Bridging the gap between the Natura 2000 regional conservation status and local conservation objectives

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a b s t r a c t

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Natura 2000 targets the sustainable conservation of Europe’s biodiversity. An important cornerstone of Natura 2000 is the Habitats Directive, which is currently implemented across European member states. However, straightforward implementation is not obvious since the favourable conservation status of habitats and species needs to be achieved at the member state level, while conservation objectives need to be formulated at the protected site level. To bridge this gap, we propose to start from regional conser- vation objectives before site level objectives are formulated. These regional conservation objectives have the advantage of providing a framework according to which conservation objectives can be allocated both within and outside the protected sites of the Natura 2000 network. Especially since they all contribute to the national or regional conservation status. Recently, Flanders (northern Belgium) has adopted this approach and has quantiﬁed conservation objectives at the regional scale. As the current regional con- servation status of habitats and species is mostly unfavourable, regional conservation objectives entail a drastic increase in area (42%) for habitats, and active conservation measures for 78% of the species. We are convinced that the method outlined here, may substantially contribute to a helpful discussion about implementing and streamlining Natura 2000 across European member states.

**Introduction**

Biodiversity levels have declined rapidly in Europe over the last decades ([EEA](#_bookmark25) [2006).](#_bookmark25) Both habitats and species suffer from severe human pressures, of which direct destruction and fragmentation of habitats, change in abiotic conditions, and introductions of exotic biota are most prominent ([Maiorano](#_bookmark39) [et al.](#_bookmark39) [2008;](#_bookmark39) [Sax](#_bookmark39) [&](#_bookmark39) [Gaines](#_bookmark39) [2008;](#_bookmark39) [Thuiller](#_bookmark39) [et al.](#_bookmark39) [2005).](#_bookmark39) This decline is not only unwanted from an ethical point of view, but also results in less stable and malfunc- tioning ecosystems ([Tilman](#_bookmark32) [et al.](#_bookmark32) [2006;](#_bookmark32) [Western](#_bookmark32) [2001).](#_bookmark32) Eventually this leads to lowered reliability of ecosystem services (e.g. harvest- ing, hunting, water storage), and thus directly inﬂuences economy, recreation and human welfare ([Costanza](#_bookmark11) [et al.](#_bookmark11) [1997;](#_bookmark11) [Luck](#_bookmark11) [et al.](#_bookmark11) [2009).](#_bookmark11)

To decrease – or better stop – this biodiversity loss, the European Union (EU) initiated an above-national approach by launching the Birds Directive (BD issued in 1979, [CD](#_bookmark12) [79/409/EEC)](#_bookmark12) and Habitats Directive (HD issued in 1992, [CD](#_bookmark13) [92/43/EEC).](#_bookmark13) These form the legal cornerstones of the Natura 2000 concept ([EC](#_bookmark22) [2000).](#_bookmark22) The core ambi-

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tion of Natura 2000 is to protect biodiversity through a number of measures, of which the delineation of Special Protection Areas (SPAs for the BD) and Sites of Community Importance (SCIs for the HD) for a set of endangered habitats and species (listed in vari- ous annexes of BD and HD) is most important ([Gaston](#_bookmark29) [et al.](#_bookmark29) [2008;](#_bookmark29) [Wätzold](#_bookmark29) [&](#_bookmark29) [Schwerdtner](#_bookmark29) [2005).](#_bookmark29) The aggregate of all these SPAs and SCIs, supported by appropriate management of connecting land- scape features (continuous structures and stepping stones, Article 10 of the HD), constitutes the trans-boundary Natura 2000 net- work, which is conceived to act as a coherent ecological network ([Kettunen](#_bookmark31) [et al.](#_bookmark31) [2007).](#_bookmark31) This network, in combination with a rigor- ous system of complete species protection, should contribute to the sustainable conservation of Europe’s biodiversity.

A full implementation of the HD implies that all enlisted habi- tats and species attain a favourable conservation status all over the European territory (Article 2 of the HD). The term ‘favourable conservation status’ is deﬁned in the HD (see also [EC](#_bookmark24) [2005,](#_bookmark24) [2006).](#_bookmark24) However, each member state has to make its own interpretation, which is expected to be based on scientiﬁc insights ([Cantarello](#_bookmark10) [&](#_bookmark10) [Newton](#_bookmark10) [2008;](#_bookmark10) [Mehtälä](#_bookmark10) [&](#_bookmark10) [Vuorisalo](#_bookmark10) [2007;](#_bookmark10) [Nielsen](#_bookmark10) [et al.](#_bookmark10) [2007).](#_bookmark10) To preserve or restore a favourable conservation status, speciﬁc mea- sures have to be taken ([Murdoch](#_bookmark41) [et al.](#_bookmark41) [2007;](#_bookmark41) [Ostermann](#_bookmark41) [1998).](#_bookmark41) These measures arise from speciﬁc conservation objectives that

have to be determined for habitats and species within each SCI. These conservation objectives are considered the most straightfor- ward interpretation of ‘priorities to maintain or restore habitats and species in a favourable conservation status’ (Articles 4 and 6 of the HD). The formulation of the conservation objectives and the corresponding actions to be taken should be based on the eco- logical requirements of habitats and species. However, economic, social and cultural requirements, as well as regional and local char- acteristics also have to be taken into account (Article 2 of the HD). It is obvious that these socio-economical aspects can strongly determine or constrain the conservation planning process ([Keulartz](#_bookmark33) [2009;](#_bookmark33) [Robertson](#_bookmark33) [&](#_bookmark33) [Hull](#_bookmark33) [2001;](#_bookmark33) [Rosa](#_bookmark33) [&](#_bookmark33) [Da](#_bookmark33) [Silva](#_bookmark33) [2005).](#_bookmark33)

In a ﬁrst series of actions, EU member states designated SPAs and SCIs, based on the presence of habitats and species of community interest. They also embedded the BD and HD within their national legislations([Schoukens](#_bookmark26) [et al.](#_bookmark26) [2007).](#_bookmark26) Currently, a second phase in the implementation process has started. This entails member states to assess the conservation status of all enlisted habitats and species, to deﬁne corresponding conservation objectives and measures in each SCI so that they can be kept or brought into a favourable conserva- tion status, and to set up monitoring schemes ([Bottin](#_bookmark8) [et al.](#_bookmark8) [2005;](#_bookmark8) [Förster](#_bookmark8) [et al.](#_bookmark8) [2008).](#_bookmark8) However, this process faces several practical obstacles.

First, as data on the occurrence and abundance of habitats and species are generally scarce ([Gaston](#_bookmark29) [et al.](#_bookmark29) [2008),](#_bookmark29) and ﬁnan- cial resources to expand these data are limited, assessment of the actual conservation status is a challenging exercise that often leads to different approaches across member states ([Opdam](#_bookmark42) [et al.](#_bookmark42) [2009).](#_bookmark42) Second, even if detailed data on the present status would be available, formulation of the conservation objectives is not a straightforward procedure. The surface area needed to attain (or maintain) a favourable conservation status for all targeted habitats and species, greatly exceeds the surface area designated by some member states as Natura 2000 sites. Hence, one must decide which habitats and species are of greatest interest in each of the individual SCIs. In addition, the HD stipulates that conservation objectives only need to be formulated and implemented within the boundaries of every individual SCI. However, the HD requires a favourable con- servation status for habitats and species at the national or regional level ([EC](#_bookmark24) [2005,](#_bookmark24) [2006).](#_bookmark24) Therefore, in the absence of a clear framework of national or regional conservation objectives, it will be difﬁcult to estimate whether the aggregation of conservation objectives at the SCI level will meet the conditions for favourable conservation sta- tus at the national or regional level ([Mehtälä](#_bookmark40) [&](#_bookmark40) [Vuorisalo](#_bookmark40) [2007).](#_bookmark40) This is especially important, considering the fact that the SPAs and the areas outside the Natura 2000 network also contribute to the national or regional conservation status. Moreover, as already stated, socio-economical aspects must be considered within each SCI, and these can strongly determine or constrain the conservation planning process.

