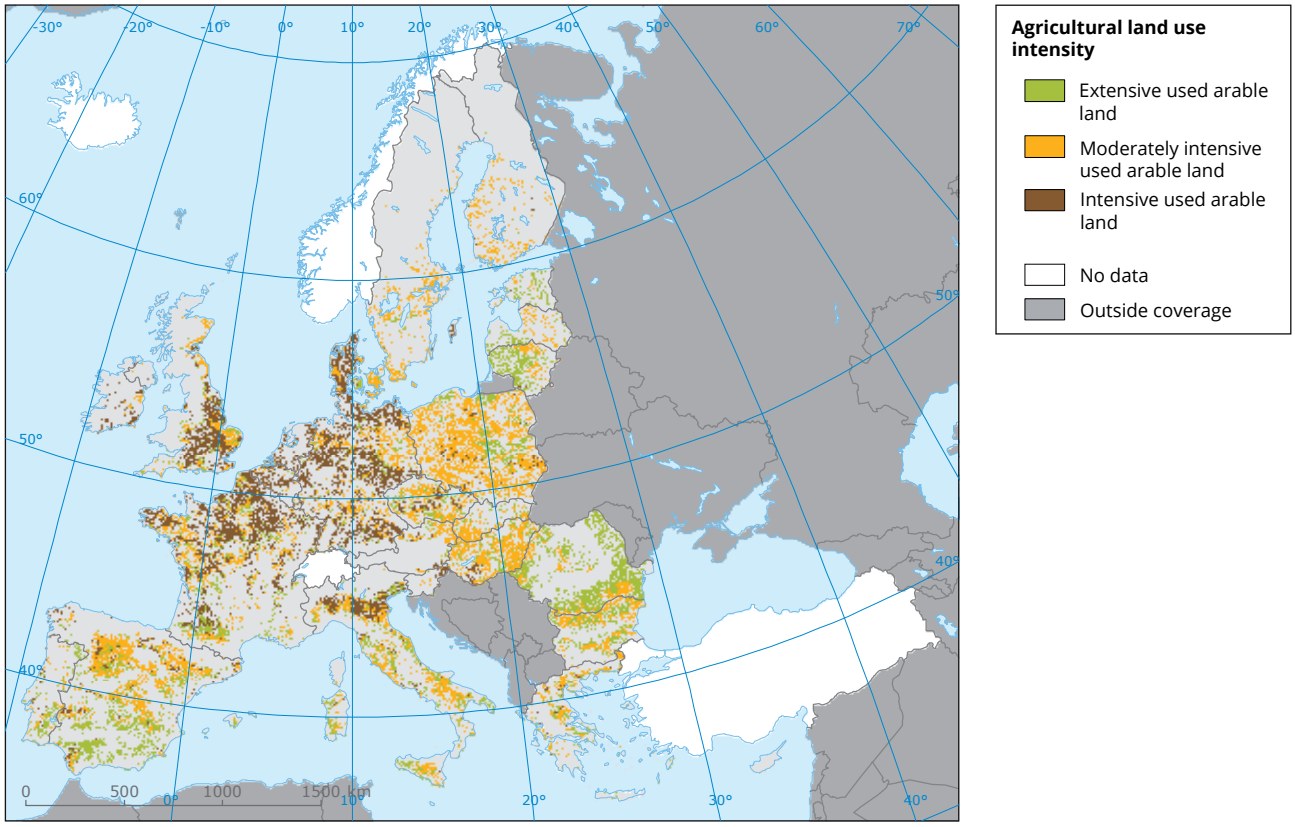
Table 6.8 Proportion of Habitats Directive species associated with MAES agricultural ecosystems, where abandonment of agriculture was noted as 'highly important' in each biogeographical region

Region	No reports for abandonment	%
Boreal	32	23
Alpine	40	10
Continental	74	9
Steppic	3	6
Pannonian	12	5
Mediterranean	11	4
Atlantic	5	2
Black Sea	1	2
Macaronesia	0	0

Source: EEA, 2015b, Article 17 reports and assessments.

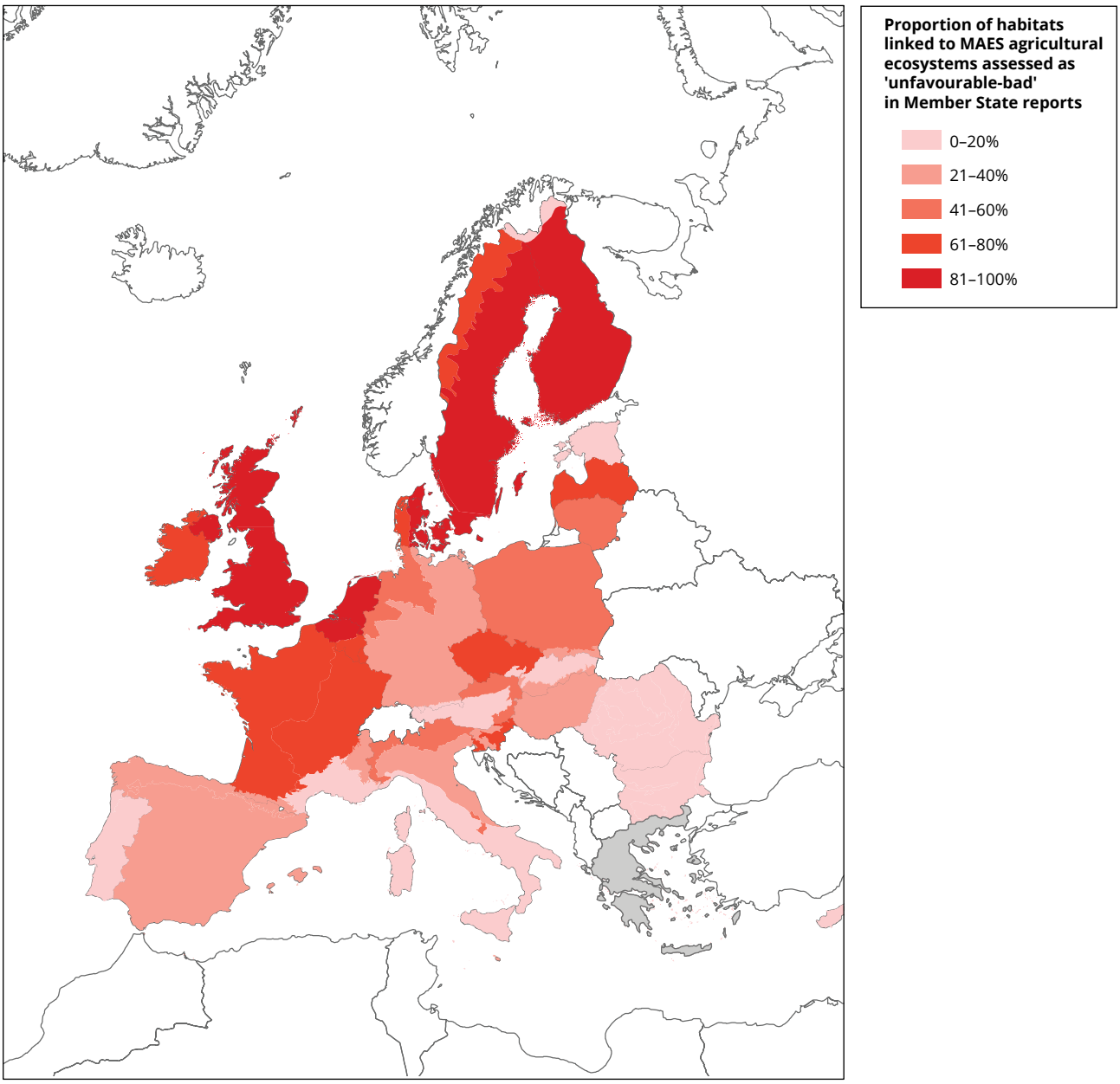
In conclusion, changes in the conservation status of habitats and species from 'agricultural ecosystems' (increase of both favourable and unfavourable assessments) between the two reporting periods are mostly an artefact, and are attributable to the drastic reduction of unknown assessments (i.e. better information).

