



Technical paper N° 5/2015

Short topic assessment on Forests and Article 17 related data.

**Analysis of Articles 12 and 17 reporting data from
2007-2012 for woodland and forest ecosystems**

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22/07/2015

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Context:

The Topic Centre has prepared this Technical paper in collaboration with the European Environment Agency (EEA) under its 2015 work programmes as a contribution to the EEA's work on Biodiversity and ecosystem assessments and networks contributing to European and global processes.

Citation:

Please cite this report as
Delbaere, B., García Feced, C. and Condé, S., 2015. Short topic assessment on Forests and Article 17 related data. ETC/BD report to the EEA.

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ETC/BD Technical paper N° 5/2015

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1 Key messages

- Forest habitats in Europe are in a relatively bad conservation status and have mostly deteriorated in the last decade.
- Forest species in Europe are doing reasonably well, with improvements in the past ten years for many species. Species appear to respond more rapidly to conservation measures than forest habitats.
- Key pressures to forests relate to unsustainable forest management practices.
- Some variation between biogeographical regions can be observed in conservation status, trends and pressures.

2 Introduction

This Short Topic Assessment aims to give an overview of the relevant information on the woodland and forest ecosystem in one concise document in an easily accessible language. Furthermore, it adds an element of ‘assessment’, offering analytical discussion from the factual information displayed in the figures. In particular, where the State of Nature report provides aggregated information at the level of the European Union (EU) and biogeographical regions for the forest ecosystem as a whole, the current paper offers some insight at the level of habitat types and species. Although called an ‘assessment’ this paper does not offer in-depth analysis or additional data processing, which would require a larger study of the original data reported by the Member States.

The 1992 Habitats Directive (Directive 92/43/EEC), together with the 1979 Birds Directive (Directive 2009/147/EC), are the legal corner stone of the nature and biodiversity policy in the European Union (EU). The Habitats Directive aims at ensuring the conservation of a variety of rare, threatened, or endemic species, including more than 1250 species and sub-species and 233 habitat types considered to be of Community interest (these habitats and species are listed in the five annexes to the Directive). For the habitat types and species listed in Annex I & II of the Habitats Directive respectively, Member States (MS) must designate Sites of Community Importance (pSCI and SCI) and manage these as appropriate Special Areas of Conservation (SACs). On the other hand, the aim of the Birds Directive is to provide for the protection, management and control of naturally occurring wild birds and their nests, eggs and habitats within the European Union. It places great emphasis on the protection of habitats for endangered as well as migratory species (193 species and sub-species listed in Annex I), especially through the establishment of a coherent network of Special Protection Areas (SPAs). Natura 2000 ecological network is comprised by Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Birds Directive.

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 a composite report based on these national reports: State of nature in the EU (EC, 2015a).

Under the reporting of the Article 12 of the Birds Directive, Member States provide (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. Under the reporting of Article 17 of the Habitats Directive, each Member States provides both (i) general information about the implementation, and (ii) an assessment of the conservation status and trends of all species and habitats covered by the Habitats Directives, as well as supporting data such as population sizes of species and the surface area of habitats. Ideally the data for reporting would have

been collected during the reporting period (the most recent: 2007-2012) and using compatible methods in all Member States. However, this was unrealistic and Member States have used data collected for a variety of purposes and over varying time periods. In the cases where suitable data was unavailable, conservation status was assessed by experts. As a result, there is a wide range in the proportion of MS assessments, for both species and habitats, reported as 'Favourable' or 'Unfavourable'. Some of this variation reflects real differences in their condition, but an indeterminate proportion is due to differing approaches and methodologies. Details about the reporting processes are described in the most recent State of nature in the EU report (EEA, 2015).

For this document we have used data prepared for the EEA report 'State of nature in the EU: Results from the reporting under the nature directives 2007-2012' (EEA, 2015). For this report data are collected from Member States and aggregated at European and biogeographical level to describe the state of forest habitats and species within and outside Natura 2000. It should be noted that no Article 17 report of the Habitats Directive was provided by Greece in 2013 and therefore figures for Greece date back to 2006. Also, the current report covers EU27, as at the time of reporting Croatia was not yet an EU Member State. Forest and woodland ecosystem comprise about 30% of the land area of the EU (ETC/BD, 2011). Forestry is therefore an important sector when it regards the sustainable use of ecosystems and the protection of species and habitats, for which the EU 2020 Biodiversity Strategy is a leading policy framework. It consists of six mutually supporting and inter-dependent targets and 20 actions responding to the objectives of the 2020 biodiversity headline target, and aims at halting biodiversity loss and the degradation of ecosystem services (EC, 2011). Targets 1⁽¹⁾, 2⁽²⁾ and 3⁽³⁾ of the Biodiversity Strategy focus, respectively, on: the full implementation of the Birds and Habitats Directives, green infrastructure and the restoration of degraded ecosystems; and increasing the contribution of forestry (and agriculture) to maintaining and enhancing biodiversity and ecosystem services.

Frequent and reliable monitoring is needed to follow the progress towards reaching the biodiversity targets. This would help adequately address shortcomings in the protection of habitats and species, and if relevant outline necessary actions and measures to address them. In this context, the findings from the assessment of Article 17 reporting (EEA, 2015) provide us with a first indication of how the EU is progressing towards, in this case, the conservation of woodland and forest ecosystems and therefore also as a proxy for progress towards the target 3-B (Forests).

This report considers woodland and forest ecosystems as defined by the 'Mapping and Assessment of Ecosystems and their Services' (MAES) typology described in EC (2013). In this context, woodland and forest ecosystem are "areas dominated by woody vegetation of various age or they have succession climax vegetation types on most of the area supporting many ecosystem services".

¹ Target 1: *To halt the deterioration in the status of all species and habitats covered by EU nature legislation and achieve a significant and measurable improvement in their status so that, by 2020, compared to current assessments: (i) 100% more habitat assessments and 50% more species assessments under the Habitats Directive show an improved conservation status; and (ii) 50% more species assessments under the Birds Directive show a secure or improved status.*

² Target 2: *By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems.*

³ Target 3B: *Forests: By 2020, Forest Management Plans or equivalent instruments, in line with Sustainable Forest Management (SFM), are in place for all forests that are publicly owned and for forest holdings above a certain size (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.*

The MAES typology includes four Corine land cover classes (level 3) to belong to the ecosystem type woodland and forest (Table 1).

Table 1: Corine land cover (CLC) classes (level 3) belonging to woodland and forest ecosystem type

CLC level 3	MAES ecosystem type
3.1.1. Broad-leaved forests	Woodland and forest
3.1.2. Coniferous forests	Woodland and forest
3.1.3. Mixed forest	Woodland and forest
3.2.4. Transitional woodland shrub	Woodland and forest

This report uses the following terminology:

- ‘Forests’ always means woodland and forest ecosystems following the MAES typology (unless mentioned differently);
- ‘Species’ always refers to those species that are listed in the Habitats or Birds Directive and are associated with woodland and forest ecosystems (unless mentioned differently);
- ‘Habitats’ always means habitat types that are associated with woodland and forest ecosystems (unless mentioned differently).

The selection of species and habitat types associated with woodland and forest ecosystem are extracted from the reference dataset developed by the EEA-ETC/BD (EEA, 2014) where all habitats and species covered by the Habitats Directives are allocated to ecosystem types as defined by the MAES.

2.1 Woodland and forest ecosystem in the European Union

Appendix 1 lists the 81 Habitats Directive Annex I habitat types associated with MAES woodland and forest ecosystem (EEA, 2014). The vast majority of these habitat types are included in Annex I as forest habitat types (codes starting with 9) which are defined as (sub)natural woodland vegetation comprising native species forming forests of tall trees, with typical undergrowth, and meeting the following criteria: rare or residual, and/or hosting species of Community interest.

There are large differences in forest coverage between the biogeographical regions of Europe. The Boreal region has the highest proportion of forests followed by the Alpine and the Macaronesian region, all three with over 50% of the territory covered by forests. The Pannonian and Steppic regions have less than 20% and 8% forest coverage respectively.

Table 2 shows the ten Annex I forest habitat types with the biggest area in the EU (and which together cover almost 75% of the whole Annex I forest habitat area) are (surface area in brackets in km² (⁴)).

⁴ Source: <http://bd.eionet.europa.eu/article17/reports2012/habitat/summary/>

Table 2: Annex I largest forest habitat types in the EU

Rank	Code	Habitat	Surface (km ²)
1	9120	Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrublayer (<i>Quercinion robori-petraeae</i> or <i>Ilici-Fagenion</i>)	220.866
2	9230	Galicio-Portuguese oak woods with <i>Quercus robur</i> and <i>Quercus pyrenaica</i>	98.399
3	91D0	*Bog woodland	44.469
4	9340	<i>Quercus ilex</i> and <i>Quercus rotundifolia</i> forests	43.819
5	9010	*Western Taiga	35.112
6	9130	<i>Asperulo-Fagetum</i> beech forests	33.120
7	91M0	Pannonian-Balkan turkey oak- sessile oak forests	33.028
8	9110	<i>Luzulo-Fagetum</i> beech forests	25.069
9	9040	Nordic subalpine/subarctic forests with <i>Betula pubescens</i> ssp. <i>Czerepanovii</i>	19.420
10	9160	Sub-Atlantic and medio-European oak or oak hornbeam forests of the <i>Carpinion betuli</i>	18.248

2.2 Species associated with woodland and forest ecosystem

The Birds Directive includes 151 bird species associated with woodland and forest ecosystem. In the Habitats Directive there is a total of 254 non-bird species associated with this ecosystem. Of the latter group, 26 are amphibians, 48 arthropods, 57 mammals, 10 molluscs, 16 non-vascular plants, 13 reptiles, and 84 vascular plants. It should be noted that most mobile species are not strictly restricted to forests only. Large carnivores for examples are known to use other ecosystems in the wider landscape. Forests, however, do make up an important ecosystem in their life cycle.