In this paper, we present an overall framework and method to derive regional conservation objectives. We illustrate this approach by the exercise performed in Flanders (northern Belgium), being a compromise of scientiﬁc insights and socio-economical needs. Finally, we report on the current conservation status of Natura 2000 habitats and species occurring in Flanders, and how the present status relates to the formulated objectives.

**Methods**

*Study region*

Flanders is the northern region of Belgium, with the Brussels Capital region as an enclave in its centre, and the Walloon region (Wallonia) bounded to the south. It ﬁts almost entirely in the

Atlantic biogeographical region, with a very small part belong- ing to the Continental biogeographical region ([Fig. 1).](#_bookmark3) The region has a surface area of 13,522 km2, a mean elevation of 38 m, and is densely populated (456 inhabitants/km2). The landscape is highly fragmented, due to a poorly organised environmental planning of housing and industry, and because of a dense transport network. This results in limited open space, and hence has severe impli- cations on the efﬁcient and sustainable conservation of nature. Flanders put forward 24 SPAs and 38 SCIs in the Natura 2000 eco- logical network (total of 62 sites), which are unevenly distributed over the territory ([Fig. 1](#_bookmark3)). The surface area of SPAs amounts up to 98,250 ha (median size per SPA 2,705 ha); for SCIs it attains 104,900 ha (median size per SCI 2,265 ha). Moreover, most SCIs consist of several highly fragmented subsites (median value 11 subsites). Because of overlap between SPAs and SCIs, a total of 166,200 ha or 12% of the Flemish surface area is designated as Natura 2000 protected sites. Although these values seem low com- pared to other EU member states, they are relatively high compared to similar neighbouring urbanised and industrialised regions (e.g. Nordrhein-Westfalen, South East England, South Netherlands; [Van](#_bookmark34) [Reeth](#_bookmark34) [et al.](#_bookmark34) [2007).](#_bookmark34)

*Data sources*

Distribution and abundance data are not equally available for habitats and species. As in many countries, both the quantity and quality of data differs signiﬁcantly among habitats and taxonomical groups, with larger and attractable biota being best covered.

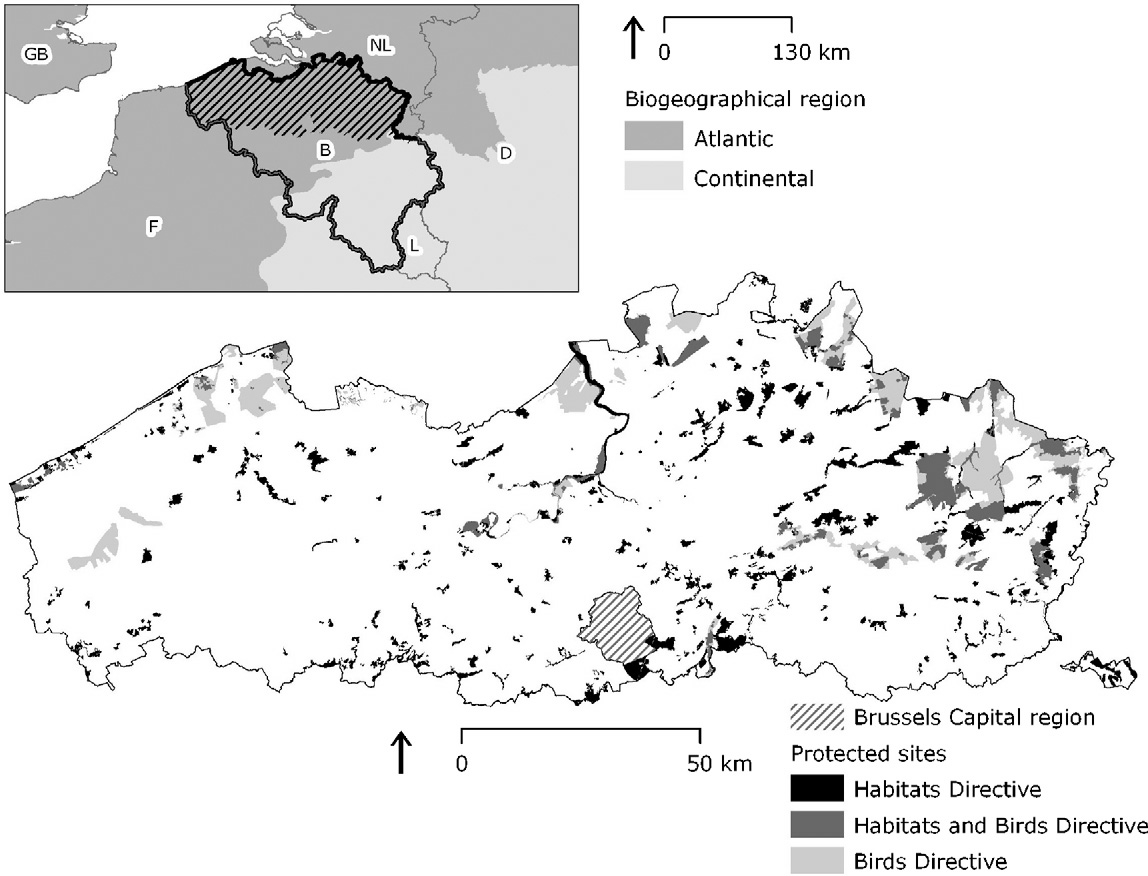
Land cover has been mapped in Flanders by an intensive ﬁeld- driven polygon-based survey with full territorial coverage since 1978. This resulted in a uniform inventory and evaluation of land cover with a ﬁne (average 0.25 ha) resolution (Biological Valuation Map, BVM, [De](#_bookmark14) [Blust](#_bookmark14) [et al.](#_bookmark14) [1985)](#_bookmark14) for the period 1997–2007 ([Paelinckx](#_bookmark15) [et al.](#_bookmark15) [2008a).](#_bookmark15) Legend units used are often equal to vegetation com- munities at the level of phytosociological alliances or associations ([De](#_bookmark16) [Blust](#_bookmark16) [et al.](#_bookmark16) [1994).](#_bookmark16) For a proper use in the Natura 2000 con- text, the legend units used in BVM were converted to Natura 2000 habitat types, which resulted in the Habitat Map ([Paelinckx](#_bookmark19) [et al.](#_bookmark19) [2009).](#_bookmark19) This conversion is straightforward for several habitat types, but more or less problematic for others. Nevertheless this map gives a detailed picture of the habitats present not only within the SCIs, but also outside the Nature 2000 protected areas.