Map 6.1 Agricultural land use intensity in the EU



Source: EEA, 2015c.

Map 6.2 **Proportion of habitats linked to MAES agricultural ecosystems assessed as 'unfavourable-bad' in Member State reports**



Source: EEA, 2015b, Article 17 reports and assessments.

Forest ecosystems

The conservation status of forest habitats is slightly worse than that for all Annex I habitats: 15% favourable (compared to 16%) and 80% unfavourable (compared to 77%) (Figure 6.14 (left), and Section 3.2.2). However, the proportion of forest habitat assessments that did not change between the two reporting periods is higher than for all habitats (53% compared to 48%) (Figure 6.14 (right)). This may be linked to the long time periods needed for forests to respond to some forms of management.

There is considerable variation across the biogeographical regions (Figure 6.15), with no forest habitats assessed as favourable in the Atlantic, Boreal and Steppic regions; by contrast, over 30% in the Mediterranean and over 20% in the Alpine regions are favourable. Two regions — Boreal and Steppic — have 100% of their forest habitats assessed as unfavourable, with over 80% being assessed as unfavourable-bad in the Boreal region.

When comparing the status in the 2001–2006 period and the 2007–2012 period (Table 6.9 and Figure 6.16), it is also evident that the four biogeographical regions mentioned above show the highest proportion of unfavourable assessments that are further deteriorating; the figures for the Boreal (near 78%) and the Continental (50%) regions are particularly high. The Alpine region also has a high proportion of unfavourable assessments that got worse from 2007 to 2012 (over 45%).

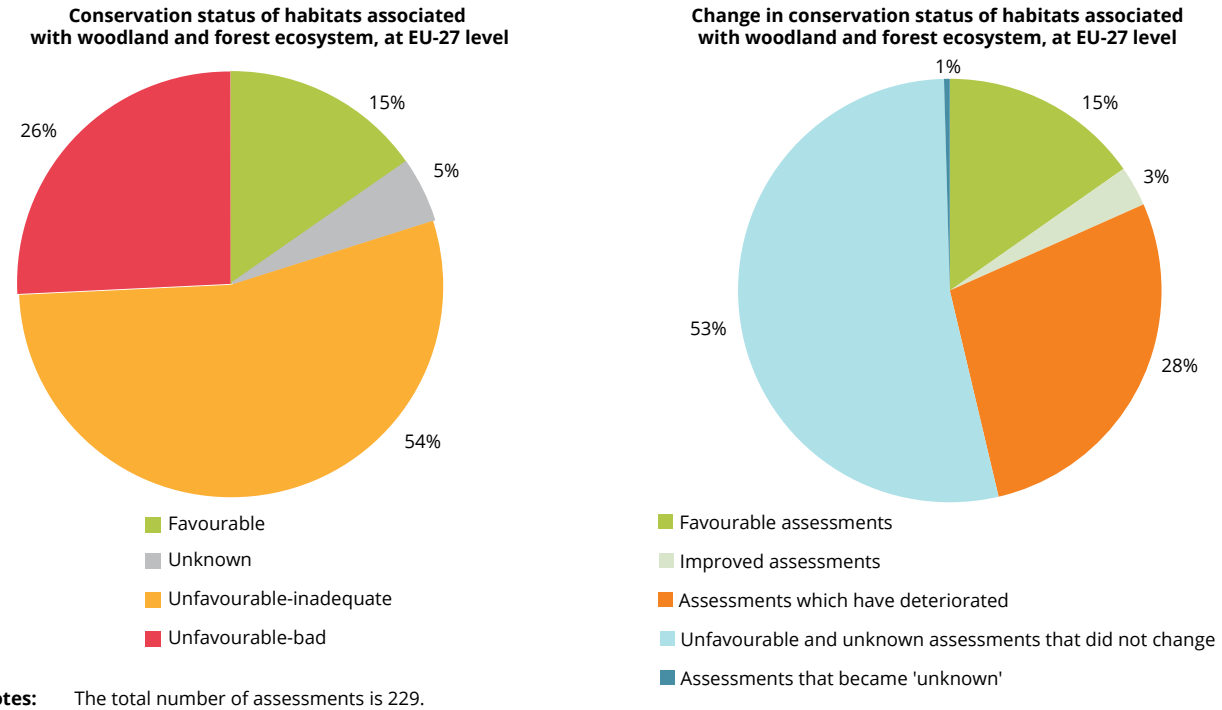
Although no habitats in the Boreal region are favourable, this region has the highest proportion of unfavourable forest habitats that are improving (over 17%). From the remaining eight biogeographical regions, only the Continental and the Atlantic regions have a (small) proportion of unfavourable assessments that are improving (6% and 4%, respectively).

In comparing the conservation status of forest habitats between the two reporting periods, the following conclusions can be drawn:

- there was a small decrease of favourable assessments (from near 17% from 2001 to 2006, to over 15% from 2007 to 2012);
- the vast majority of assessments remain unfavourable (80%), and did not change between the two reporting periods, when taking into account the drastic reduction of unknown assessments (from over 34% to under 5%).

During the reporting period, only 3% of assessments were unfavourable but improving, and 28% were unfavourable and further deteriorating (see Figure 6.14 (right)).

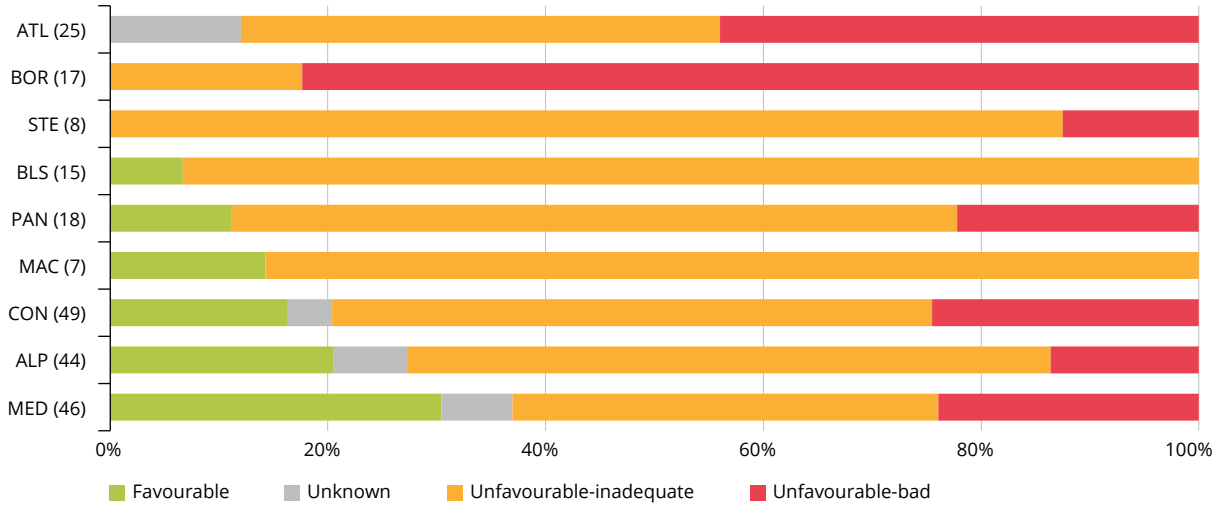
Figure 6.14 Conservation status (left) and changes in conservation status (right) for Annex I habitats associated with woodland and forest ecosystem



Notes: The total number of assessments is 229.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 6.15 Conservation status for Annex I habitats associated with woodland and forest ecosystem, by biogeographical region



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 229.