When considering the forest-associated non-bird species from the Habitats Directive annexes per biogeographical region, the highest total number are to be found in the Mediterranean (122) and the Alpine (109) regions. The lowest number (30) is to be found in the Steppic region, which is relative small and low in forest cover. In general, mammals make up the largest share in all regions except for the Macaronesian, where the vascular plants make up a larger share (27 plant species compared to 8 mammal species).

3 Status and trends

In the Habitats Directive, the conservation status of a particular species or habitat is classified based on an evaluation of four parameters: a) for species: range, population, suitable habitat and future prospects; b) for habitats: range, area, structure and functions, and future prospects. The parameters are collected by the Member States and assessed according to an agreed evaluation matrix (EC, 2005), leading to an overall conservation status assessment in four classes (Table 3) (EEA, 2015).

Table 3: Habitats Directive conservation status classes

Habitats and non-bird species conservation status class
Favourable ⁵
Unknown
Unfavourable - inadequate ⁶
Unfavourable - bad ⁷

The trends in conservation status of habitats and non-bird species with unfavourable status are classified as shown in Table 4.

Table 4: Habitats Directive trends in conservation status classes

Qualifier classes for assessing trends in the overall unfavourable conservation status of habitats and non-bird species
Improving
Unknown
Stable
Declining

With respect to the Birds Directive, the assessment of the population status at EU level is based on the population size and trends reported by Member States. The four population status classes used for birds (Table 5) are based on the scientific criteria developed to determine risks of extinction that were used to establish Species Red Lists by IUCN (EEA, 2015).

Table 5: Birds Directive population status classes

Birds population status class
Secure
Unknown
Near threatened, declining or depleted
Threatened (i.e. vulnerable, endangered, critically endangered, regionally extinct)

The trends in population status of bird species with non-secure status are classified as shown in Table 6.

Table 6: Birds Directive trends in population status classes

Population trend for species under the Birds Directive
Increasing
Uncertain/Unknown
Stable/Fluctuating
Decreasing

⁵ The habitat or species can be expected to prosper without any change to existing management or policies.

⁶ 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.

⁷ Habitats or species are in serious danger of becoming extinct (at least regionally).

3.1 Status and trends at EU biogeographical level

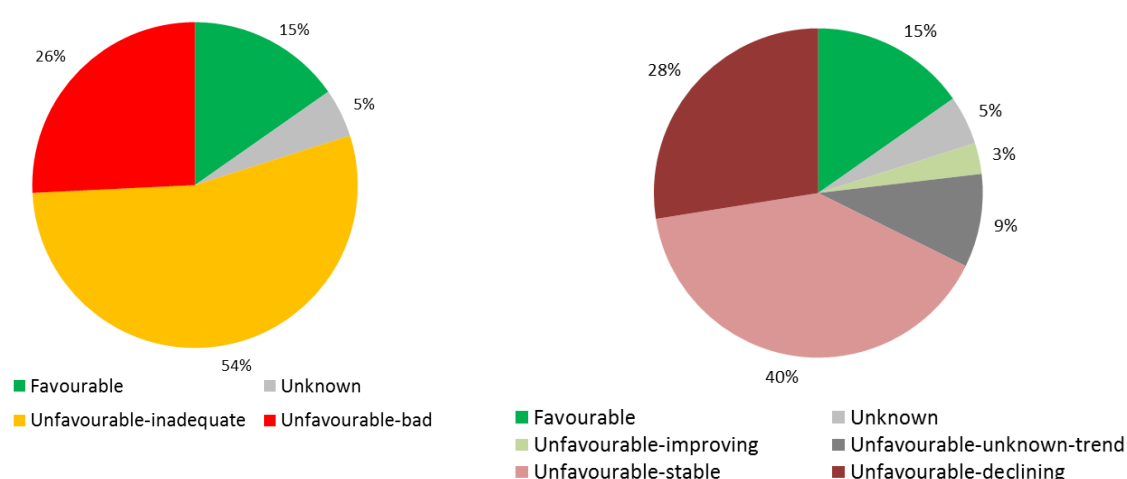
The European Union has nine biogeographical regions, each with its own characteristic blend of vegetation, climate and geology ⁽⁸⁾. For habitats and non-bird species, Member States assess the status for each of the biogeographical regions that are represented in their country. This section is based on the conservation status of habitats and species assessed at EU biogeographical level. There are 229 and 642 assessments respectively of habitats and species associated with woodland and forest ecosystems.

3.1.1 Conservation status and trends of habitats

As is demonstrated in Figure 1 only a small part of the assessments is favourable and four out of five assessments are classified as not being in a good conservation status. For 5% of the assessments the status is unknown, indicating that forests are relatively well-studied.

As for trends in conservation status of forest habitats, both unfavourable-stable and unfavourable-declining together made up two thirds of assessments, while unfavourable-improving made up only 3% (Figure 1, right).

Figure 1: Conservation status and trends of habitats associated with woodland and forest ecosystem (% of number of assessments)



3.1.2 Conservation status and trends of non-bird species

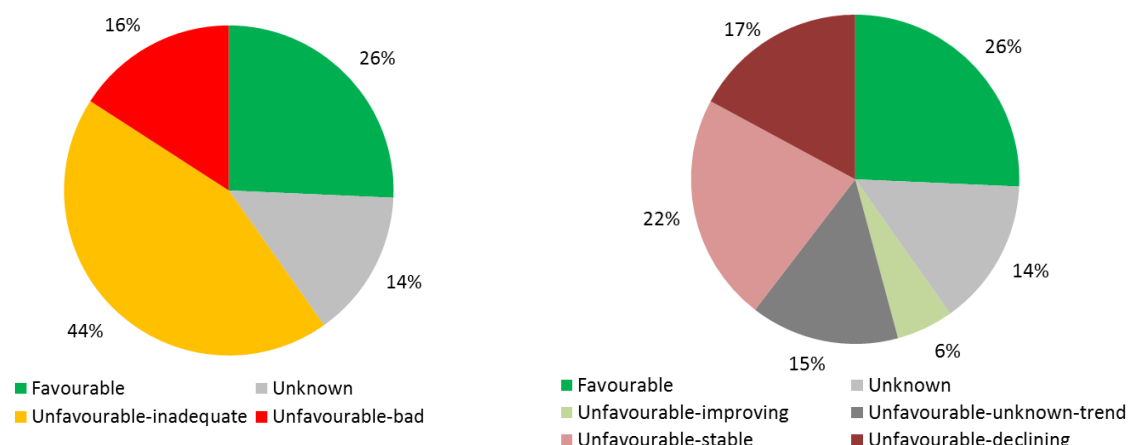
As shown in Figure 2, more than a quarter of assessments are assessed as favourable. However, almost two thirds of species assessments are assessed as unfavourable. The proportion of unknown status of species is almost three times as high as that for forest habitats.

Regarding the trends, nearly a quarter of the assessments are assessed as unfavourable-stable, while only 6% are assessed as unfavourable-improving and a significant amount of the remaining assessments (17%) are assessed as unfavourable-declining.

⁸ Source: http://ec.europa.eu/environment/nature/natura2000/sites_hab/biogeog_regions/index_en.htm

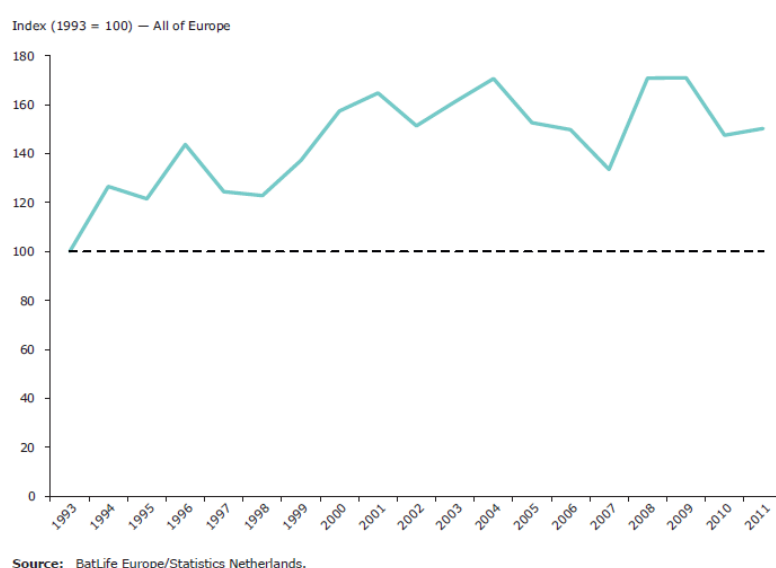
The overall picture is mixed, with a relatively high share of favourable assessments, but also with a high share of unfavourable assessments and little signs of improvement. However, much of the above is based on an artefact due to the large decrease in the number of unknown assessments (from near 43% to close to 14%).

Figure 2: Conservation status and trends of non-bird species associated with woodland and forest ecosystem (% of number of assessments)



Within the group of forest species, bats appear to show relatively more positive trends although the majority is still assessed as unfavourable in most biogeographical regions. Species such as Schreiber's bent-winged bat (*Miniopterus schreibersii*), Long-fingered bat (*Myotis capaccini*) and Mediterranean horseshoe bat (*Rhinolophus euryale*) show clear improvements in terms of overall assessment compared to the previous reporting round. This general improvement among bats is reflected also in the recent prototype European hibernating bat indicator (Figure 3) (EEA, 2013). On the other hand, the Barbastelle bat (*Barbastella barbastellus*) has been generally assessed as unfavourable in all biogeographical regions.