Data on the distribution and abundance of species are obtained through species-speciﬁc survey programs, performed by both pro- fessionals and volunteers. Data are stored in electronic databases and are subject to a thorough quality control by thematic experts ([Devos](#_bookmark17) [et al.](#_bookmark17) [2008;](#_bookmark17) [Van](#_bookmark17) [Landuyt](#_bookmark17) [et al.](#_bookmark17) [2008;](#_bookmark17) [Van](#_bookmark17) [Thuyne](#_bookmark17) [et al.](#_bookmark17) [2008;](#_bookmark17) [Vermeersch](#_bookmark17) [et al.](#_bookmark17) [2008;](#_bookmark17) [Werkgroepen](#_bookmark17) [Natuurpunt](#_bookmark17) [2008).](#_bookmark17)

*Conceptual framework*

A schematic presentation of the stepwise approach in deriving conservation objectives is presented in [Fig. 2.](#_bookmark4) A ﬁrst step in the process is the assessment of the current conservation status at the regional level (i.e. both within and outside the SCIs). This assess- ment must be based on four criteria, being range, area/population, speciﬁc structures and functions of habitats/quantity and quality of the habitat of species, and future prospects ([EC](#_bookmark24) [2005,](#_bookmark24) [2006).](#_bookmark24) Assessments are performed via a systematic approach, using quan- titative and qualitative data. When consistent data were lacking, expert judgment was used to assess current conservation status (see <http://www.inbo.be/natura2000> for a more detailed descrip- tion on the assessment method).

Secondly, reference conditions that mirror a favourable con- servation status must be determined. They can ideally be drawn from theoretical, demographical or population genetical models



**Fig. 1.** Map of Flanders (northern region of Belgium) depicting its location within the biogeographical regions of Western Europe. The different protected sites according to the Birds and Habitats Directive are visualised.

(e.g. [Lande](#_bookmark35) [1988;](#_bookmark35) [Laikre](#_bookmark35) [et al.](#_bookmark35) [2009;](#_bookmark35) [Shaffer](#_bookmark35) [1981;](#_bookmark35) [Traill](#_bookmark35) [et al.](#_bookmark35) [2007),](#_bookmark35) where scientiﬁc insights in the ecology of habitats and species are applied in combination with the abiotic character- istics of the region. However, these data rarely exist and, if so, they often lead to high and unfeasible reference conditions, which in many cases conﬂict with socio-economical aspects. Hence, a more pragmatic and straightforward approach can be followed, as applied in Flanders. Here, knowledge of the current conser- vation status, as well as indicative, but not yet allocated nature development potentials in the landscape are used. Setting up ref- erence conditions is furthermore supported by historical and actual distribution and abundance data of habitats and species, ecologi- cal signatures of habitats and species, complemented with expert judgment. These reference conditions were further ﬁne-tuned with socio-economical considerations, via a participation process with stakeholders. Despite this more pragmatic approach, reference conditions (range and area/population) must at least attain the level recorded at the time the HD came into force in the member state ([EC](#_bookmark24) [2005,](#_bookmark24) [2006;](#_bookmark24) for Belgium being 1994).

Subsequently, an analysis of how the current situation (regional conservation status) relates to the favourable conservation status (reference condition) is made. From this analysis, regional conser- vation objectives (qualitative and quantitative objectives) can be extracted ([Fig. 2).](#_bookmark4) General objectives include for instance, a stand still or an increase in range, habitat area, (the number of) popu- lation(s), an improvement of speciﬁc structures and functions of habitats, quantity and quality of the habitat of species, or the safe- guard of their future prospects. For some of these general objectives a quantiﬁcation is made, leading to quantiﬁed objectives (e.g. area and population).

Once the regional conservation objectives are set out, translat- ing them into SCI conservation objectives may be guided by setting

priorities ([Dimopoulos](#_bookmark21) [et al.](#_bookmark21) [2006;](#_bookmark21) [Fig. 2).](#_bookmark4) On the one hand, a deci- sion can be made for which habitats or species ﬁrst actions should be taken. This can be based on the relative importance Flanders has for the conservation of the habitats or species at the European scale (prioritising habitats and species). According to the relative contribution of the Flemish region to the European-wide conser- vation of habitats and species, they are classiﬁed into one of three categories (very important, important or moderately important). A habitat is considered very important when the area of the habi- tat in Flanders relative to the Atlantic biogeographical region is higher than 8% (Flanders covers 2% of the Atlantic biogeograph- ical region in Europe; a factor 4 is assumed to be considerably higher), it is a European Priority habitat type according to the HD, or it contains exceptional vegetation types or occurs under excep- tional environmental conditions. Habitats whose area in Flanders relative to the Atlantic biogeographical region is lower than 0.5% (a factor 4 is assumed to be considerably lower), are categorised as moderately important; all other habitats as important. A species (excluding birds) is set as very important when its distribution is conﬁned to Western Europe and it is common in Flanders/has a high population size. Species at the margin of their European dis- tribution range are categorised as moderately important; all other species as important. Bird species with a high number of breed- ing pairs (number of breeding pairs times three in at least one SPA being equal or higher than 1% of the biogeographical pop- ulation), or high numbers of regularly wintering and migrating individuals (equalling or exceeding 10% of the total biogeographi- cal population) are deﬁned as very important (1% and 10% norms are internationally accepted; [Wetlands](#_bookmark43) [International](#_bookmark43) [2006;](#_bookmark43) Anselin et al. unpublished results). Bird species being at the margin of their European distribution range (breeding birds), or numbers of reg- ularly wintering and migrating individuals being less than 1% of

# range area/

population

structures & functions/ habitat of species

future prospects

100

80

Unfavourable - bad Unfavourable - inadequate Unknown

Favourable

60

**regional conservation status**

**reference conditions**

**regional conservation objectives**

general objectives specific quantified objectives

priority setting

which

habitats/species?

which SCIs?

**SCI conservation objectives**

%

40

20

0

Habitats

II IV

Species (excluding birds)

I

Birds

>1%

**Fig. 3.** Synthesis of the assessment of the current regional conservation status of Natura 2000 habitats and species in Flanders. Species (excluding birds) and birds are categorised according to their occurrence in the Habitats and Birds Directive annexes, respectively. Birds meeting the 1% norm of occurrence (>1%) are also included.

**Fig. 2.** Diagram of the different aspects that affect the formulation of conservation objectives for habitats and species. An assessment of the current regional conser- vation status allows an evaluation of how it relates to the reference conditions. Subsequently, regional conservation objectives can be derived and quantiﬁed, giv- ing rise to a series of needed measures. The translation of regional objectives into conservation objectives at the SCI level can be supported by setting priorities. This priority setting helps to decide which habitats or species should initially be dealt with, or which SCIs are most important for the conservation of speciﬁc habitats or species within the territory. Finally, SCI conservation objectives may ﬁne-tune regional conservation objectives when new scientiﬁc insights or facts are gathered. Details about the applied method is given in the text.

the total biogeographical population are categorised as moderately important; all other bird species as important.