Source: EEA, 2015b, Article 17 reports and assessments.

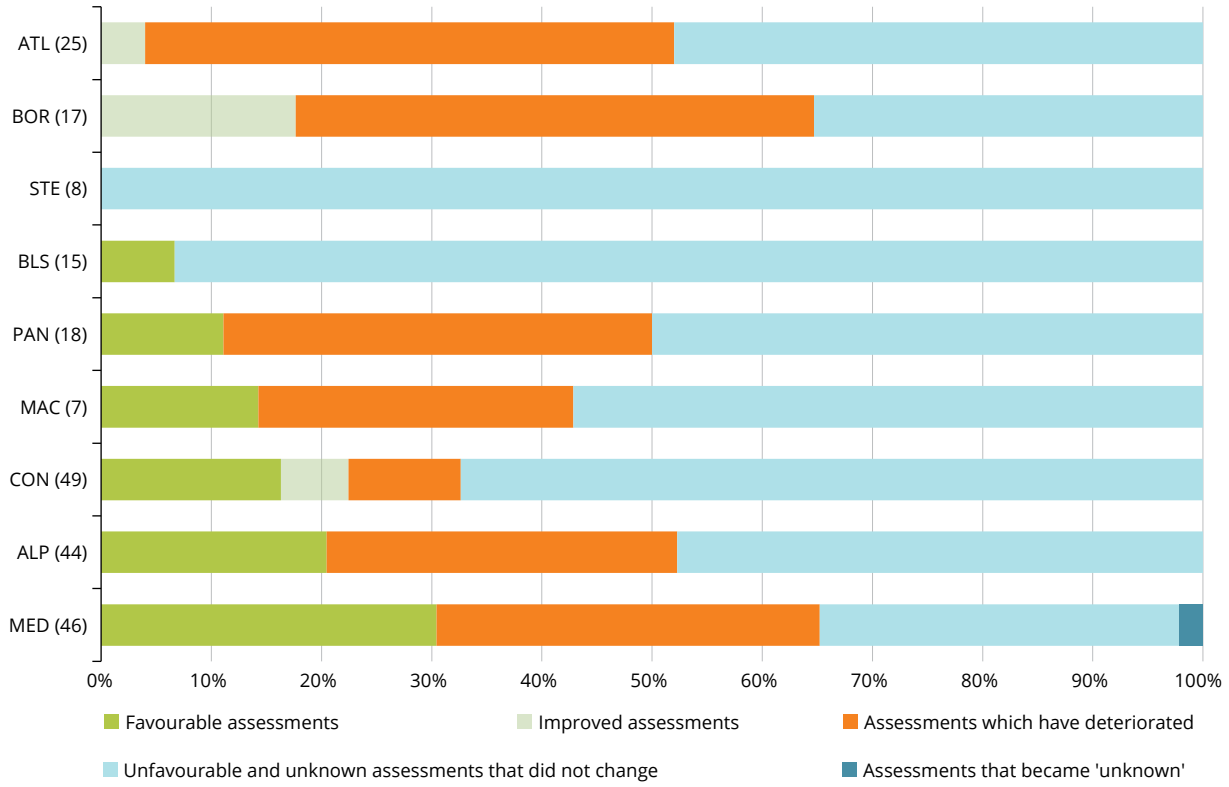
Table 6.9 Proportion of assessments of habitats associated with MAES woodland and forest ecosystem in each change class, by biogeographical region

Region	Favourable assessments	Improved assessments	Assessments which have deteriorated	Unfavourable and unknown assessments that did not change	Assessments that became unknown	Total no of assessments
Mediterranean	30.4		34.8	32.6	2.2	46
Alpine	20.5		31.8	47.7		44
Continental	16.3	6.1	10.2	67.3		49
Macaronesian	14.3		28.6	57.1		7
Pannonian	11.1		38.9	50.0		18
Black Sea	6.7			93.3		15
Steppic				100		8
Boreal		17.6	47.1	35.3		17
Atlantic		4.0	48.0	48.0		25

Notes: The total number of assessments is 229.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 6.16 Changes in conservation status for Annex I habitats associated with woodland and forest ecosystem, by biogeographical region



Notes: The number of assessments is indicated in parentheses. The total number of assessments is 229.

Source: EEA, 2015b, Article 17 reports and assessments.

The conservation status of species associated with woodland and forest ecosystems does not differ much from that of all other species from the Habitats Directive: 26% favourable (compared to 23% overall), and 60% unfavourable, with slightly less being unfavourable-bad (16% compared to 18%) (see Figure 6.17 (left)).

In comparing the conservation status of forest-related species from the Habitats Directive between the two reporting periods, the following conclusions can be drawn:

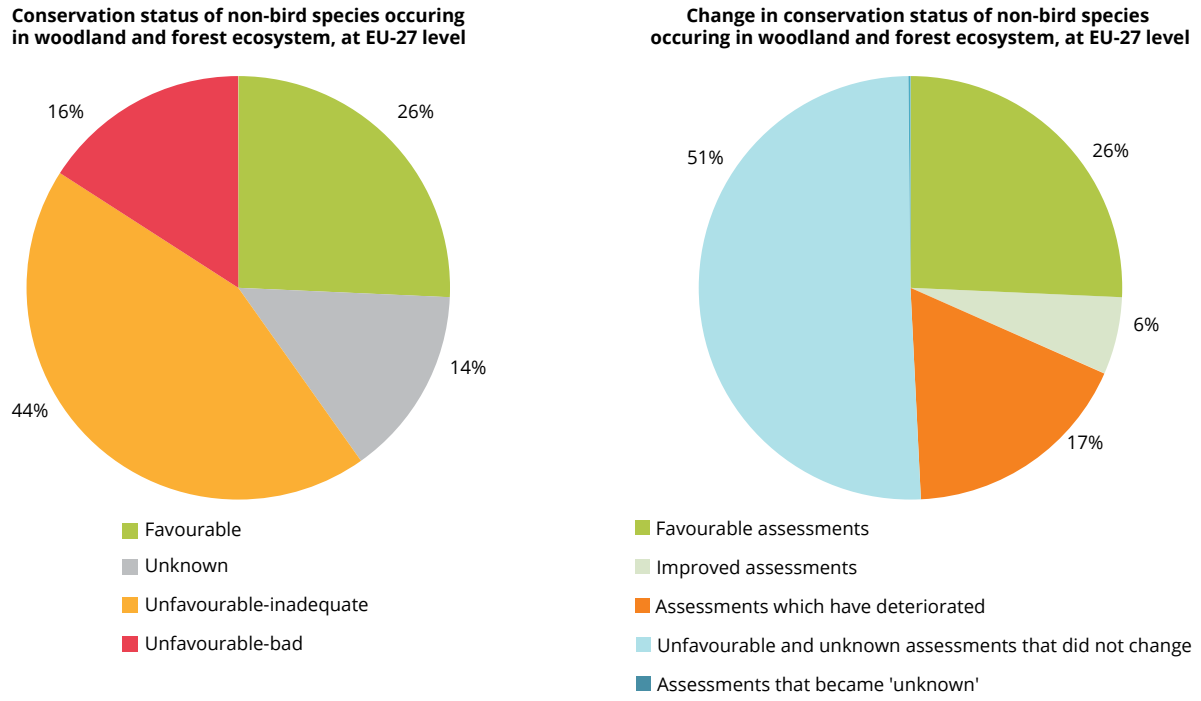
- there was an increase in favourable assessments (from over 13% from 2001 to 2006, to near 26% from 2007 to 2012), but this is an artefact, due to the large decrease in the number of unknown assessments (from near 43% to close to 14%);
- the large majority of assessments remain unfavourable (60%), and did not change between the two reporting periods, when taking into account the drastic decrease in unknown assessments (see Figure 6.17).