Figure 3: The prototype European hibernating bat index



Another species group that is associated with forests in a heterogeneous landscape consists of a number of large carnivores. For Wolf (*Canus lupus*), Lynx (*Lynx lynx*), Wolverine (*Gulo gulo*) and

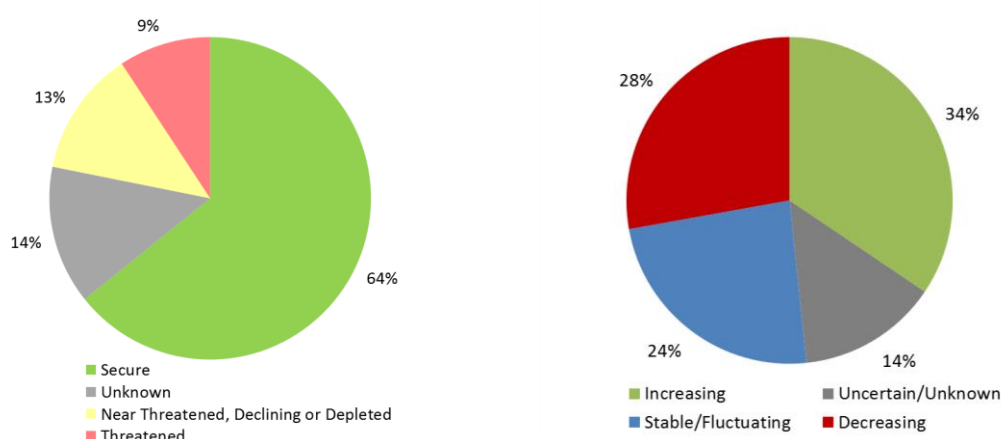
Brown bear (*Ursus arctos*) positive trends are reported for some regions, which largely corresponds to trends described by the European Commission (EC, 2012).

3.1.3 Population status and trends of bird species

Birds associated with forests are doing reasonably well, see Figure 4, when compared to all common bird species: almost two out of three forest birds have a secure population status, compared to just over half of all common birds.

When looking at trends in bird populations, the increasing populations are roughly balanced by decreasing populations, which shows an overall picture of stability (Figure 4, right). This picture is also reflected by the Common forest bird index, which shows a decline for forest bird populations in the EU in the period 1990 to 2000, followed by a modest recovery since that time (Figure 5).

Figure 4: Population status (left) and short-term trends (right) of bird species associated with woodland and forest ecosystem (% of number of assessments)



There are significant differences at the level of individual species. When comparing species, it should be recognized that most bird species are dependent on a number of different habitat categories in a wider landscape setting. Therefore, any increase or decline of a species that is associated with forests cannot necessarily be attributed to changing forest status. Also, information on the population status of individual species⁹ covers the entire population and not just that which is located in woodland and forest ecosystems.

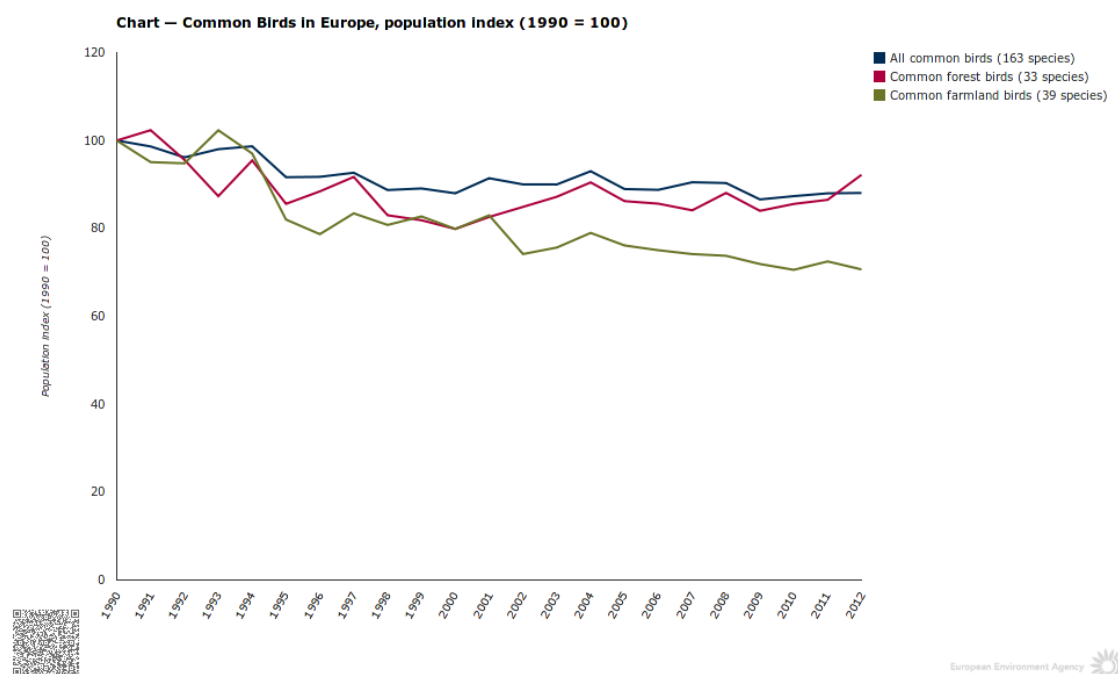
Of the 33 common bird species that the European Bird Census Council identified as relatively more dependent on forests, 24 have a secure population status. Examples include Crested tit (*Parus cristatus*), Bullfinch (*Pyrrhula pyrrhula*) and Hasel grouse (*Bonasa bonasia*). An example of a threatened forest species is the Willow tit (*Parus montanus*).

Examples of forest bird species that have increased considerably (plus 48% or more) in 2003-2012 include Common redstart (*Phoenicurus phoenicurus*), widespread across Europe, Middle spotted woodpecker (*Dendrocopos medius*), a more central and eastern European species, and Bonelli's warbler (*Phylloscopus bonelli*), a species with a more southern/Mediterranean distribution. Forest bird

⁹ <http://www.ebcc.info/index.php?ID=557>

species that show steep declines in the past ten years are only few, with Waxwing (*Bombycilla garrulus*) a typical boreal species, and Goldcrest (*Regulus regulus*), more equally distributed across Europe, showing declines of 25% or more.

Figure 5: Common birds in Europe population index



Source: SEBI indicator 001 - Abundance and distribution of selected species¹⁰

3.2 Conservation status by biogeographical region

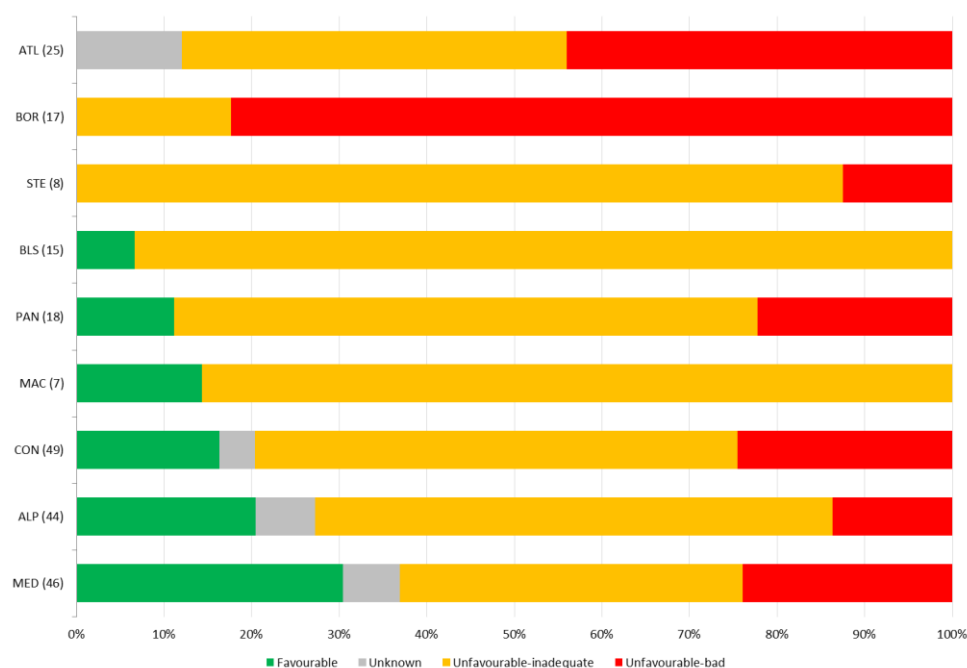
This section presents the results of the biogeographical assessments detailed by biogeographical region. Birds are not presented, as Member States only report population trends of birds at the country level.

3.2.1 Habitats

The share in forest habitat area of each conservation status class per biogeographical region is presented in Figure 6:

Figure 6: Conservation status of habitats associated with woodland and forest ecosystem by biogeographical region (% of number of assessments)

¹⁰ <http://www.eea.europa.eu/data-and-maps/indicators/abundance-and-distribution-of-selected-species/abundance-and-distribution-of-selected-2>



The Mediterranean region has the highest share of favourable habitat assessments (about one third) and at the same time a relatively high share of unfavourable-bad assessments (almost a quarter).

The Atlantic, Boreal and Steppic biogeographical regions show no forest habitat assessments in favourable conservation status. The Atlantic and Boreal regions even have over 40% and 80% respectively of their forest habitat assessments in unfavourable-bad status.