On the other hand, a decision can be made for which SCIs a particular habitat or species should be developed/attracted or maintained preferentially within the national/regional territory (prioritising SCIs). SCIs are ranked according to their importance (essential site, very important site, important site) for the conser- vation of speciﬁc habitats or species within the territory. SPAs for birds are ranked analogously. A SCI is considered as an essential site for a habitat type when the area of the habitat within the SCI relative to the total area of the respective habitat within all SCIs in Flanders (as the greater part of area of Natura 2000 habitats is located within SCIs) is higher than 15% or lies between 2 and 15% and well developed habitat is present. SCIs with an area of the habi- tat relative to the total area of the respective habitat within all SCIs in Flanders lower than 2%, with no approved plans for future habi- tat development that may lead to the 2% norm, nor the presence of well developed habitat, are categorised as important sites; all other SCIs as very important sites. For species (excluding birds), SCIs are set as essential site when the ratio of a population within

the SCI to the total population in Flanders is higher than 15%. SCIs with a ratio lower than 2%, and few potential to reach the species’ reference condition, are categorised as important sites; all other SCIs as very important sites. SPAs are set as essential sites for bird species (breeding birds) when the population within the SPA equals or exceeds the 1% norm of the total biogeographical population, or the bird species is listed on Annex I of the BD in combination with a small population size in Flanders. Similarly, SPAs are deﬁned as essential site for wintering and migrating bird species when the numbers equal or exceed the 1% norm of the total biogeographi- cal population on a regular (at least half of the winters) basis, or if irregularly, the species are listed on Annex I. Furthermore, SPAs har- bouring 15% or more of the total population of Annex I bird species in Flanders are categorised as essential sites. SPAs are listed as important sites when the local population is less than 2% of the total population in Flanders, the bird species occurred regularly during delineation of the SPA, and no potential to reach the bird species’ reference condition is present; all other SPAs are categorised as very important sites.

**Results**

The regional conservation status and objectives were assessed for 46 habitats, 49 species (excluding birds), and 55 birds of which two (Avocet *Recurvirostra avosetta* and Spoonbill *Platalea leucoro- dia*) were treated as both a breeding and wintering and migrating bird ([Table 1).](#_bookmark5) Other Natura 2000 habitats and species are, or used to be, observed in Flanders, but no regional conservation objec- tives were determined for reasons of extinction, vagrant behaviour, incorrect reporting to the EC, federal responsibility (i.e. not regional,

e.g. marine species), or policy related exclusion (e.g. Great cor- morant *Phalacrocorax carbo*).

An analysis of the regional conservation status revealed that only 7% of the habitats (1140, 2160 and 8310) reach the favourable conservation status ([Table 1;](#_bookmark5) [Fig. 3).](#_bookmark4) For species (excluding birds), the result differs between Annex II and IV species: fewer Annex II species reached the favourable conservation status than Annex IV species (15% and 55%, respectively). Birds showed a different pic- ture: 51% of those listed in Annex I of the BD, and 68% of those meeting the 1% norm of occurrence, reached favourable conserva- tion status. The conservation status was unknown for some species (excluding birds): 22% on average.

Following the assessment of the regional conservation status, regional conservation objectives were set out, and quantiﬁed if pos- sible. The objectives for the relative increase in area per habitat has a median value of 42% and ranges from no increase (several habitats)

**Table 1**

Overview of habitats and species for which Flanders has developed conservation objectives. For each habitat and species the annex status in the Habitats and Birds Directive is indicated (\*priority habitat or species, >1%: more than 1% of the biogeographical population is present). Furthermore the regional conservation status is presented (R: range, A: area, Q: speciﬁc structures and functions of habitats/quantity and quality of the habitat of species, P: future prospects, and O: overall conservation status) by codes (0: unknown, 1: favourable, 2: unfavourable-inadequate, 3: unfavourable-bad). Regional conservation objectives (RCO) are quantiﬁed and expressed as surface area (ha) for habitats, breeding pairs for breeding birds, and number of individuals for birds attaining the 1% norm (abs: absolute RCO (maximum value shown), incr.: increase in relation to the actual quantity, –: not quantiﬁed). As for species (excluding birds), no quantitative RCO are set out, with the increase only expressed as an indication of the direction of the objectives (∼: status quo, +: active conservation measures regarding range and/or population expansion). Priority setting for habitats and species is expressed as the importance of Flanders for their conservation at the European scale (H/S; VI: very important, I: important, MI: moderately important, X: not assigned), and the number of protected sites (SCIs for habitats and species (excluding birds), and SPAs for birds) where they occur, ranked according to the share of habitats or species they harbour (E: essential site, VI: very important site, I: important site). In addition, to give a more detailed picture of the effective degree of protection of habitats and species, the percentage (%; –: not known) of the region-wide actual area or populations present within the respective protected sites is shown (0%: habitat or species completely outside protected areas, 100%: habitat or species completely within SCIs).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Code | English name | Scientiﬁc name | Habitats |  | Birds | Regional |  | Regional |  | Priority setting | |
|  |  |  | Directive |  | Directive | conservation |  | conservation |  |  |  |
|  |  |  |  |  |  | status |  | objectives |  |  |  |

I II IV I >1% R A Q P O abs. incr. H/S Sites

% E VI I %

**Habitats**

*Coastal and halophytic habitats*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1130 | Estuaries | x | 2 | 3 | 3 | 1 | 3 | 7,580 | 40 | VI | 1 | 0 | 2 | 80 |
| 1140  1310 | Mudﬂats and sandﬂats not covered by seawater at low tide  Salicornia and other | x  x | 1  2 | 1  2 | 0  2 | 1  2 | 1  3 | 2,300  145 | 4  81 | MI  I | 1  2 | 0  0 | 0  1 | 16  80 |
| 1320 | annuals colonising mud and sand  Spartina swards | x | 1 | 2 | 3 | 3 | 3 | 4.5 | 200 | MI | 1 | 1 | 0 | 100 |
| 1330 | (Spartinion maritimae) Atlantic salt meadows | x | 1 | 2 | 2 | 2 | 2 | 605 | 68 | I | 3 | 0 | 0 | 80 |
| *Coastal sand dunes* | (Glauco-Puccinellietalia maritimae) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *and inland dunes* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2110  2120 | Embryonic shifting dunes  Shifting dunes along the shoreline | x  x | 1  1 | 3  2 | 3  3 | 2  2 | 3  3 | 41  590 | 41  5 | I  I | 1  1 | 0  0 | 0  0 | 45  85 |
| 2130\* | with *Ammophila arenaria* (’white dunes’)  Fixed coastal dunes with | x | 1 | 3 | 3 | 1 | 3 | 940 | 19 | VI | 1 | 0 | 0 | 90 |
|  | herbaceous vegetation (’grey dunes’) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2150\*  2160 | Atlantic decalciﬁed ﬁxed dunes (Calluno-Ulicetea)  Dunes with *Hippophae rhamnoides* | x  x | 3  1 | 3  1 | 3  1 | 1  1 | 3  1 | 5  670 | 2.5 E5  0 | MI  I | 1  1 | 0  0 | 0  0 | 100  90 |
| 2170  2180 | Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae) Wooded dunes of the Atlantic, | x  x | 1  1 | 3  1 | 3  3 | 2  1 | 3  3 | 84  450 | 14  80 | I  I | 1  1 | 0  0 | 0  0 | 99  95 |
| 2190 | Continental and Boreal region Humid dune slacks | x | 1 | 3 | 3 | 1 | 3 | 119 | 102 | I | 1 | 0 | 0 | 99 |
| 2310 | Dry sand heaths with *Calluna* and  *Genista* | x | 1 | 1 | 3 | 3 | 3 | 3,700 | 42 | VI | 2 | 3 | 10 | 91 |
| 2330  *Freshwater habitats* | Inland dunes with open *Corynephorus* and *Agrostis* grasslands | x | 1 | 1 | 3 | 3 | 3 | 1,200 | 38 | I | 2 | 6 | 9 | 75 |
| 3110  3130 | Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniﬂorae) Oligotrophic to mesotrophic | x  x | 3  3 | 3  2 | 2  3 | 3  2 | 3  3 | 15  747 | 1.4 E3  8 | MI  I | 3  8 | 0  5 | 0  5 | 100  85 |
| 3140 | standing waters with vegetation of the Littorelletea uniﬂorae and/or of the Isoeto-Nanojuncetea  Hard oligo-mesotrophic waters | x | 3 | 2 | 3 | 0 | 3 | 295 | 9 | I | 4 | 0 | 4 | 25 |
| 3150 | with benthic vegetation of *Chara*  spp.  Natural eutrophic lakes with | x | 2 | 2 | 3 | 2 | 3 | 365 | 18 | I | 1 | 7 | 7 | 30 |
| 3160 | Magnopotamion or Hydrocharition type vegetation  Natural dystrophic lakes and ponds | x | 2 | 2 | 3 | 2 | 3 | 87 | 107 | MI | 4 | 2 | 2 | 95 |
| 3260  3270 | Water courses of plain to montane levels with the Ranunculion ﬂuitantis and  Callitricho-Batrachion vegetation Rivers with muddy banks with | x  x | 3  2 | 3  2 | 3  3 | 3  1 | 3  3 | 60  35 | 0  17 | I  I | 4  1 | 4  1 | 9  0 | 35  40 |
|  | Chenopodion rubri p.p. and Bidention p.p. vegetation |  |  |  |  |  |  |  |  |  |  |  |  |  |