During the reporting period, only 6% of assessments were unfavourable but improving, and 17% were unfavourable and further deteriorating.

About 64% of bird species associated with woodland and forest ecosystems are assessed as secure, and 21% as non-secure, while 14% are unknown (see Figure 6.18 (left)). This indicates that these bird species have a better status when compared to all bird species (52% secure and 32% non-secure, see Chapter 2). This is consistent with the EU Common Bird Index, where forest birds have maintained their populations since 1980, but other groups have declined, especially farmland birds (EC, 2013d). However, among non-secure species, only 7% are increasing, and 13% are decreasing, while about 1% are stable in the short-term.

There is much less variation across biogeographical regions for species from the Habitats Directive associated with woodland and forest ecosystems than for habitat types (see Figure 6.12). The conservation status is favourable for more than 20% of the species in all regions, except the Continental, with near 19%.

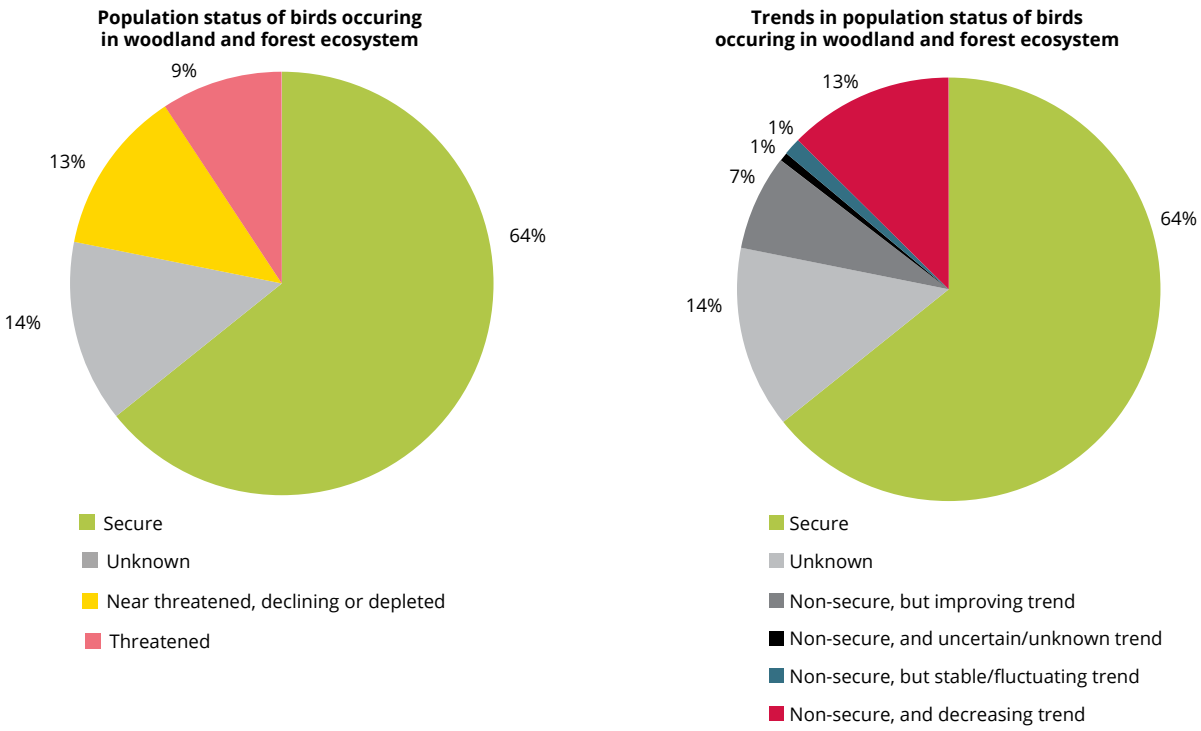
Figure 6.17 Conservation status (*right*) and changes in conservation status (*left*) of species (Habitats Directive) associated with woodland and forest ecosystem



Notes: Non-bird species are species from the Habitats Directive. The total number of assessments is 642.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 6.18 EU population status (*left*) and trends in population status (*right*) of bird species associated with MAES woodland and forest ecosystem



Notes: The total number of assessments is 151.

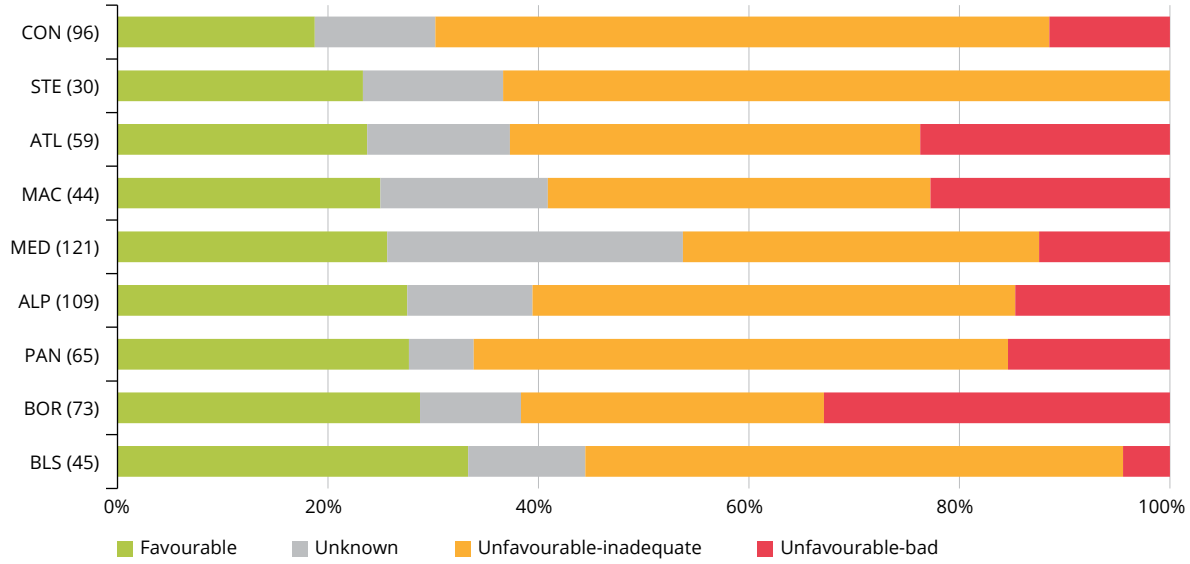
Source: EEA, 2015a, Article 12 reports and assessments.

In all regions, except the Macaronesian, more than half of the species are assessed as unfavourable; in three regions — Boreal, Atlantic and Macaronesian — the unfavourable-bad assessments represent more than 20% of the total, with near 33%, 24% and 23%, respectively (see Figure 6.18).

When comparing changes in the assessments between the 2001–2006 period and the 2007–2012 period, the unfavourable assessments that improved are outnumbered by those that deteriorated, except in the Macaronesian region (over 20% improved against 14% deteriorated), and the Atlantic region with the same proportion of improved and deteriorated assessments (near 14%) (see Table 6.10 and Figure 6.20).

In conclusion, changes in the conservation status of habitats and species from the Habitats Directive

Figure 6.19 Conservation status of non-bird species associated with MAES woodland and forest ecosystem



Notes: Non-bird species are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 642.

Source: EEA, 2014, Article 17 reports and assessments.