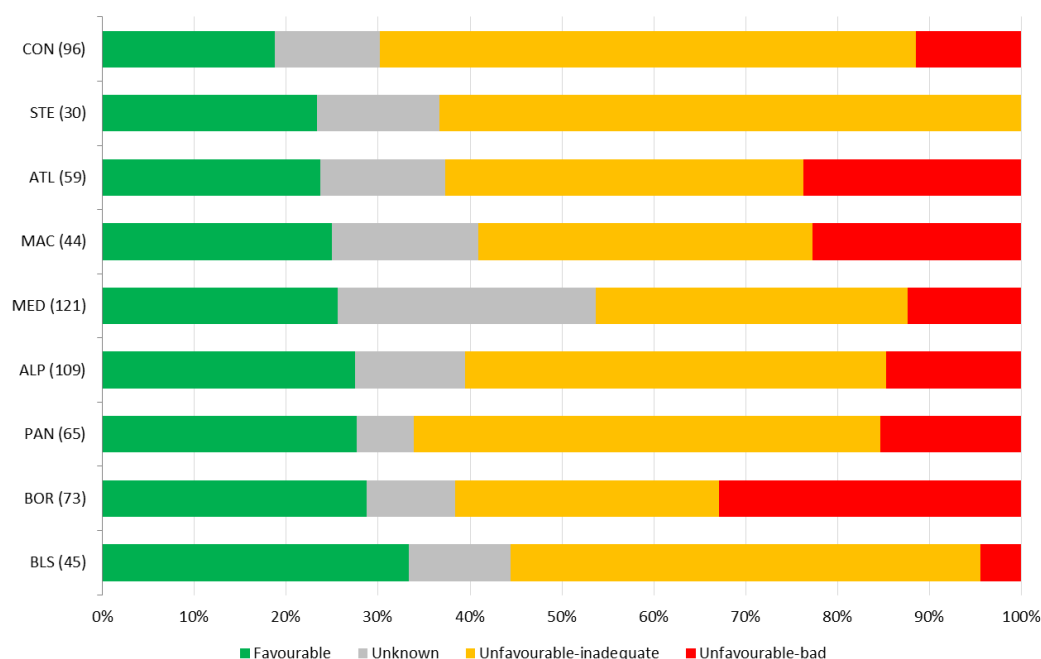
When looking at the level of habitat groups and individual habitat types (Appendix 2) some differences can be highlighted. For example, forests in the Boreal biogeographical region are in general assessed as being in unfavourable status, except for Nordic subalp/subarctic forests *Betula pubescens czerepavoni* (9040) in the Alpine region. Fennoscandian wooded pastures (9070) are doing particularly bad, being assessed as unfavourable-bad in the Alpine, Boreal and Continental regions. Strikingly, Mediterranean forest types appear to show more favourable assessments, with nearly all forest habitat types in Italy being assessed as favourable, which may be an artefact.

A forest habitat type that has been receiving particularly negative assessments across the biogeographical regions is ‘Alluvial forests with *Alnus glutinosa* & *Fraxinus excelsior*’ (91E0). This appears to be unfavourably assessed across its range, with only a few exceptions at national level. This may explain why over one third of all 85 LIFE-Nature projects on forest habitats in the period 2006-2013 focus on habitat restoration or species conservation in this particular habitat type (Bollen et al., 2015). It would be very speculative to draw any conclusions on effectiveness given the known time lag between restoration measures and habitat improvements. However, it should be noted that, compared to the 2001-2006 reporting round, in both the Mediterranean and the Pannonic regions these Alluvial forests have improved from an overall unfavourable-bad to an unfavourable-inadequate status.

3.2.2 Non-bird species

When comparing regions (Figure 7), the proportion of favourably assessed forest species ranges from just under one fifth for the Continental to one third for the Black Sea region. As for habitats, the Boreal and Atlantic regions show the highest proportion of unfavourable-bad assessments for non-bird species.

Figure 7: Conservation status of non-bird species associated with woodland and forest ecosystem by biogeographical region (% of number of assessments)



There are large differences in conservation status between non-bird species and between biogeographical regions. It should be noted that species labelled as ‘forest species’ are in many cases also dependent on other ecosystems within a wider landscape. Conservation status for species, as provided by Member States, is across ecosystems and not only concerning the situation in forests.

The overview of conservation status of forest amphibian, mammal and reptiles species by biogeographical region (Appendix 3) shows that the majority of assessments are unfavourable-inadequate. However, some species stand out by differing from the overall picture. For example, the Great crested newt (*Triturus cristatus*) also shows unfavourable-bad assessments for the Alpine and Boreal regions and no region with a favourable overall assessment. On the other end, the Pine marten (*Martes martes*) appears to be doing rather well, with an overall favourable assessment in all biogeographical regions for which sufficient data is available. The Aesculapian snake (*Elaphe longissima*) on the other hand, a forest-dwelling reptile of the southern parts of Europe, shows quite some variation in conservation status per biogeographical region, being unfavourable-bad in the Alpine and Pannonian region and favourable in the Atlantic and Mediterranean regions.

4 Changes in conservation status in relation to previous reporting period

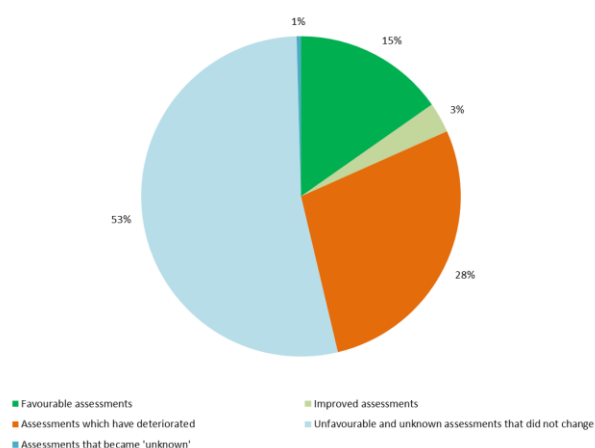
Changes in conservation status in the current chapter are based on a specific analysis comparing overall data between the two reporting periods — 2001-2006 and 2007-2012 (EEA, 2015).

4.1 Changes in conservation status at EU biogeographical level

4.1.1 Habitats

Looking at the changes in conservation status of forest habitats between the two reporting periods (Figure 8), 53% of woodland and forest habitats assessments did not change and are still unfavourable and unknown; this is slightly different than for all habitats (48%) (Table 6.2 in EEA, 2015). But 28% of assessments have deteriorated (30% for all habitats).

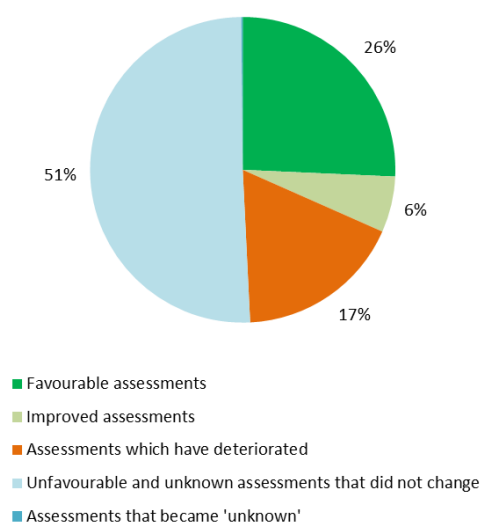
Figure 8: Change in conservation status of habitats associated with woodland and forest ecosystem at EU27 level (% of number of assessments)



4.1.2 Non-bird species

When considering non-bird species, the comparison between the two reporting periods (Figure 9), 17% of woodland and forest non-bird species assessment have 17% of assessments which have deteriorated (22% for all species).

Figure 9: Changes in conservation status of non-bird species associated with woodland and forest ecosystem at EU27 level (% of number of assessments)

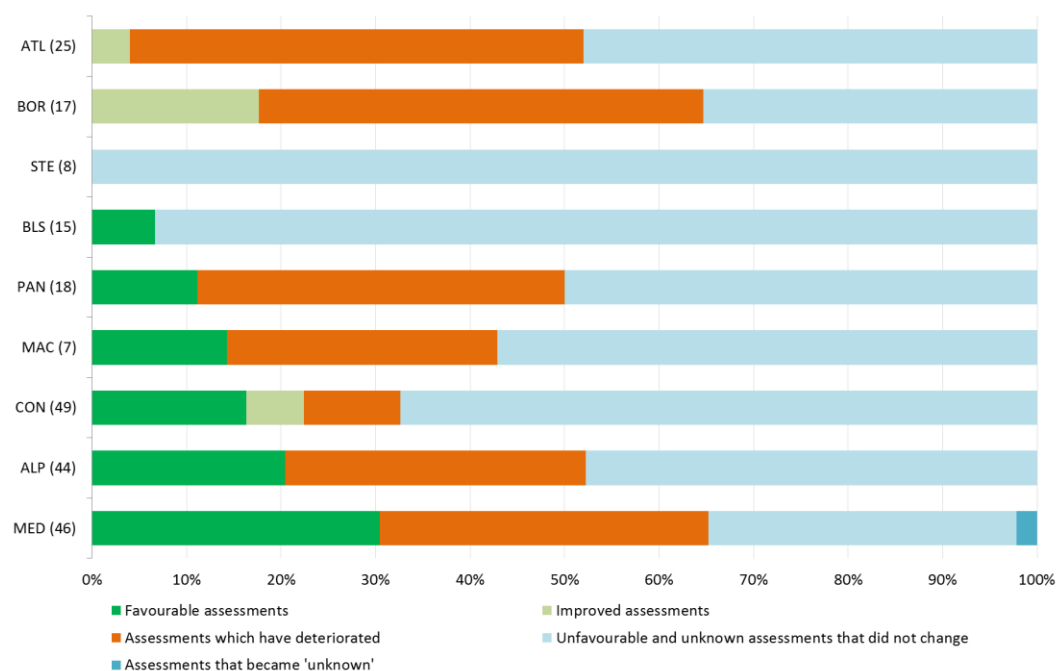


4.2 Changes in conservation status by biogeographical region

4.2.1 Habitats

The EU picture of changes in forest habitats is clearly reflected when looking at the differences per biogeographical region (Figure 10).