Code English name Scientiﬁc name Habitats Directive

Birds Directive

Regional conservation status

Regional conservation objectives

Priority setting

I II IV I >1% R A Q P O abs. incr. H/S Sites

% E VI I %

T*emperate heath and scrub*

4010 Northern Atlantic wet heaths with

*Erica tetralix*

x 1 3 3 3 3 3,000 36 I 3 6 16 95

4030 European dry heaths x 1 2 3 2 3 6,100 13 I 2 15 13 80

*Sclerophyllous scrub*

5130 *Juniperus communis* formations on heaths or calcareous grasslands

*Natural and semi-natural grassland formations*

6120\* Xeric sand

calcareous grasslands

6210\* Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco- Brometalia) (\* important orchid sites)

6230\* Species-rich *Nardus* grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)

6410 *Molinia* meadows on calcareous, peaty or

clayey-silt-laden soils (Molinion caeruleae)

6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

6510 Lowland hay

meadows (*Alopecurus pratensis*, *Sanguisorba ofﬁcinalis*)

*Raised bogs and mires and fens*

x 2 3 3 3 3 30 30 MI 2 0 1 75

x 1 2 2 1 2 90 64 VI 1 0 0 45

x 1 1 2 2 2 7.8 875 MI 1 0 0 20

x 2 3 3 2 3 600 71 VI 8 7 12 75

x 3 3 3 3 3 110 83 I 7 5 8 50

x 1 1 3 1 3 4,800 0 I 10 9 10 40

x 1 2 3 2 3 2,400 37 I 6 9 19 23

7110 Active raised bogs x 3 3 3 2 3 1.6 0 MI 1 0 1 100

7140 Transition mires and quaking bogs

7150 Depressions on peat substrates of the Rhynchosporion

7210\* Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae

7220\* Petrifying springs with tufa formation (Cratoneurion)

x 2 2 3 3 3 600 150 I 7 8 8 85

x 1 1 2 2 2 21 01 I 0 0 0 95

x 3 2 1 2 3 11 22 MI 2 0 2 99

x 1 2 0 2 2 562 –2 MI 1 3 0 66

7230 Alkaline fens x 3 2 2 2 3 10 43 MI 2 2 1 95

*Rocky habitats and caves*

8310 Caves not open to the public

x 1 1 1 1 1 105 0 MI 1 1 0 40

*Forests*

9110 Luzulo-Fagetum beech forests

x 1 1 2 1 2 470 42 MI 1 0 0 85

I II IV I >1% R A Q P O abs. incr. H/S Sites

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Code | English name | Scientiﬁc name | Habitats |  | Birds | Regional |  | Regional |  | Priority setting |
|  |  |  | Directive |  | Directive | conservation |  | conservation |  |  |
|  |  |  |  |  |  | status |  | objectives |  |  |

% E VI I %

9120 Atlantic

acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (Quercion

robori-petraeae or Ilici-Fagenion)

9130 Asperulo-Fagetum beech forests

9150 Medio-European limestone beech forests of the Cephalanthero- Fagion

9160 Sub-Atlantic and medio-European oak or

oak-hornbeam forests of the Carpinion betuli

9190 Old acidophilous oak woods with *Quercus robur* on sandy plains

91E0\* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)

91F0 Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (Ulmenion minoris)

x 1 1 3 1 3 42,800 86 VI 4 8 21 50

x 1 1 2 1 2 6,160 71 VI 4 2 1 60

x 1 3 3 3 3 23.7 541 MI 2 0 0 99

x 1 1 2 1 2 4,890 40 I 4 6 11 50

x 1 1 3 1 3 11,490 174 I 4 8 12 50

x 1 1 3 1 3 27,700 113 VI 4 24 8 50

x 3 3 3 1 3 61 455 I 1 0 0 85

**Species** (excluding birds)

*Molluscs—gastropoda*

4056 Ramshorn snail *Anisus vorticulus* x x 0 0 0 0 0 ∼ X 0 1 0 20

1014 Narrow-mouthed whorl snail

1016 Desmoulin’s whorl snail

*Vertigo angustior* x 0 0 0 0 0 ∼ I 1 1 0 91

*Vertigo moulinsiana* x 0 0 0 0 0 ∼ I 1 6 0 68

*Insects*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1078\* | Jersey tiger | *Callimorpha quadripunctaria* | x |  | 1 | 1 | 0 | 1 | 1 | ∼ | MI | 0 | 2 | 6 | 17 |
| 1040 | River clubtail | *Gomphus ﬂavipes* |  | x | 1 | 2 | 1 | 1 | 2 | + | MI | 1 | 0 | 0 | 0 |
| 1042 | Large white-faced | *Leucorrhinia pectoralis* | x | x | 1 | 3 | 0 | 3 | 3 | + | MI | 5 | 5 | 0 | 100 |
|  | darter |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1083 | Stag beetle | *Lucanus cervus* | x |  | 1 | 3 | 2 | 2 | 3 | + | I | 0 | 4 | 5 | 38 |
| *Fishes* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1103 | Twaite shad | *Alosa fallax fallax* | x |  | 3 | 3 | 3 | 3 | 3 | + | I | 2 | 0 | 0 | – |
| 1149 | Spined loach | *Cobitis taenia* | x |  | 1 | 2 | 2 | 1 | 2 | + | I | 1 | 1 | 4 | 35 |
| 1163 | Freshwater sculpin | *Cottus gobio* | x |  | 1 | 2 | 2 | 1 | 2 | +3 | I | 0 | 7 | 0 | 46 |
| 1099 | River lamprey | *Lampetra ﬂuviatilis* | x |  | 2 | 3 | 2 | 1 | 3 | + | I | 1 | 2 | 0 | 0 |
| 1096 | Brook lamprey | *Lampetra planeri* | x |  | 2 | 2 | 3 | 2 | 3 | +3 | I | 1 | 10 | 0 | 89 |
| 1145 | Mud loach | *Misgurnus fossilis* | x |  | 3 | 3 | 3 | 2 | 3 | + | MI | 1 | 3 | 0 | 44 |
| 1134 | Bitterling | *Rhodeus sericeus amarus* | x |  | 1 | 1 | 1 | 1 | 1 | ∼ | I | 0 | 4 | 16 | 32 |
| 1106 | Common Atlantic | *Salmo salar* | x |  | 3 | 3 | 2 | 1 | 3 | + | MI | 1 | 0 | 0 | 0 |
|  | salmon |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Amphibians & reptiles* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1191 | Midwife toad | *Alytes obstetricans* |  | x | 1 | 1 | 0 | 1 | 1 | +3 | MI | 1 | 2 | 0 | 54 |
| 1202 | Natterjack toad | *Bufo calamita* |  | x | 1 | 1 | 0 | 1 | 1 | + | I | 1 | 5 | 4 | 54 |
| 1283 | Smooth snake | *Coronella austriaca* |  | x | 1 | 0 | 0 | 0 | 0 | +3 | I | 1 | 5 | 1 | 77 |
| 1203 | European tree frog | *Hyla arborea* |  | x | 3 | 3 | 0 | 3 | 3 | +3 | I | 4 | 0 | 0 | 85 |