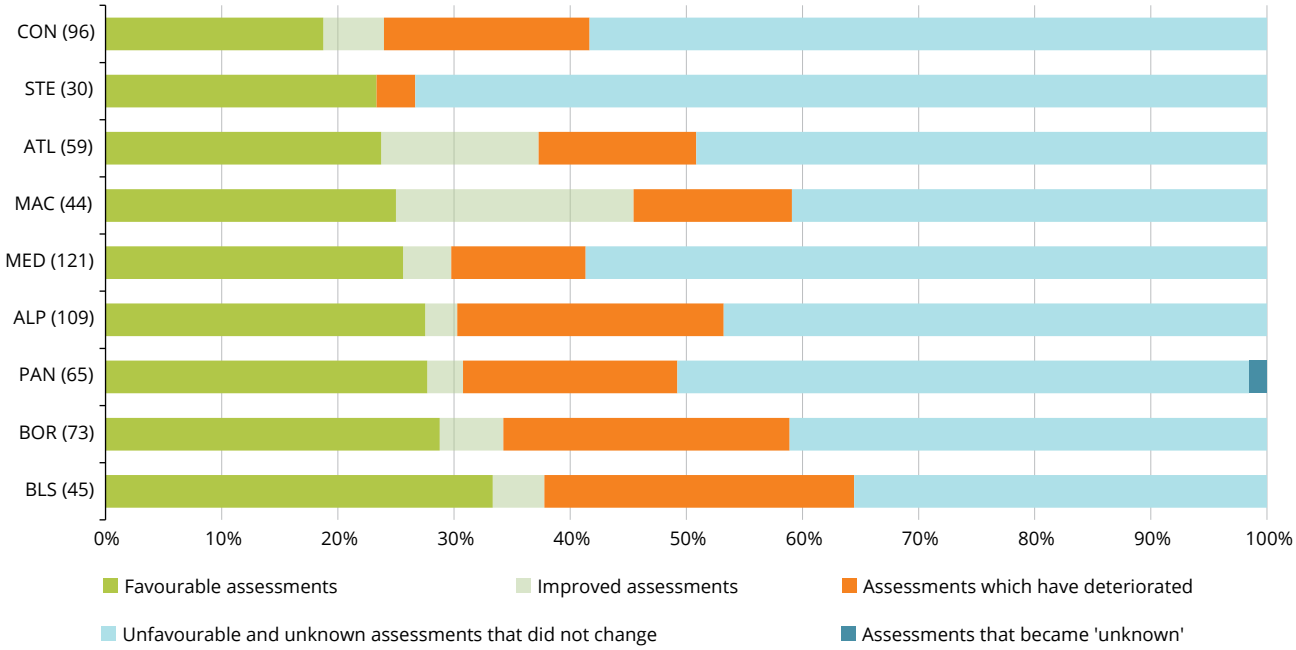
Table 6.10 Proportion of assessments of species from the Habitats Directive associated with MAES woodland and forest ecosystem in each change class, by biogeographical region

Region	Favourable assessments	Improved assessments	Assessments which have deteriorated	Unfavourable and unknown assessments that did not change	Assessments that became 'unknown'	Total no of assessments
Black Sea	33.3	4.4	26.7	35.6		45
Boreal	28.8	5.5	24.7	41.1		73
Pannonian	27.7	3.1	18.5	49.2	1.5	65
Alpine	27.5	2.8	22.9	46.8		109
Mediterranean	25.6	4.1	11.6	58.7		121
Macaronesia	25.0	20.5	13.6	40.9		44
Atlantic	23.7	13.6	13.6	49.2		59
Steppic	23.3		3.3	73.3		30
Continental	18.8	5.2	17.7	58.3		96

Notes: The total number of assessments is 642.

Source: EEA, 2015b, Article 17 reports and assessments.

Figure 6.20 Changes in conservation status of non-bird species associated with forest ecosystem, by biogeographical region



Notes: Non-bird species are species from the Habitats Directive. The number of assessments is indicated in parentheses. The total number of assessments is 642.

Source: EEA 2015b, Article 17 reports and assessments.

associated with the woodland and forest ecosystems between the two reporting periods (increase of both favourable and unfavourable assessments) are mostly an artefact, attributable to the drastic reduction of unknown assessments (due to better information). Most likely, the conservation status of these habitats and species did not significantly change. In addition, the proportion of unfavourable assessments that improved is in general small, and is lower than those assessments that deteriorated. Bird species associated with this ecosystem are largely secure, but among the non-secure species, there are many more decreasing than increasing.

Acronyms and abbreviations

AEWA	African-Eurasian Migratory Waterbirds
ANOVA	Analysis of variance
BD	Birds Directive
BMS	Brief Management Statements
CDR	Central Data Repository
CS	Conservation Status
EEA	European Environment Agency
ESIC	Spain/Canary Islands
ETC/BD	European Topic Centre on Biological Diversity
EU	European Union
FCS	Favourable Conservation Status
FV	Favourable
GIB	United Kingdom/Gibraltar
GIS	Geographic information system
HD	Habitats Directive
HELCOM	Baltic Marine Environment Protection Commission
IOER	Institute of Ecological and Regional Development
IUCN	International Union for Conservation of Nature
JRC	Joint Research Centre
MAES	Mapping and Assessment of Ecosystems and their Services
MP	Management Plan
NGO	Non-governmental organisation
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PA	Protected area

PTAC	Portugal/Azores
PTMA	Portugal/Madeira
SAC	Special Area of Conservation
SAP	Species Action Plan
SCI	Site of Community Importance
SPA	Special Protection Area
U1	Unfavourable-inadequate
U2	Unfavourable-bad
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
XX	Unknown (for conservation status)

References

Abellán, M. D., Martínez, J. E., Palazón, J. A., Esteve, M. Á. and Calvo, J. F., 2011, 'Efficiency of a Protected-Area Network in a Mediterranean Region: a Multispecies Assessment with Raptors', *Environmental Management,* 47 (5): 983–91.

Abellán, P. and Sánchez-Fernández, D., 2015, 'A gap analysis comparing the effectiveness of Natura 2000 and national protected area networks in representing European amphibians and reptiles', *Biodiversity and Conservation*, (2015) 1–14.

Albuquerque, F. S., Assunção-Albuquerque, M. J. T., Cayuela, L., Zamora, R. and Benito, B. M., 2013, 'European Bird Distribution Is 'well' Represented by Special Protected Areas: Mission Accomplished?', *Biological Conservation,* (159) 45–50.

Apostolopoulou, E., Drakou, E. G. and Pediaditi, K., 2012, 'Participation in the Management of Greek Natura 2000 Sites: Evidence from a Cross-Level Analysis,' *Journal of Environmental Management,* 113 (December): 308–318.

Apostolopoulou, E. and Pantis J. D., 2009, 'Conceptual Gaps in the National Strategy for the Implementation of the European Natura 2000 Conservation Policy in Greece', *Biological Conservation,* 142 (1) 221–237.

Araújo, M. B, Alagador, D., Cabeza, M., Bravo, D. N. and Thuiller, W., 2011, 'Climate Change Threatens European Conservation Areas', *Ecology Letters,* 14 (5) 484–492.

Baier, F. and Wiedl, H. J., 2010, 'The re-evaluated conservation status of the mountain populations of the highly endangered Cyprus grass snake, *Natrix cypriaca* (Hecht, 1930), with miscellaneous natural history notes', *Salamandra*, 46(1) 16–23.

BirdLife International, 2004, *Birds in the European Union: a status assessment*, Wageningen, BirdLife International, the Netherlands.

Biserkov, V. and Gussev, C. (eds), 2011, *Red Data Book of Bulgaria*, Volume 3 — Natural habitats Bulgarian Academy of Sciences and Ministry of Environment and Water (http://e-ecodb.bas.bg/rdb/en/vol3/) accessed 13 March 2015.

Bosso, L., Rebelo H., Garonna A. P. and Russo D., 2013, 'Modelling Geographic Distribution and Detecting Conservation Gaps in Italy for the Threatened Beetle Rosalia Alpina', *Journal for Nature Conservation,* 21 (2) 72–80.

Brown, A. E., Burn, A. J., Hopkins, J. J. and Way, S. F. (eds), 1997, *The Habitats Directive: selection of Special Areas of Conservation in the UK*, Joint Nature Conservation Committee (JNCC) Report 270, Peterborough, 295 pp.