Figure 10: Changes in conservation status of habitats associated with woodland and forest ecosystem by biogeographical region (% of number of assessments)

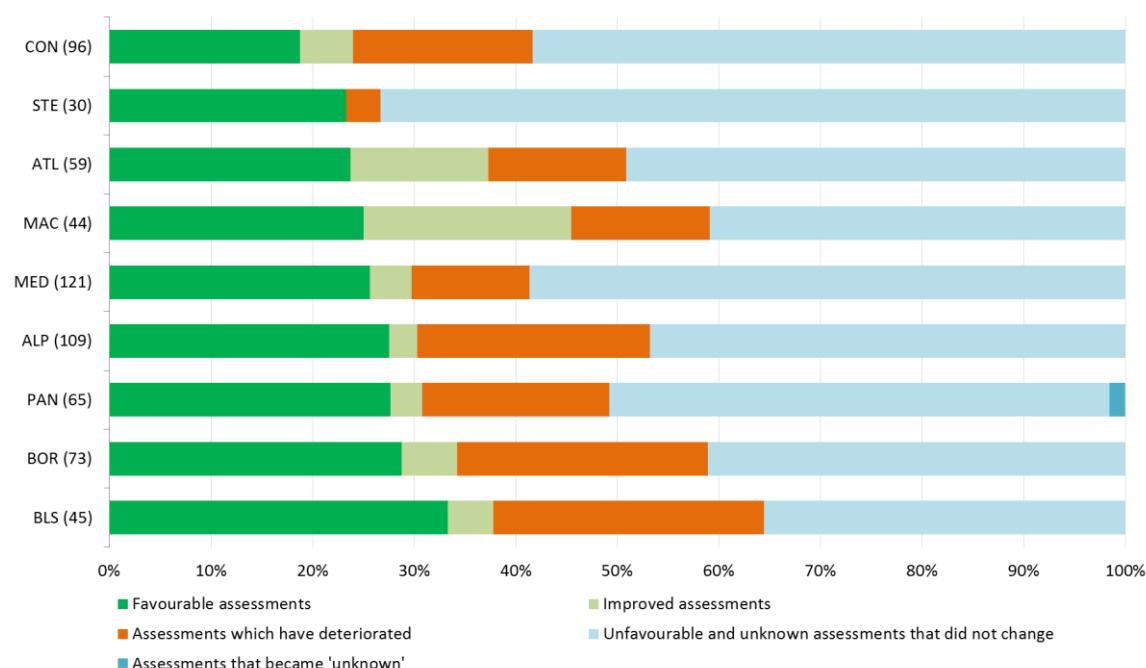


All regions show a high proportion of stable assessments, although the Steppic and Black Sea regions stand out in terms of stability. Both regions show no assessments that have gotten worse since the previous reporting round, whereas almost half of the assessments for the Boreal and the Atlantic regions have deteriorated. In terms of improved assessments, the EU total of 3% is situated in three regions only, Atlantic, Boreal, and Continental, which in the previous reporting round showed high numbers and proportions of unfavourable assessments. This could be interpreted as a modest sign of habitat recovery.

4.2.2 Non-bird species

When comparing changes in the assessments between 2001-2006 and 2007-2012 (Figure 11), 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. Other than for habitat types, improvements in conservation status for non-bird species seem to be more equally spread across the biogeographical regions.

Figure 11: Changes in conservation status of non-bird species associated with woodland and forest ecosystem by biogeographical region (% of number of assessments)



5 Pressures and threats

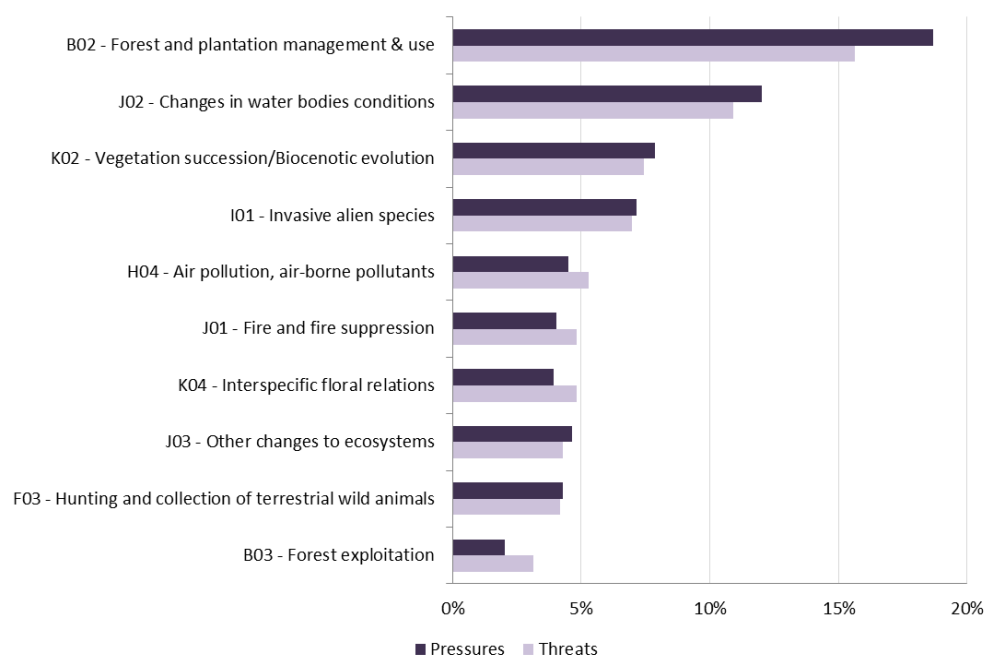
As part of the reporting for the nature directives Member States indicate the key pressures and threats that influence the status and trends of individual species and habitat types. Pressures are defined as the factors acting now or during the reporting period (i.e. 6 years) to threaten the long-term viability of species, whereas threats are factors expected to be acting in the near future (i.e. 12 years into the future) (EEA, 2015). In the reporting process pressures and threats are grouped into several hierarchical levels, with a generic first level of 17 categories and a detailed fourth level containing 112 categories. In the following paragraphs assessment on pressures and threats have been summed and in most cases represented for level 1 or 2 only.

5.1 Pressures and threats: overall results

5.1.1 Habitats

Woodland and forest habitats naturally face the largest pressures/threats from 'forestry' (comprising 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 and use (particularly the removal of dead and dying trees) and changes in water body conditions. A further significant human-induced pressure/threat to woodland and forest habitats is caused by invasive alien species (Figure 12).

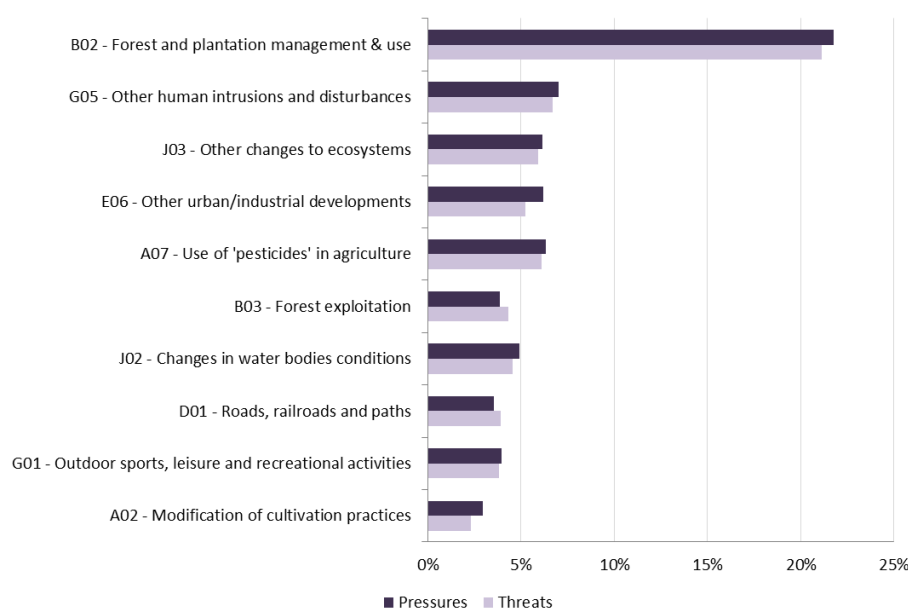
Figure 12: Top 10 (% of frequency) reported high-ranked pressures and threats (at level 2) for habitats associated with woodland and forest ecosystem



5.1.2 Non-bird species

The dominant threat and pressure for woodland and forest ecosystem non-bird species also 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 (Figure 13).