**Species** (excluding birds)

*Molluscs—gastropoda*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1197 | Common spadefoot | *Pelobates fuscus* |  | x | 3 | 3 | 0 | 3 | 3 | +3 | MI | 4 | 0 | 0 | 75 |
|  | toad |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1214 | Moor frog | *Rana arvalis* |  | x | 1 | 1 | 0 | 1 | 1 | + | I | 2 | 7 | 2 | 96 |
| 1207 | Pool frog | *Rana lessonae* |  | x | 0 | 0 | 0 | 0 | 0 | + | I | 1 | 9 | 8 | 76 |
| 1166 | Crested newt | *Triturus cristatus* | x | x | 2 | 3 | 0 | 3 | 3 | + | I | 0 | 6 | 14 | 36 |

M*ammals—bats*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1308 | Barbastelle bat | *Barbastella barbastellus* | x | x |  |  | 0 | 0 | 0 | 0 | 0 |  | + | MI | 2 | 0 | 1 | – |
| 1327 | Serotine | *Eptesicus serotinus* |  | x |  |  | 1 | 1 | 0 | 1 | 1 |  | ∼ | I | 0 | 0 | 0 | 0 |
| 1323 | Bechstein’s bat | *Myotis bechsteinii* | x | x |  |  | 1 | 0 | 0 | 0 | 0 |  | + | MI | 4 | 0 | 0 | 79 |
| 1320 | Brandt’s bat | *Myotis brandtii* |  | x |  |  | 1 | 1 | 1 | 1 | 1 |  | ∼/+ | I | 2 | 4 | 8 | 78 |
| 1318 | Pond bat | *Myotis dasycneme* | x | x |  |  | 1 | 1 | 0 | 1 | 1 |  | ∼/+ | I | 2 | 1 | 2 | 80 |
| 1314 | Daubenton’s bat | *Myotis daubentonii* |  | x |  |  | 1 | 1 | 0 | 1 | 1 |  | ∼/+ | I | 1 | 5 | 7 | 80 |
| 1321 | Geoffroy’s bat | *Myotis emarginatus* | x | x |  |  | 1 | 1 | 0 | 1 | 1 |  | ∼/+ | I | 2 | 1 | 3 | 93 |
| 1324 | Greater | *Myotis myotis* | x | x |  |  | 1 | 0 | 0 | 0 | 0 |  | + | MI | 2 | 0 | 0 | 67 |
|  | mouse-eared bat |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1330 | Whiskered bat | *Myotis mystacinus* |  | x |  |  | 1 | 1 | 1 | 1 | 1 |  | ∼/+ | I | 2 | 4 | 8 | 78 |
| 1322 | Natterer’s bat | *Myotis nattereri* |  | x |  |  | 1 | 1 | 0 | 1 | 1 |  | ∼/+ | I | 3 | 1 | 5 | 82 |
| 1331 | Leisler’s bat | *Nyctalus leisleri* |  | x |  |  | 1 | 0 | 0 | 0 | 0 |  | ∼/+ | I | 3 | 0 | 1 | – |
| 1312 | Noctule | *Nyctalus noctula* |  | x |  |  | 1 | 0 | 0 | 1 | 0 |  | ∼/+ | I | 0 | 0 | 0 |  |
| 1317 | Nathusius’  pipistrelle | *Pipistrellus nathusii* |  | x |  |  | 1 | 1 | 1 | 0 | 1 |  | ∼ | I | 0 | 0 | 0 |  |
| 1309 | Common pipistrelle | *Pipistrellus pipistrellus* |  | x |  |  | 1 | 1 | 1 | 1 | 1 |  | ∼ | I | 0 | 0 | 0 |  |
| - | Soprano pipistrelle | *Pipistrellus pygmaeus* |  | x |  |  | 0 | 0 | 0 | 0 | 0 |  | ∼ | I | 0 | 0 | 0 |  |
| 1326 | Brown long-eared  bat | *Plecotus auritus* |  | x |  |  | 1 | 1 | 0 | 1 | 1 |  | ∼/+ | I | 1 | 8 | 4 | 78 |
| 1329 | Grey long-eared bat | *Plecotus austriacus* |  | x |  |  | 1 | 1 | 0 | 1 | 1 |  | ∼/+ | I | 1 | 8 | 4 | 78 |
| 1304 | Greater horseshoe  bat | *Rhinolophus ferrumequinum* | x | x |  |  | 3 | 3 | 3 | 3 | 3 |  | ∼ | MI | 0 | 0 | 2 | – |
| *Mammals—rodents & carnivores* | | | | | | | | | | | | | | | | | | |
| 1337 | European beaver | *Castor ﬁber* | x | x |  |  | 1 | 2 | 2 | 3 | 3 |  | + | I | 3 | 0 | 0 | 68 |
| 1339 | Common hamster | *Cricetus cricetus* |  | x |  |  | 2 | 3 | 2 | 3 | 3 |  | +3 | MI | 0 | 0 | 0 | 0 |
| 1355 | Eurasian otter | *Lutra lutra* | x | x |  |  | 3 | 3 | 3 | 3 | 3 |  | + | I | 2 | 0 | 0 | 50 |
| 1341 | Common | *Muscardinus avellanarius* |  | x |  |  | 3 | 3 | 3 | 3 | 3 |  | + | MI | 1 | 0 | 0 | 87 |
|  | dormouse |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Plants* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1614 | Creeping | *Apium repens* | x | x |  |  | 2 | 2 | 2 | 2 | 2 |  | + | VI | 3 | 0 | 1 | 100 |
|  | marshwort |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1393 | Slender green feather-moss | *Hamatocaulis vernicosus* | x |  |  |  | 3 | 3 | 3 | 3 | 3 |  | ∼ | MI | 1 | 0 | 0 | 100 |
| 1903 | Fen orchid | *Liparis loeselii* | x | x |  |  | 3 | 3 | 3 | 3 | 3 |  | + | MI | 1 | 0 | 2 | 50 |
| 1831 | Floating water | *Luronium natans* | x | x |  |  | 1 | 2 | 3 | 2 | 3 |  | + | VI | 1 | 5 | 5 | 71 |
|  | plantain |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Birds** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Birds—breeding regularly* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Kingﬁsher | *Alcedo atthis* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 750 | 0 | I | 0 | 5 | 15 | 23 |
|  | Bittern | *Botaurus stellaris* |  |  | x |  | 3 | 3 | 3 | 2 | 3 | 75 | 6503 | I | 6 | 0 | 0 | 80 |
|  | Nightjar | *Caprimulgus europaeus* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 550 | 0 | I | 1 | 3 | 5 | 37 |
|  | Kentish plover | *Charadrius alexandrinus* |  |  | x |  | 0 | 3 | 3 | 3 | 3 | 80 | 1673 | MI | 3 | 0 | 0 | 94 |
|  | White stork | *Ciconia ciconia* |  |  | x |  | 3 | 3 | 2 | 2 | 3 | 30 | 173 | MI | 1 | 0 | 0 | 32 |
|  | Marsh harrier | *Circus aeruginosus* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 135 | 0 | I | 1 | 4 | 8 | 51 |
|  | Corn crake | *Crex crex* |  |  | x |  | 3 | 3 | 3 | 3 | 3 | 100 | 9003 | I | 2 | 0 | 0 | 85 |
|  | Middle spotted | *Dendrocopos medius* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 75 | 0 | MI | 0 | 0 | 2 | 7 |
|  | woodpecker |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Black woodpecker | *Dryocopus martius* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 850 | 0 | I | 0 | 4 | 11 | 17 |
|  | Little egret | *Egretta garzetta* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 20 | 0 | MI | 3 | 0 | 0 | 100 |
|  | Peregrine falcon | *Falco peregrinus* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 25 | 0 | I | 0 | 1 | 0 | 11 |
|  | Black-winged stilt | *Himantopus himantopus* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 10 | 0 | MI | 2 | 0 | 0 | 75 |
|  | Little bittern | *Ixobrychus minutus* |  |  | x |  | 3 | 3 | 3 | 2 | 3 | 75 | 650 | I | 7 | 0 | 0 | 78 |
|  | Red-backed shrike | *Lanius collurio* |  |  | x |  | 3 | 3 | 3 | 3 | 3 | 80 | 4333 | I | 2 | 0 | 0 | 25 |
|  | Mediterranean gull | *Larus melanocephalus* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 1,100 | 450 | I | 1 | 1 | 3 | 81 |
|  | Woodlark | *Lullula arborea* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 650 | 0 | I | 0 | 9 | 2 | 45 |
|  | Bluethroat | *Luscinia svecica* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 3,350 | 0 | I | 0 | 3 | 20 | 30 |
|  | Night heron | *Nycticorax nycticorax* |  |  | x |  | 3 | 3 | 2 | 2 | 3 | 40 | 3.9 E3 | MI | 1 | 2 | 0 | 94 |
|  | Honey buzzard | *Pernis apivorus* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 200 | 0 | I | 0 | 11 | 6 | 27 |
|  | Spoonbill | *Platalea leucorodia* |  |  | x | x | 1 | 3 | 2 | 3 | 3 | 40 | 100 | MI | 2 | 0 | 0 | 100 |
|  | Spotted crake | *Porzana porzana* |  |  | x |  | 0 | 3 | 3 | 3 | 3 | 70 | 6003 | I | 1 | 9 | 0 | 73 |
|  | Avocet | *Recurvirostra avosetta* |  |  | x | x | 1 | 1 | 1 | 1 | 1 | 600 | 76 | VI | 2 | 2 | 1 | 66 |
|  | Little tern | *Sterna albifrons* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 200 | 0 | VI | 1 | 0 | 0 | 100 |
|  | Common tern | *Sterna hirundo* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 2,300 | 0 | VI | 1 | 1 | 3 | 96 |
|  | Sandwich tern | *Sterna sandvicensis* |  |  | x |  | 1 | 1 | 1 | 1 | 1 | 4,000 | 0 | VI | 1 | 0 | 1 | 100 |
| *Birds—breeding irregularly* | | | | | | | | | | | | | | | | | | |
| Purple heron | | *Ardea purpurea* |  |  | x |  | 3 | 3 | 2 | 2 | 3 | 60 | 0 | MI | 0 | 0 | 0 | – |
| Montagu’s harrier | | *Circus pygargus* |  |  | x |  | 3 | 3 | 3 | 3 | 3 | 15 | 03 | I | 1 | 0 | 0 | 25 |