Brambilla, M., Bergero V., Bassi E. and Falco R., 2014, 'Current and Future Effectiveness of Natura 2000 Network in the Central Alps for the Conservation of Mountain Forest Owl Species in a Warming Climate', *European Journal of Wildlife Research*, October, 1–10.

Brodier, S., Augiron, S., Cornulier, T. and Bretagnolle, V., 2014, 'Local Improvement of Skylark and Corn Bunting Population Trends on Intensive Arable Landscape: a Case Study of the Conservation Tool Natura 2000', *Animal Conservation,* 17 (3): 204–216.

Chefaoui, Rosa M. and Jorge M. Lobo, 2007, 'Assessing the Conservation Status of an Iberian Moth Using Pseudo-Absences', *The Journal of Wildlife Management,* 71 (8) 2 507–2 516.

D'Amen, M., Bombi, P., Pearman, P. B., Schmatz, D. R., Zimmermann, N. E. and Bologna, M. A., 2011, 'Will Climate Change Reduce the Efficacy of Protected Areas for Amphibian Conservation in Italy?', *Biological Conservation,* 144 (3): 989–997.

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*, Final report to Rewilding Europe by ZSL, BirdLife International and the European Bird Census Council, London, UK: ZSL.

Delbaere, B., Whitfield, C. and Evans, D., 2014, 'Impact of atmospheric nitrogen deposition on biodiversity', Unpublished EEA report.

Devictor, V., Godet, L., Julliard, R., Couvet, D. and Jiguet, F., 2007, 'Can Common Species Benefit from Protected Areas?', *Biological Conservation,* 139 (1–2) 29–36.

Donald, P. F., Sanderson, F. J., Burfield, I. J., Bierman, S. M., Gregory, R. D. and Waliczky, Z., 2007, 'International Conservation Policy Delivers Benefits for Birds in Europe', *Science,* 317 (5839) 810–813.

EEA, 2010, *EU 2010 Biodiversity Baseline*, Technical report No 12/2010, European Environment Agency, Copenhagen.

EEA, 2012a, *Protected areas in Europe — an overview*, EEA Report No 5/2012, European Environment Agency, Copenhagen.

EEA, 2012b, *Climate Change, Impacts and Vulnerability in Europe 2012 — an Indicator-Based Report*, EEA Report No 12/2012, European Environment Agency, Copenhagen.

EEA, 2014, *Marine messages: Our seas, our future — moving towards a new understanding*, European Environment Agency Brochure No 1/2014, European Environment Agency, Copenhagen (http://www.eea.europa.eu/publications/marine-messages/at_download/file) accessed 13 March 2015.

EEA, 2014, Central Data Repository, European Environment Agency, Copenhagen. (http://cdr.eionet.europa.eu/) accessed 13 March 2015.

EEA, 2015a, 'Article 12 reports and assessments 2008–2012', European Environment Agency.

EEA, 2015b, 'Article 17 reports and assessments 2007–2012', European Environment Agency, (http://www.eea.europa.eu/data-and-maps/data/article-17-database-habitats-directive-92-43-eec-1) accessed 13 March 2015.

EEA, 2015c, *European Ecosystem Assessment — Concept, Data, and Implementation Contribution to Target 2 Action 5 Mapping and Assessment of Ecosystems and their Services (MAES) of the EU Biodiversity Strategy to 2020*, EEA Technical Report, European Environment Agency, Copenhagen (in preparation).

Ellwanger, G., Ssymank, A. and Paulsch, C. (eds), 2012, *Natura 2000 and Climate Change — a Challenge*, Heft, 118, Naturschutz Und Biologische Vielfalt. Bonn: Bundesamt für Naturschutz.

EC, 2003, Report from the Commission on the implementation of the Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (COM(2003) 845 final).

EC, 2005, Assessment, monitoring and reporting of conservation status — Preparing the 2001–2006 report under Article 17 of the Habitats Directive. Note to the Habitats Committee, DG Environment, Brussels, 15 March 2005.

EC, 2007, *Guidelines for the establishment of the Natura 2000 network in the marine environment*, *Application of the Habitats and Birds Directives*, 112 pp. (http://ec.europa.eu/environment/nature/natura2000/marine/docs/marine_guidelines.pdf) accessed 13 March 2015.

EC, 2009, The Composite Report on the Conservation Status of Habitat Types and Species as required under Article 17 of the Habitats Directive (COM(2009) 358 final).

EC, 2011b**, '**Our life insurance, our natural capital: an EU biodiversity strategy to 2020', European Commission, Brussels, 3.5.2011 (COM(2011) 244 final).

EC, 2013a, *EU Guidelines on Climate Change and Natura 2000*, Technical Report 068, (http://ec.europa.eu/environment/nature/climatechange/pdf/Guidance%20document.pdf) accessed 13 March 2015.

EC, 2013b, *Mapping and Assessment of Ecosystems and their Services: An analytical framework for ecosystem assessment under Action 5 of the EU Biodiversity Strategy to 2020*, Technical Report 2013 – 067 (http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/pdf/MAESWorkingPaper2013.pdf) accessed 13 March 2015.

EC, 2013c, *Interpretation Manual of European Union Habitats*, EUR 28, DG Environment, Nature and Biodiversity, Brussels (http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int_Manual_EU28.pdf) accessed 13 March 2015.

EC, 2013d, *Sustainable development in the European Union — 2013 monitoring report of the EU sustainable development strategy*, Publications Office of the European Union, Luxembourg.

EC, 2014, *Mapping and Assessment of Ecosystems and their Services: Indicators for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020*, Technical Report 2014 – 080 (http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/pdf/2ndMAESWorkingPaper.pdf) accessed 13 March 2015.

ETC/BD, 2011, *EU Baseline Glossary and short Compendium*, European Topic Centre on Biological Diversity (http://www.eea.europa.eu/themes/biodiversity/document-library/eu-2010-biodiversity-

baseline/eu-2010-biodiversity-baseline-compendium/view) accessed 13 March 2015.

ETC/BD, 2014, *Article 17 Reporting — Assessments of conservation status at the EU biogeographical level _Public consultation*, ETC/BD Technical paper 3/2014, European Topic Centre on Biological Diversity (http://bd.eionet.europa.eu/activities/Reporting/Article_17/Documents/ART17%20public%20consultation%20guide.pdf) accessed 13 March 2015.

Evans, D., 2010, 'Interpreting the habitats of Annex I — Past, present and future', *Acta Botanica Gallica,* 157(4) 677–686.

Evans, D. and Arvela, M., 2011, *Assessment and reporting under Article 17 of the Habitats Directive: Explanatory Notes and Guidelines for the period 2007–2012*, European Topic Centre on Biological Diversity, July 2011 (http://www.bfn.de/fileadmin/MDB/documents/themen/natura2000/Nat_Bericht_2013/Art17_-_Guidelines-final.pdf) accessed 13 March 2015.

Evans, D., MacSharry, B. and Opermanis, O., 2011, 'Current Status of the Habitats Directive Marine Special Areas of Conservation (SACs) Network', in: von Nordheim, H., Krause J. C.,

and Maschner K. (eds), *Progress in Marine Conservation in Europe 2009*, BfN Scripten, Bonn: Bundesamt für Naturschutz (http://www.bfn.de/fileadmin/MDB/documents/themen/meeresundkuestenschutz/downloads/Fachtagungen/PMCE-2009/PMCE_2009.pdf) accessed 13 March 2015.

Evans, D. and Gelabert, E., 2013, *Crosswalks between marine habitat typologies — a contribution to the MAES marine pilot*, Technical paper 1/2014, ETC/BD report for the EEA (http://biodiversity.europa.eu/maes/crosswalks-between-european-marine-habitat-typologies_10-04-14_v3.pdf) accessed 13 March 2015.