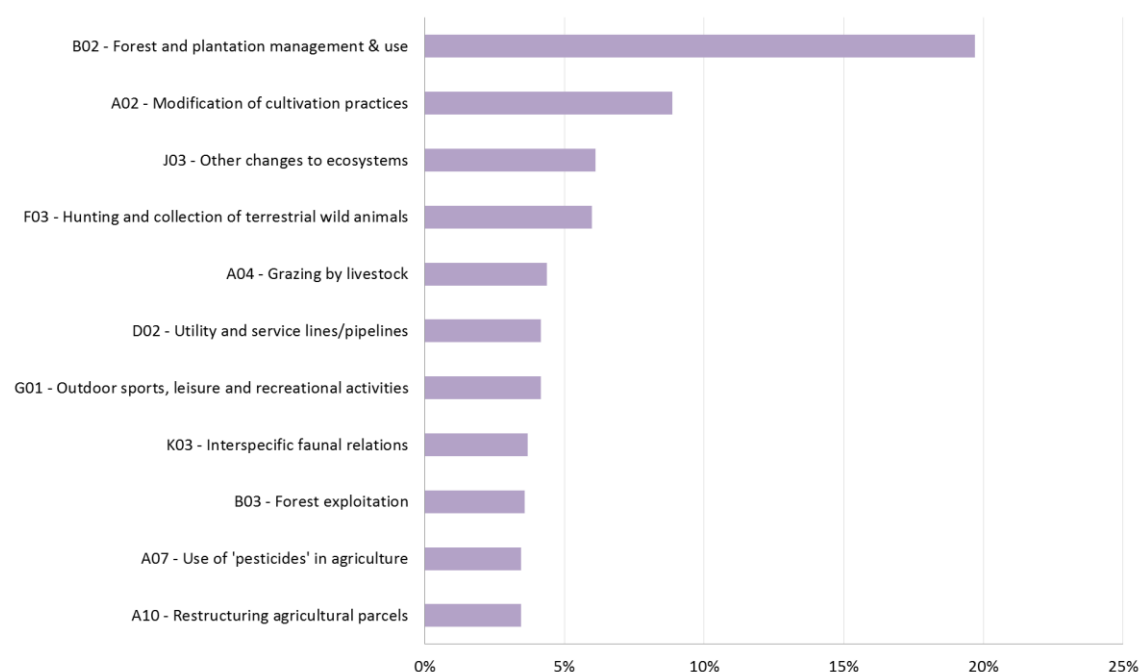
Figure 13: Top 10 (% of frequency) reported high-ranked pressures and threats (at level 2) for non-bird species (Habitats Directive) associated with woodland and forest ecosystem



5.1.3 Bird species

Woodland and forest birds are most affected by forestry and agriculture-related pressures/threats (roughly one quarter 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 (Figure 14).

Figure 14: Top 10 (% of frequency) reported high-ranked pressures/threats (at level 2) for birds associated with woodland and forest ecosystem



5.2 Pressures by biogeographical region

5.2.1 Habitats

There is some variation in most reported pressures to forest habitats when looking at the level of biogeographical region (Table 7). In the Mediterranean region, for example, fire and fire suppression is most often reported. For the Black Sea, Macaronesian and Steppic regions also pressures other than 'Forest and plantation management and use' top the list. However, for these three regions the numbers of reported pressures are very low (<10).

Table 7: Top three reported pressures (at level 2) to habitats associated with woodland and forest ecosystem by biogeographical region

ALP	ATL	BLS	BOR	CON	MAC	MED	PAN	STE
Forest and Plantation management & use	Forest and Plantation management & use	Mining and quarrying	Forest and plantation management & use	Forest and plantation management & use	Invasive alien species	Fire and fire suppression	Forest and plantation management & use	Abiotic changes (climate change)
Changes in water bodies conditions	Air pollution, air-borne pollutants	Grazing in forests & woodlands	Vegetation succession/Biototic evolution	Changes in water bodies conditions	Interspecific floral relations	Forest exploitation	Vegetation succession/Biototic evolution	Changes in water bodies conditions
Sport and leisure infrastructures	Changes in water bodies conditions	Invasive alien species	Changes in water bodies conditions	Vegetation succession/Biototic evolution	Grazing by livestock	Grazing by livestock	Hunting and collection of terrestrial wild animals	Interspecific faunal relations

5.2.2 Non-bird species

Pressures for non-bird species associated with forest ecosystems at EU level are ranked in Figure 3. Although 'Forest and Plantation management & use' features in the top three of all biogeographical regions except Macaronesian, there are some differences, some of the pressures are specific to certain biogeographical regions. This is for example the case for 'Fire and fire suppression' in the Black Sea region or the 'Restructuring of agricultural parcels' in the Atlantic biogeographical region (Table 8).

Table 8: Top three reported pressures (at level 2) to species associated with woodland and forest ecosystem by biogeographical region

ALP	ATL	BLS	BOR	CON	MAC	MED	PAN	STE
Forest and Plantation management & use	Forest and Plantation management & use	Fire and fire suppression	Forest and plantation management & use	Forest and plantation management & use	Other changes to ecosystems	Forest and plantation management & use	Forest and plantation management & use	Forest and plantation management & use
Other urban/industrial developments	Restructuring agricultural parcels	Forest and plantation management & use	Other changes to ecosystems	Use of 'pesticides' in agriculture	Invasive alien species	Other changes to ecosystems	Use of 'pesticides' in agriculture	Production of renewable energy (abiotic)
Forest exploitation	Other changes to ecosystems	Use of 'pesticides' (forestry)	Other human intrusions and disturbances	Other human intrusions and disturbances	Abiotic changes (climate change)	Other human intrusions and disturbances	Other human intrusions and disturbances	Other human intrusions and disturbances

6 Natura 2000 coverage and conservation measures

6.1 Coverage of the ecosystem in Natura 2000

In total 375 000 km² of forests are included in the Natura 2000 Network. This represents almost 50% of the total area in Natura 2000 and around 21% of the total forest resource in the EU (EC, 2015b). About 25% of forest habitat area is covered by Habitats Directive sites (Sites of Community Importance; SCI) in the whole EU. The percentage of coverage is much higher in regions with a small forested area (Macaronesian, Black Sea, Steppic and Pannonian regions) than in the regions that have large proportions of forest habitat. Data in the Atlantic region are dominated by unreliable high forest habitat areas reported by France and should therefore be interpreted with caution.

6.2 Conservation measures

As part of the reporting on the Habitats and Birds Directives, Member States are asked to give information on the most common conservation measures applied to forests. The five most frequently reported conservation measures for woodland and forest habitats, non-bird species and bird species at level 2 of the conservation measures categorisation are listed in Table 9, Table 10 and Table 11.

Table 9: Top 5 level 2 conservation measures ranked high for habitats associated with woodland and forest ecosystem

Measure	%
6.1 - Establish protected areas/sites	26.8
3.2 - Adapt forest management	18.9
3.1 - Restoring/improving forest habitats	18.4
6.3 - Legal protection of habitats and species	8.6
6.2 - Establishing wilderness areas/allowing succession	5.6

Table 10: Top 5 level 2 conservation measures ranked high for non-bird species associated with woodland and forest ecosystem

Measure	%
6.3 - Legal protection of habitats and species	25.4
6.1 - Establish protected areas/sites	19.1
7.4 - Specific single species or species group management measures	8.4
3.2 - Adapt forest management	8.2
3.1 - Restoring/improving forest habitats	7.7

Table 11: Top 5 level 2 conservation measures ranked high for bird species associated with woodland and forest ecosystem

Measure	%
6.3 - Legal protection of habitats and species	22.2
6.1 - Establish protected areas/sites	21.8
3.2 - Adapt forest management	11.5
3.1 - Restoring/improving forest habitats	7.9
7.4 - Specific single species or species group management measures	6.9

The top five presented conservation measures are roughly the same for habitats or species, with some differences in their relative importance. The only difference is in the establishment of wilderness areas or allowing for succession being a top five measure for habitats, whereas management measures that aim at specific species or species groups obviously feature higher for species conservation measures. Of all measures listed above, two can be regarded as being of a more administrative or legal nature: legal protection of habitats or species requires changes to the regulatory framework. This also holds for the establishment of protected areas, combined with spatial planning measures. The other listed measures can be regarded as practical conservation measures that can be applied at site or habitat level. In comparison with the measures ranking highest for habitats it can be noted that for species (including birds) legal conservation measures rank higher than nature management practices.

The picture presented above corresponds to a certain extent with the main objectives of LIFE projects focused on forest habitat types in the period 2006-2013. The majority (25%) of forest-related projects aim to restore habitats and the second most common objective is the conservation of species (14%) (Bollen et al., 2015).

Despite the many conservation measures taken, the information presented in the current paper does not give evidence at the level of the EU27 or at the level of biogeographical regions of clear improvements in conservation status of forests or of the individual species or habitat types. On the contrary, the overall picture seems to be negative, with more habitats and species deteriorating than improving. This may to a large extent be attributable to the time lag between implementation of conservation measures and the effect this has on populations or habitat quality. Some small signs of improvement in individual species or habitat types demonstrate that positive changes can result from conservation measures taken.