*Birds—breeding at least until 1979, but now extinct*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tawny pipit | *Anthus campestris* | x | 3 | 3 | 3 | 3 | 3 | – – MI | – |
| Black tern | *Chlidonias niger* | x | 3 | 3 | 3 | 3 | 3 | – – MI | – |
| Ortolan bunting | *Emberiza hortulana* | x | 3 | 3 | 3 | 3 | 3 | – – MI | – |
| Black grouse | *Tetrao tetrix* | x | 3 | 3 | 3 | 3 | 3 | – – MI | – |

*Birds—regular >1%*

>75

50–75

>75

50–75

>75

>75

*Birds—irregular >1%*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Northern pintail | *Anas acuta* |  | x | 2 | 1 | 2 | 2 | 2 | 2,000 | 0 | I | 3 | 3 | 0 |
| Northern shoveler | *Anas clypeata* |  | x | 1 | 1 | 1 | 1 | 1 | 3,500 | 0 | VI | 5 | 1 | 0 |
| Teal | *Anas crecca* |  | x | 1 | 1 | 1 | 1 | 1 | 24,000 | 0 | I | 2 | 1 | 0 |
| Eurasian wigeon | *Anas penelope* |  | x | 1 | 1 | 1 | 1 | 1 | 39,000 | 0 | I | 2 | 1 | 0 |
| Gadwall | *Anas strepera* |  | x | 1 | 1 | 1 | 1 | 1 | 7,500 | 0 | VI | 5 | 1 | 0 |
| White-fronted | *Anser albifrons* |  | x | 1 | 1 | 1 | 1 | 1 | 20,000 | 0 | I | 3 | 2 | 0 |
| goose |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Greylag goose | *Anser anser* |  | x | 1 | 1 | 1 | 1 | 1 | 12,000 | 0 | I | 3 | 0 | 0 |
| Pink-footed goose | *Anser brachyrhynchus* |  | x | 1 | 1 | 1 | 2 | 2 | 12,000 | 03 | VI | 1 | 1 | 0 |
| Turnstone | *Arenaria interpres* |  | x | 1 | 1 | 1 | 1 | 1 | 1,200 | 0 | I | 0 | 0 | 0 |
| Pochard | *Aythya ferina* |  | x | 1 | 1 | 1 | 2 | 2 | 11,000 | 0 | I | 1 | 0 | 0 |
| Bewick’s swan | *Cygnus bewickii* | x | x | 1 | 1 | 1 | 2 | 2 | 140 | 0 | I | 3 | 0 | 3 |
| Herring gull | *Larus argentatus* |  | x | 1 | 1 | 1 | 0 | 1 | 20,000 | 0 | I | 2 | 0 | 0 |
| Common gull | *Larus canus* |  | x | 1 | 1 | 1 | 1 | 1 | 100,000 | 0 | I | 2 | 0 | 0 |
| Black-headed gull | *Larus ridibundus* |  | x | 1 | 1 | 1 | 1 | 1 | 150,000 | 0 | I | 4 | 0 | 0 |
| Avocet | *Recurvirostra avosetta* | x | x | 1 | 1 | 1 | 1 | 1 | 300 | 0 | VI | 2 | 2 | 1 |