Evans, D., 2012, 'Building the European Union's Natura 2000 Network', *Nature Conservation,* (1) 11–26. doi:10.3897/natureconservation.1.1808.

Fox, R., 2013, 'The decline of moths in Great Britain: a review of possible causes', *Insect Conservation and Diversity*, 6(1): 5–19.

Gardiner, S., Hanson, S., Nicholls, R., Zhang, Z., Jude, S. and Jones, A., 2007, *The Habitats Directive, Coastal Habitats and Climate Change — Case Studies from the South Coast of the UK*, Working Paper 108, UK: Tyndall Centre (http://tyndall.ac.uk/sites/default/files/wp108.pdf) accessed 13 March 2015.

Gies, M. and Albrecht, J., 2013, *Legal Study and Recommendations for Climate Change Adaptation in Natura 2000 Protected Areas*, Germany: Leibniz Institute of Ecological and Regional Development (IOER) (http://www2.ioer.de/download/habit-change/HABIT-CHANGE_6_2_2_Legal_Study.pdf) accessed 13 March 2015.

Grodzinska-Jurczak, M. and Cent, J., 2011, 'Expansion of Nature Conservation Areas: Problems with Natura 2000 Implementation in Poland?', *Environmental Management,* 47 (1): 11–27.

Grodzinska-Jurczak, M., Pietrzyk-Kaszynska, A., Cent, J., Scott, A. V., Apostolopoulou, E., and Paloniemi, R., 2014, 'Governance of Network of Protected Areas: Innovative Solutions and Instruments', in: Henle, K., Potts, S., Kunin, W., Matsinos, Y., Simila, J., Pantis, J., Grobelnik, V., Penev, L. and Settele, J., (eds), *Scaling in Ecology and Biodiversity Conservation*, Pensoft.

Gruber, B., Evans, D., Henle, K., Bauch, B., Schmeller, D. S., Dziock, F., Henry, P-Y., Szabolcs, L., Seppelt, R, Margules, C. and Dormann, C. F., 2012, 'Mind the gap — how well does Natura 2000 cover species of European Interest', *Nature Conservation* (3) 45–63.

Halada, L., Evans, D., Romão, C. and Petersen, J. E., 2011, 'Which habitats of European importance depend on agricultural practices?', *Biodiversity and Conservation*, 20(11) 2 365–2 378.

Hardy, P. B., Sparks, T. H. and Dennis, R. L., 2014, 'The impact of climatic change on butterfly geography: does climatic change produce coincident trends in populations, distributions and ranges?', *Biodiversity and conservation*, 23(4) 855–876.

Henle, K., S. G. Potts, A. V. Scott, W. E. Kunin, R. M. Gunton, D. S. Schmeller, Y. G. Matsinos, J. Similä, J. D. Pantis, A. D. Mazaris, V. Grobelnik, A. Grimm, L. Penev, R. Klenke and J. Settele, 2014, 'Lessons learned', in: Henle, K., Potts, S., Kunin, W., Matsinos, Y., Simila, J., Pantis, J., Grobelnik, V., Penev, L. and Settele, J., (eds), *Scaling in Ecology and Biodiversity Conservation*, Pensoft.

Hernández-Manrique, O. L., Numa, C., Verdú, J. R., Galante, E. and Lobo, J. M., 2012, 'Current Protected Sites Do Not Allow the Representation of Endangered Invertebrates: The Spanish Case', *Insect Conservation and Diversity,* 5 (6) 414–421.

Heywood, V. H., 2014, 'An overview of in situ conservation of plant species in the Mediterranean', *Flora Mediterranea*, (24) 5–24.

Hickling, R., Roy, D. B., Hill, J. K., Fox, R. and Thomas, C. D., 2006, 'The distributions of a wide range of taxonomic groups are expanding polewards', *Global Change Biology* (12) 450–455.

Hiley, J. R., Bradbury, R. B., Holling, M. and Thomas, C. D., 2013, 'Protected areas act as establishment centres for species colonizing the UK', *Proceedings of the Royal Society B: Biological Sciences*, 280(1760), 2012–2310.

Iojă, C. I., Patroescu, M., Rozylowicz, L., Popescu, V. D., Verghelet, M., Zotta, M. I. and Felciuc, M., 2010, 'The Efficacy of Romania's Protected Areas Network in Conserving Biodiversity', *Biological Conservation* 143 (11) 2468–76. doi:10.1016/j.biocon.2010.06.013.

Jaeschke, A., Bittner, T., Jentsch, A. and Beierkuhnlein, C., 2014, 'The last decade in ecological climate change impact research: where are we now?', *Naturwissenschaften*, 101(1), 1–9.

Jantke, K., Schleupner, C. and Schneider, U. A., 2011, 'Gap Analysis of European Wetland Species: Priority Regions for Expanding the Natura 2000 Network', *Biodiversity and Conservation,* 20 (3) 581–605.

JNCC, 2014, *Advancing Conservation Science Thinking on Protected Areas for Biodiversity in the UK*, Joint Nature Conservation Committee, Peterborough, UK (http://jncc.defra.gov.uk/pdf/JNCC14_P09_revised.pdf) accessed 13 March 2015.

Kallimanis, A. S., Touloumis, K., Tzanopoulos, J., Mazaris, A. D., Apostolopoulou, E., Stefanidou, S., Scott, A. V., Potts, S. G. and Pantis, J. D., 2014, 'Vegetation Coverage Change in the EU: Patterns inside and Outside Natura 2000 Protected Areas', *Biodiversity and Conservation*, (2014) 1–13.

Kati, V., Hovardas, T., Dieterich, M., Ibisch, P. L., Mihok, B. and Selva, N., 2014, 'The Challenge of Implementing the European Network of Protected Areas Natura 2000', *Conservation Biology*, 29(1) 260–270.

Kleijn, D., Cherkaoui, I., Goedhart, P. W., Hout, J., and Lammertsma, D.,2014, 'Waterbirds increase more rapidly in Ramsar-designated wetlands than in unprotected wetlands'. *Journal of applied ecology*, *51*(2), 289–298

Lawson, C. R., Bennie, J. J., Thomas, C. D., Hodgson, J. A. and Wilson, R. J., 2014, 'Active management of protected areas enhances metapopulation expansion under climate change', *Conservation Letters*, 7(2), 111–118.

Lawton, J. H., Brotherton, P. N. M., Brown, V. K., Elphick, C., Fitter, A. H., Forshaw, J., Haddow, R. W., Hilborne, S., Leafe, R. N., Mace, G. M., Southgate, M. P., Sutherland, W. A., Tew, T. E., Varley, J., and Wynne, G. R., 2010, *Making Space for Nature: a Review of England's Wildlife Sites and Ecological Network,* Report to the Department for Environment, Food and Rural Affairs (Defra) (http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf) accessed 8 March 2014.

López-López, P., García-Ripollés, C., Soutullo, Á., Cadahía, L. and Urios, V., 2007, 'Are Important Bird Areas and Special Protected Areas Enough for Conservation?: The Case of Bonelli's Eagle in a Mediterranean Area', *Biodiversity and Conservation,* 16 (13) 3755–80.

Maiorano, L., Falcucci, A. and Boitani, L., 2006, 'Gap Analysis of Terrestrial Vertebrates in Italy: Priorities for Conservation Planning in a Human Dominated Landscape', *Biological Conservation,* 133 (4) 455–73.

Maiorano, L., Falcucci, A. and Boitani, L., 2008, 'Size-Dependent Resistance of Protected Areas to Land-Use Change', *Proceedings of the Royal Society B: Biological Sciences,* 275 (1640) 1297–1304.