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Appendix 1: Habitats Directive Annex I habitat types associated with MAES woodland and forest ecosystem (EEA, 2014)

2180	Wooded dunes of the Atlantic, Continental and Boreal region
2270	Wooded dunes with <i>Pinus pinea</i> and/or <i>Pinus pinaster</i>
9010	Western Taiga
9020	Fennoscandian hemiboreal natural old broad-leaved deciduous forests (<i>Quercus</i> , <i>Tilia</i> , <i>Acer</i> , <i>Fraxinus</i> or <i>Ulmus</i>) rich in epiphytes
9030	Natural forests of primary succession stages of landupheaval coast
9040	Nordic subalpine/subarctic forests with <i>Betula pubescens</i> ssp. <i>czerepanovii</i>
9050	Fennoscandian herb-rich forests with <i>Picea abies</i>
9060	Coniferous forests on, or connected to, glaciofluvial eskers
9080	Fennoscandian deciduous swamp woods
9110	Luzulo-Fagetum beech forests
9120	Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrublayer (<i>Quercion roburi-petraeae</i> or <i>Ilici-Fagenion</i>)
9130	Asperulo-Fagetum beech forests
9140	Medio-European subalpine beech woods with <i>Acer</i> and <i>Rumex arifolius</i>
9150	Medio-European limestone beech forests of the <i>Cephalanthero-Fagion</i>
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the <i>Carpinion betuli</i>
9170	<i>Galio-Carpinetum</i> oak-hornbeam forests
9180	<i>Tilio-Acerion</i> forests of slopes, screes and ravines
9190	Old acidophilous oak woods with <i>Quercus robur</i> on sandy plains
91A0	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles
91AA	Eastern white oak woods
91B0	Thermophilous <i>Fraxinus angustifolia</i> woods
91BA	Moesian silver fir forests
91C0	Caledonian forest
91CA	Rhodopide and Balkan Range Scots pine forests
91D0	Bog woodland
91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)
91F0	Riparian mixed forests of <i>Quercus robur</i> , <i>Ulmus laevis</i> and <i>Ulmus minor</i> , <i>Fraxinus excelsior</i> or <i>Fraxinus angustifolia</i> , along the great rivers (<i>Ulmenion minoris</i>)
91G0	Pannonic woods with <i>Quercus petraea</i> and <i>Carpinus betulus</i>
91H0	Pannonian woods with <i>Quercus pubescens</i>
91I0	Euro-Siberian steppic woods with <i>Quercus</i> spp.
91J0	<i>Taxus baccata</i> woods of the British Isles
91K0	Illyrian <i>Fagus sylvatica</i> forests (<i>Aremonio-Fagion</i>)
91L0	Illyrian oak-hornbeam forests (<i>Erythronio-Carpinion</i>)
91M0	Pannonian-Balkanic turkey oak-sessile oak forests
91N0	Pannonic inland sand dune thicket (<i>Junipero-Populetum albae</i>)
91P0	Holy Cross fir forests (<i>Abietetum polonicum</i>)
91Q0	Western Carpathian calcicolous <i>Pinus sylvestris</i> forests
91R0	Dinaric dolomite Scots pine forests (<i>Genisto januensis-Pinetum</i>)
91S0	Western Pontic beech forests
91T0	Central European lichen Scots pine forests
91U0	Sarmatic steppe pine forest
91V0	Dacian Beech forests (<i>Symphyto-Fagion</i>)
91W0	Moesian beech forests
91X0	Dobrogean beech forests

- 91Y0 Dacian oak & hornbeam forests
- 91Z0 Moesian silver lime woods
- 9210 Apennine beech forests with *Taxus* and *Ilex*
- 9220 Apennine beech forests with *Abies alba* and beech forests with *Abies nebrodensis*
- 9230 Galicio-Portuguese oak woods with *Quercus robur* and *Quercus pyrenaica*
- 9240 *Quercus faginea* and *Quercus canariensis* Iberian woods
- 9250 *Quercus trojana* woods
- 9260 *Castanea sativa* woods
- 9270 Hellenic beech forests with *Abies borisii-regis*
- 9280 *Quercus frainetto* woods
- 9290 Cupressus forests (*Acero-Cupression*)
- 92A0 *Salix alba* and *Populus alba* galleries
- 92B0 Riparian formations on intermittent Mediterranean water courses with *Rhododendron ponticum*, *Salix* and others
- 92C0 *Platanus orientalis* and *Liquidambar orientalis* woods (*Platanion orientalis*)
- 92D0 Southern riparian galleries and thickets (*Nerio-Tamaricetea* and *Securinegion tinctoriae*)
- 9310 Aegean *Quercus brachyphylla* woods
- 9320 *Olea* and *Ceratonia* forests
- 9330 *Quercus suber* forests
- 9340 *Quercus ilex* and *Quercus rotundifolia* forests
- 9350 *Quercus macrolepis* forests
- 9360 Macaronesian laurel forests (*Laurus*, *Ocotea*)
- 9370 Palm groves of *Phoenix*
- 9380 Forests of *Ilex aquifolium*
- 9390 Scrub and low forest vegetation with *Quercus alnifolia*
- 93A0 Woodlands with *Quercus infectoria* (*Anagyro foetidae-Quercetum infectoriae*)
- 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)
- 9420 Alpine *Larix decidua* and/or *Pinus cembra* forests
- 9430 Subalpine and montane *Pinus uncinata* forests (* if on gypsum or limestone)
- 9510 Southern Apennine *Abies alba* forests
- 9520 *Abies pinsapo* forests
- 9530 (Sub-) Mediterranean pine forests with endemic black pines
- 9540 Mediterranean pine forests with endemic Mesogean pines
- 9550 Canarian endemic pine forests
- 9560 Endemic forests with *Juniperus* spp.
- 9580 Mediterranean *Taxus baccata* woods
- 9590 *Cedrus brevifolia* forests (*Cedrosetum brevifoliae*)
- 95A0 High oro-Mediterranean pine forests

Appendix 2: Conservation status of habitat types associated with woodland and forest ecosystem in 2007-2013 by biogeographical region

Habitats associated with woodland and forest	ALP	ATL	BLS	BOR	CON	MAC	MED	PAN	STE
2180 - Wooded dunes of the Atlantic, Continental & Boreal region		U1	U1	U2	U1				
2270 - Wooded dunes with Pinus pinea and/or Pinus pinaster					FV		U1		
9010 - Western Taiga	U1			U2	U2				
9020 - Fennoscandian old broad-leaved deciduous forests				U2	U2				
9030 - Nat forests of primary succession of landupheaval coast				U1					
9040 - Nordic subalp/subarctic forests Betula pub. czerepavoni	FV			U1					
9050 - Fennoscandian herb-rich forests with Picea abies	U1			U2					
9060 - Conif. forests on, or connected to, glaciofluvial eskers				U2					
9080 - Fennoscandian deciduous swamp woods				U2	U2				
9110 - Luzulo-Fagetum beech forests	U1	U1		U2	U1		FV	U1	
9120 - Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion roburi-petraeae or Ilici-Fagenion)	U1	U1			FV		U2		
9130 - Asperulo-Fagetum beech forests	U1	U1		U2	U1		FV	FV	
9140 - Medio-Europ. subalp. beech woods Acer & Rumex arifolius	U1				XX		FV		
9150 - Medio-Europ. limestone beech forests Cephalanthero-Fagion	U1	U1	U1		U1		U2	FV	
9160 - Sub-Atlantic and medio-Europ. oak/oak-hornbeam forests	U2	U2		U2	U1		XX		
9170 - Galio-Carpinetum oak-hornbeam forests	U1	U2	FV		U1			U2	
9180 - Tilio-Acerion forest of slopes, screes and ravines	U2	U2	U1	U2	U1		U1	U1	
9190 - Old acidophilous oak woods with Q. robur on sandy plain		U2		U2	U2			U1	
91A0 - Old sessile oak woods with Ilex & Blechnum in British Isles		U2							
91AA - Eastern white oak woods	XX		U1		U2		U2		U1
91B0 - Thermophilous Fraxinus angustifolia woods					U2		U1		
91BA - Moesian silver fir forests	U1				U1				
91C0 - Caledonian forest		U2							
91CA - Rhodope and Balkan Range Scots pine forests	U1				U1				
91D0 - Bog woodland	FV	U2		U1	U1	U1		U1	
91E0 - Alluvial forests with Alnus glutinosa & F. excelsior	U2	U2	U1	U2	U2		U1	U1	
91F0 - Riparian mixed forests of Quercus robur, Ulmus laevis and Ulmus minor, Fraxinus excelsior or Fraxinus angustifolia, along the great rivers	U2	U1	U1	U2	U2		U2	U1	U1
91G0 - Pannonic woods with Q. petraea & Carpinus betululus	U1		U1		U1			U1	

Habitats associated with woodland and forest	ALP	ATL	BLS	BOR	CON	MAC	MED	PAN	STE
91H0 - Pannonian woods with <i>Quercus pubescens</i>	U2		U1		U1			U1	
91I0 - Euro-Siberian steppic woods with <i>Quercus</i> spp.	FV		U1		U1			U2	U2
91J0 - <i>Taxus baccata</i> woods of the British Isles		U2							
91K0 - Illyrian <i>Fagus sylvatica</i> forests (Aremonio-Fagion)	U1				FV			U1	
91L0 - Illyrian oak-hornbeam forests (Erythronio-carpinion)	U2				U1		U1	U1	
91M0 - Pannonian-Balkan turkey oak-sessile oak forests	U1		U1		U1		U1	U1	U1
91N0 - Pann. inland sand dune thicket <i>Juniperus</i> - <i>Populeto albae</i>								U2	
91P0 - Holy Cross fir forests (<i>Abietetum polonicum</i>)					U1				
91Q0 - Western Carpathian calcicolous <i>Pinus sylvestris</i> forests	FV								
91R0 - Dinaric dolomite Scots pine forests <i>Genista janauensis</i> -Pinetum	FV				FV				
91S0 - Western Pontic beech forests			U1		U1				
91T0 - Central European lichen Scots pine forests	XX	U2		U2	U2			U2	
91U0 - Sarmatic steppe pine forest					U2				
91V0 - Dacian Beech forests (Symphyto-Fagion)	FV				FV				
91W0 - Moesian beech forests	U1				U1				
91X0 - Dobrogean beech forests									U1
91Y0 - Dacian oak & hornbeam forests					U1				U1
91Z0 - Moesian silver lime woods	U1		U1		U1				
9210 - Apennine beech forests with <i>Taxus</i> and <i>Ilex</i>	FV				U1		FV		
9220 - Apennine beech forests with <i>Abies alba</i> and beech forest	FV				FV		FV		
9230 - Galicio-Portuguese oak woods <i>Q. robur</i> & <i>Q. pyrenaica</i>		XX					XX		
9240 - <i>Quercus faginea</i> and <i>Quercus canariensis</i> Iberian woods	XX	XX					XX		
9250 - <i>Quercus trojana</i> woods							U1		
9260 - <i>Castanea sativa</i> woods	U1	U1			U1		U2		
9270 - Hellenic beech forests with <i>Abies borisii-regis</i>	U1				XX		FV		
9280 - <i>Quercus frainetto</i> woods							FV		
9290 - <i>Cupressus</i> forests (<i>Acero-Cupression</i>)							FV		
92A0 - <i>Salix alba</i> and <i>Populus alba</i> galleries	U1	U1	U1		U2		U2	U1	U1
92B0 - Riparian formations on intermittent Mediterranean water courses with <i>Rhododendron ponticum</i> , <i>Salix</i> and others							U1		
92C0 - <i>Platanus orientalis</i> and <i>Liquidambar orientalis</i> woods	U1				U1		U1		
92D0 - Southern riparian galleries and thickets (<i>Nerio-Tamaricetea</i> and <i>Securinegion tinctoriae</i>)			U1		U1	U1	U1		U1
9310 - Aegean <i>Quercus brachyphylla</i> woods							FV		
9320 - <i>Olea</i> and <i>Ceratonia</i> forests						U1	U1		
9330 - <i>Quercus suber</i> forests		U2					U1		
9340 - <i>Quercus ilex</i> and <i>Quercus rotundifolia</i> forests	U1	U1			FV		U1		
9350 - <i>Quercus macrolepis</i> forests							U2		
9360 - Macaronesian laurel forests (<i>Laurus</i> , <i>Ocotea</i>)						U1			
9370 - Palm groves of <i>Phoenix</i>						U1	FV		
9380 - Forests of <i>Ilex aquifolium</i>		U1					U2		