Mazaris, A. D., Papanikolaou, A. D., Barbet-Massin, M., Kallimanis, A. S., Jiguet, F., Schmeller, D. S. and Pantis, J. D., 2013, 'Evaluating the Connectivity of a Protected Areas' Network under the Prism of Global Change: The Efficiency of the European Natura 2000 Network for Four Birds of Prey', *PLoS ONE* 8 (3) e59640.

Metzger, M. J., Bunce, R. G. H., van Eupen, M. and Mirtl, M., 2010, 'An Assessment of Long Term Ecosystem Research Activities across European Socio-Ecological Gradients', *Journal of Environmental Management,* 91 (6) 1357–65.

Miklín, J. and Čížek, L., 2014, 'Erasing a European Biodiversity Hot-Spot: Open Woodlands, Veteran Trees and Mature Forests Succumb to Forestry Intensification, Succession, and Logging in a UNESCO Biosphere Reserve', *Journal for Nature Conservation,* 22 (1) 35–41.

Mossman, H. L., Davy, A. J. and Grant, A., 2012, 'Does managed coastal realignment create saltmarshes with 'equivalent biological characteristics' to natural reference sites?', *Journal of Applied Ecology*, 49(6) 1 446–1 456.

Müller, J. and Opgenoorth, L., 2014, 'On the Gap between Science and Conservation implementation — a National Park Perspective', *Basic and Applied Ecology*, (15) 373–378.

N2K Group, 2011, Assessment and reporting under Article 12 of the Birds Directive: Explanatory Notes and Guidelines for the period 2008–2012, European Commission (https://circabc.europa.eu/sd/a/4fc954f6-

61e3-4a0b-8450-ca54e5e4dd53/Art.12%20guidelines%20final%20Dec%2011.pdf) accessed 13 March 2015.

Nicolaou, H., Hajisterkotis, E., Erotokritou, E., Lučan, R., Bartonička, T. and Horáček, I., 2010, 'Is the only European population of fruit bats close to extinction?', In *15th International Bat Research Conference*, ISBN 978-80-87154-46-5.

Normand, S., Svenning, J-C and Skov, F., 2007, 'National and European Perspectives on Climate Change Sensitivity of the Habitats Directive Characteristic Plant Species', *Journal for Nature Conservation,* 15 (1) 41–53.

Ostermann, O. P., 1998, 'The need for management of nature conservation sites designated under Natura 2000', *Journal of applied ecology*, 35(6) 968–973.

Papanikolaou, K., Henle, L., Pe'er, P. and Mazaris, 2014, 'Climate and Land-Use Change Affecting Ecological Network Efficiency: The Case of the European Grasslands', in: Henle, K., Potts S., Kunin, W., Matsinos, Y., Simila, J., Pantis, J., Grobelnik, V., Penev, L. and Settele, J. (eds), *Scaling in Ecology and Biodiversity Conservation*.

Parmesan, C., 2006, 'Ecological and evolutionary responses to recent climate change', *Annual Review of Ecology, Evolution, and Systematics*, (2006) 637–669.

Pellissier, V., Schmucki, R., F., Jiguet, R., Julliard, J., Touroult, Richard D. and D. Evans, 2014, *The Impact of Natura 2000 on Non-Target Species: Assessment Using Volunteer-Based Biodiversity Monitoring*, ETC/BD report to the EEA, Technical paper No 4/2014.

Pellissier, V., Touroult, J., Julliard R., Siblet J. P. and Jiguet, F., 2013, 'Assessing the Natura 2000 Network with a Common Breeding Birds Survey', *Animal Conservation,* 16 (5): 566–74.

Penniston, R. and Lundberg, A., 2014, 'Forest Expansion as Explained by Climate Change and Changes in Land Use: a Study From Bergen, Western Norway', *Geografiska Annaler: Series a, Physical Geography,* 96 (4) 579–589.

Popescu, V. D., Rozylowicz, L., Niculae, I. M., Cucu, a. L. and Hartel, T., 2014, 'Species, Habitats, Society: An Evaluation of Research Supporting EU's Natura 2000 Network', *PloS ONE*, 9(11), e113648.

Rubio-Salcedo, M., Martínez, I., Carreño F. and Escudero, A., 2013, 'Poor Effectiveness of the Natura 2000 Network Protecting Mediterranean Lichen Species', *Journal for Nature Conservation,* 21 (1) 1–9.

Sánchez-Fernández, D., Abellán, P., Mellado, A., Velasco, J. and Millán, A., 2006, 'Are Water Beetles Good Indicators of Biodiversity in Mediterranean Aquatic Ecosystems? The Case of the Segura River Basin (SE Spain)', *Biodiversity and Conservation,* 15 (14) 4 507–4 520.

Sandor, A. D., and Domsa, C. 2012. 'Special Protected Areas for Conservation of Romania' Forest Birds: Status Assessment and Possible Expansion Using Predictive Tools.' *Acta Zool. Bulg.,* 64 (4) 367–374.

Timmermann, A., Damgaard, C., Strandberg, M. T. and Svenning, J. C., 2014, 'Pervasive early 21st-century vegetation changes across Danish semi-natural ecosystems: more losers than winners and a shift towards competitive, tall-growing species', *Journal of Applied Ecology,* (2014).

Touloumis, K. and John D. Pantis, 2014, 'Scaling of Habitat Loss in Natura 2000 Network', in: Henle, K., Potts, S., Kunin, W., Matsinos, Y., Simila J., Grobelnik, V. Penev L. and Settele, J., *Scaling in Ecology and Biodiversity Conservation*, Sofia: Pensoft Publishers (http://ab.pensoft.net/articles.php?id=1169) accessed 13 March 2015.

Tucker and Evans, 1997, 'Habitats for Birds in Europe: a Conservation Strategy for the Wider Environment', Cambridge, UK: BirdLife International, *BirdLife Conservation Series* 6.

Tsintides T., Christodoulou C. S., Delipetrou P. and Georghiou K., 2007, *The Red Data Book of the flora of Cyprus*, Cyprus Forest Association, Nicosia.

Trochet, A., 2013, 'Effectiveness of the Natura 2000 Network to Cover Threatened Species', *Nature Conservation,* (4) 35–53.

Van der Meij, T., Van Strien, A. J., Haysom, K. A., Dekker, J., Russ, J., Biala, K., Bihari, Z. et al., 2014, 'Return of the bats? A prototype indicator of trends in European bat populations in underground hibernacula', *Mammalian Biology — Zeitschrift für Säugetierkunde* (2014).

Verschuuren, J., 2010, 'Climate Change: Rethinking Restoration in the European Union's Birds and Habitats Directives', *Ecological Restoration,* 28 (4) 431–439.

Virkkala, R., Pöyry, J., Heikkinen, R. K., Lehikoinen, A. and Valkama, J., 2014, 'Protected areas alleviate climate change effects on northern bird species of conservation concern', *Ecology and evolution*, 4(15) 2 991–3 003.

European Environment Agency

State of nature in the EU
Results from reporting under the nature directives 2007–2012

2015 — 173 pp. — 21 x 29.7 cm

ISBN 978-92-9213-586-7
doi:10.2800/603862

HOW TO OBTAIN EU PUBLICATIONS

Free publications:

- one copy:
  via EU Bookshop (http://bookshop.europa.eu);

- more than one copy or posters/maps:
  from the European Union's representations (http://ec.europa.eu/represent_en.htm);
  from the delegations in non-EU countries (http://eeas.europa.eu/delegations/index_en.htm);
  by contacting the Europe Direct service (http://europa.eu/europedirect/index_en.htm) or calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (*).

  (*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

Priced publications:

- via EU Bookshop (http://bookshop.europa.eu).

TH-AK-15-002-EN-N
doi:10.2800/603862

European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark

Tel.: +45 33 36 71 00
Web: eea.europa.eu
Enquiries: eea.europa.eu/enquiries

Publications Office

European Environment Agency