Habitats associated with woodland and forest	ALP	ATL	BLS	BOR	CON	MAC	MED	PAN	STE
9390 - Scrub and low forest vegetation with <i>Quercus alnifolia</i>							FV		
93A0 - Woodlands with <i>Q. infectoria</i> (<i>Anagyro foetidae</i> - <i>Q. infec.</i>)							FV		
9410 - Acidophilous <i>Picea</i> forests of montane to alpine levels	U1				U1		FV		
9420 - Alpine <i>Larix decidua</i> and/or <i>Pinus cembra</i> forests	FV								
9430 - Subalpine and montane <i>Pinus uncinata</i> forests	U1				FV		U2		
9510 - Southern Apennine <i>Abies alba</i> forests	U1						U1		
9520 - <i>Abies pinsapo</i> forests							U1		
9530 - (Sub-)Mediterranean pine forest with endemic black pine	U1				U1		U1		
9540 - Mediterranean pine forests with endemic Mesogean pines					U2		U1		
9550 - Canarian endemic pines forests						FV			
9560 - Endemic forests with <i>Juniperus</i> spp.	U1	XX			U1	U1	U2		
9580 - Mediterranean <i>Taxus baccata</i> woods		U1					U2		
9590 - <i>Cedrus brevifolia</i> forests (<i>Cedrosetum brevifoliae</i>)							FV		
95A0 - High oro-Mediterranean pine forests	U1						U1		

Appendix 3: Conservation status of amphibian, mammal and reptile species associated with woodland and forest ecosystem in 2007-2013 by biogeographical region

Forest Amphibians	ALP	ATL	BLS	BOR	CON	MAC	MED	PAN	STE
<i>Alytes obstetricans</i>	U1	U1			U2		U1		
<i>Bombina bombina</i>	U2	U2	FV	U1	U2		XX	U1	XX
<i>Bombina variegata</i>	U1	U2			U2		FV	XX	
<i>Chioglossa lusitanica</i>		FV					U1		
<i>Hyla savignyi</i>							FV		
<i>Mertensiella luschani</i>							U1		
<i>Rana arvalis</i>	FV	U1		FV	U1			U1	
<i>Rana dalmatina</i>	U1	FV	FV	U2	U1		FV	U1	U1
<i>Rana graeca</i>	U1				U1		FV		
<i>Rana latastei</i>	U1				U1				
<i>Rana lessonae</i>	U2	U1		U1	XX		FV	FV	
<i>Rana ridibunda</i>	U1	U1	U1	U1	U1		FV	FV	U1
<i>Rana temporaria</i>	FV	U1		FV	U1		U1	U1	
<i>Salamandra atra</i>	FV				U1				
<i>Salamandra lanzai</i>	U1								
<i>Salamandrina terdigitata</i>	FV				FV		FV		
<i>Triturus carnifex</i>	U1				U1		U1	U2	
<i>Triturus cristatus</i>	U2	U1		U2	U1		U1	XX	
<i>Triturus dobrogicus</i>	U2		XX		U1			U1	XX
<i>Triturus italicus</i>	FV				FV		FV		
<i>Triturus karelinii</i>	FV		U1		U1		U2		
<i>Triturus macedonicus</i>	U1						U2		
<i>Triturus marmoratus</i>	U2	XX			XX		XX		
<i>Triturus montandoni</i>	XX				U2				
<i>Triturus vulgaris</i>	XX				XX				
<i>ampelensis</i>									
Forest Mammals	ALP	ATL	BLS	BOR	CON	MAC	MED	PAN	STE
<i>Barbastella barbastellus</i>	U1	U2	U1	U2	U1	U1	U1	U1	
<i>Bison bonasus</i>	U1				U1				
<i>Canis lupus</i>	FV	FV	U1	U1	U1		U1	U1	
<i>Castor fiber</i>	FV	U1		FV	FV		FV	FV	
<i>Cervus elaphus corsicanus</i>							FV		
<i>Dryomys nitedula</i>	FV		U1	XX	FV		XX	U1	FV
<i>Eptesicus nilssonii</i>	U1	XX		FV	U1			XX	
<i>Eptesicus serotinus</i>	U1	U1	U1	U1	U1		U1	FV	U1
<i>Erinaceus algirus</i>						FV	FV		
<i>Felis silvestris</i>	U1	U2	U1		FV		FV	U1	FV

Genetta genetta	FV	FV			FV		FV	
Gulo gulo	FV			U1				
Lepus timidus	U1	FV		U2	U2			
Lynx lynx	FV		U2	FV	U1		U2	U2
Lynx pardinus							U2	
Martes martes	FV	FV	XX	FV	FV		XX	XX
Microtus tatricus	FV							
Miniopterus schreibersii	U2	U2	FV		U1		U2	U2
Muscardinus avellanarius	FV	U2	U1	FV	U1		XX	U1
Mustela putorius	U1	U1	XX	FV	U1		XX	FV
Myomimus roachi			U1		U1		XX	
Myotis alcathoe	XX	XX	XX		XX		U1	U1
Myotis aurascens	FV		U1		U1		XX	
Myotis bechsteinii	U1	U1	U1		U1		U2	U1
Myotis brandtii	XX	U2		XX	U1		XX	U1
Myotis capaccinii	U1		U1		U1		U2	
Myotis dasycneme	XX	U1		U1	U1			U1
Myotis daubentonii	FV	FV	U1	FV	FV		U1	XX
Myotis emarginatus	U1	U1	U1		U1		U1	FV
Myotis myotis	U1	U1	FV		U1		U1	U1
Myotis mystacinus	U1	FV	U1	U2	U1		XX	U1
Myotis nattereri	U1	U1	U1	U2	U1		U1	U1
Nyctalus azoreum						U1		
Nyctalus lasiopterus	XX	XX	U1		XX		XX	U2
Nyctalus leisleri	U1	FV	U1	XX	U1	U1	U1	U1
Nyctalus noctula	U2	U1	U1	FV	U1		U2	FV
Pipistrellus maderensis						U1		
Pipistrellus nathusii	XX	XX	U1	U1	U1		U1	FV
Pipistrellus pipistrellus	XX	FV	FV	U1	FV		U1	FV
Pipistrellus pygmaeus	U1	FV	FV	FV	U1		U1	FV
Plecotus auritus	U1	U1	U1	U1	U1		U1	U1
Plecotus sardus							U1	
Plecotus teneriffae						U2		
Pteromys volans				U1				
Rangifer tarandus fennicus				U1				
Rhinolophus blasii	U1		FV		U1		XX	
Rhinolophus euryale	U1	U2	FV		U1		U1	FV
Rhinolophus ferrumequinum	U1	U1	FV		U1		U2	U1
Rhinolophus hipposideros	U1	U1	FV		U1		U1	FV
Rhinolophus mehelyi	U1		U1		U1		U2	
Rousettus aegyptiacus							U1	
Sciurus anomalus							XX	
Sicista betulina	U1	U1		XX	XX			
Tadarida teniotis	XX	U1			FV	U1	U1	
Ursus arctos	FV	U1		FV	FV		U1	

Vespertilio murinus	XX	U2	XX	U2	XX		XX	XX	U1
Forest Reptiles	ALP	ATL	BLS	BOR	CON	MAC	MED	PAN	STE
Algyroides fitzingeri							FV		
Algyroides marchi							U1		
Algyroides moreoticus							XX		
Algyroides nigropunctatus					U1		XX		
Chalcides sexlineatus						XX			
Chalcides viridianus						XX			
Elaphe lineata							FV		
Elaphe longissima	U2	FV	U1		U1		FV	U2	U1
Elaphe sauromates			U1		U2		XX		
Lacerta anatolica							U1		
Lacerta oertzeni							XX		
Lacerta vivipara								U2	
pannonica									
Testudo hermanni	U1		U2		U1		U1		FV