>75

>75

<25

50–75

25–50

–

–

– 66

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bean goose | *Anser fabalis* |  | x | 1 | 1 | 1 | 1 | 1 | 650 | 0 | MI | 0 | 1 | 0 | <25 |
| Tufted duck | *Aythya fuligula* |  | x | 1 | 1 | 1 | 1 | 1 | 10,000 | 0 | I | 0 | 0 | 0 | 50–75 |
| Curlew | *Numenius arquata* |  | x | 1 | 1 | 1 | 1 | 1 | 3,600 | 0 | MI | 0 | 4 | 0 | 50–75 |
| Whimbrel | *Numenius phaeopus* |  | x | 1 | 3 | 2 | 3 | 3 | – | – | MI | 2 | 1 | 0 | 25–50 |
| Spoonbill | *Platalea leucorodia* | x | x | 1 | 3 | 2 | 3 | 3 | 110 | 267 | MI | 2 | 0 | 0 | 100 |
| Eurasian golden  plover Shelduck | *Pluvialis apricaria*  *Tadorna tadorna* | x | x  x | 1  1 | 2  1 | 1  1 | 1  1 | 2  1 | 5,000  3,900 | 67  0 | MI  I | 2  0 | 4  2 | 0  0 | 50–75  >75 |
| *Birds—non-breeding Annex I* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Aquatic warbler | *Acrocephalus paludicula* | x |  | 0 | 0 | 2 | 3 | 3 | – | – | MI | – | – | – – | |
| Hen harrier | *Circus cyaneus* | x |  | 1 | 0 | 0 | 2 | 2 | 150 | 0 | MI | 2 | 1 | 7 <25 | |
| Great egret | *Egretta alba* | x |  | 1 | 1 | 1 | 1 | 1 | 70 | 0 | MI | 3 | 4 | 0 50–75 | |
| Ruff | *Philomachus pugnax* | x |  | 1 | 1 | 1 | 1 | 1 | 800 | 0 | MI | 2 | 4 | 0 25–50 | |

1 Supposed to increase along with restoration efforts in favour of habitats 4010 and 7140; 2 expressed as the number of occurrences in Flanders as present today; due to knowledge gaps, clear conservation objectives are hard to set, but an increase is pursued; 3 increase of a species’ habitat (as Natura 2000 habitat) is explicitly speciﬁed in the RCO, in addition to the area expansion of the speciﬁc Natura 2000 habitats, as already proposed in the table above.

to an increase of 2.5 E5% of the actual area (habitat 2150) ([Table 1).](#_bookmark5) Regional conservation objectives for species (excluding birds) were not quantiﬁed due to the lack of consistent data. Instead, a gen- eral trend of the efforts needed for their sustainable conservation is indicated. For the bulk of them (78%), active conservation mea- sures are needed regarding range and/or population expansion, sometimes supplemented with an explicit increase in the amount of habitat area for species. For 11 out of the 25 birds breeding regu- larly, an increase of 76% (Avocet) to 3.9 E3% (Night heron *Nycticorax nycticorax*) of the current breeding pairs is planned. For all but two wintering and migrating birds, no efforts are required to increase the number of individuals.

When setting priorities, habitats and species were categorised according to the importance Flanders has for their conservation at the European scale ([Table 1;](#_bookmark5) [Fig. 4).](#_bookmark6) Generally, only 12% of Flem- ish habitats and species were assigned as very important in this respect, with minor differences among habitats, species (excluding birds) and birds (17%, 4%, and 14%, respectively). The number of pro- tected sites important for the conservation of habitats and species strongly differed between and within habitats and species, with 79% of habitats and species having at least one site rated as essen- tial for their conservation ([Table 1).](#_bookmark5) For a univocal interpretation of their overall degree of protection by the Natura 2000 network, however, this categorisation should be considered along with the percentage of the area (habitats) or populations (species) present

beneﬁt of this approach is twofold. First, they will act as a general framework for the more detailed elaboration of SCI conservation objectives, taking into account ecological, economical and political interests in the region, as prescribed by Article 6 of the HD. Second, they will facilitate the evaluation and reporting of the national or regional conservation status of habitats and species to the EC, as they serve as reference conditions ([EC](#_bookmark24) [2005,](#_bookmark24) [2006).](#_bookmark24) Indeed, since the regional conservation objectives are not merely the sum of the objectives for all SCIs together, but also take into account the situa- tion in the surrounding landscape matrix, they can be used directly as a benchmark in the monitoring process, and ease the report-

100

Unknown

Moderately important Important

Very important

80

60

%

40

20

0

within the SCIs (or SPAs for birds).

Habitats

II IV I

Species (excluding birds)

Birds

>1%

**Discussion**

For a successful implementation of Natura 2000, we strongly recommend to determine regional conservation objectives. The

**Fig. 4.** Synthesis of the ranking of Natura 2000 habitats and species based on the con- tribution of the Flemish region to their conservation at the European scale. Species (excluding birds) and birds are categorised according to their occurrence in the Habitats and Birds Directive annexes, respectively. Birds meeting the 1% norm of occurrence (>1%) are also included.

ing of several aspects of the regional conservation status (distance to target for range and area/population). On the other hand, the method proposed may seem rather rigid, as determining conser- vation objectives may appear to be ﬁxed for an indeﬁnite period of time. However, it is important that new scientiﬁc evidence can be considered at any time during and after the process, eventually leading to even more well-founded conservation objectives.

Not all European member states follow the proposed procedure, as emerged from a questionnaire we directed to all European mem- ber states ([Table 2).](#_bookmark7) The majority of member states responded that they only determined conservation objectives at the SCI level. Some member states, e.g. The Netherlands ([LNV](#_bookmark36) [2006)](#_bookmark36) and Denmark (but only as a guide, not legally ratiﬁed; [Søgaard](#_bookmark30) [et al.](#_bookmark30) [2007),](#_bookmark30) also draw up regional conservation objectives. If so, the regional objectives are mainly qualitative and concern both bird species (BD) and the habitats and species of the HD. For almost all member states, pub- lic participation is a key element in the process, leading to more pragmatic rather than strictly scientiﬁc approaches.

The way to develop SCI conservation objectives is largely left open by the HD. They may be the result from a comparison of the current conservation status with reference conditions, which can be generated by theoretical, demographical or population genetic models (e.g. as being the case for some species in The Netherlands). These reference conditions, however, are difﬁcult to set as data availability is often limited ([Rondinini](#_bookmark23) [&](#_bookmark23) [Chiozza](#_bookmark23) [2010),](#_bookmark23) and if avail- able, reference numbers often turn out to be very high. For this reason and because public support is often limited and stakehold- ers and policy makers can exert considerable pressure during the process, pragmatic and conservative approaches turn out to be most feasible ([Apostolopoulou](#_bookmark9) [&](#_bookmark9) [Pantis](#_bookmark9) [2009;](#_bookmark9) [Maiorano](#_bookmark9) [et al.](#_bookmark9) [2007;](#_bookmark9) [Opdam](#_bookmark9) [et al.](#_bookmark9) [2009;](#_bookmark9) [Table 2).](#_bookmark7) Moreover, by allowing stakeholder par- ticipation while formulating conservation objectives at the regional level, discussion about conservation objectives at the SCI level is tempered and their implementation is eased.

Therefore, Flanders adopted the strategy to ﬁrst assess the current conservation status of habitats and species for its entire territory, i.e. both within and outside protected areas. Their current status was then benchmarked to pragmatic reference conditions for range and area/population, together with an assessment of spe- ciﬁc structures and functions of habitats/quantity and quality of the habitat of species, and their future prospects. If the favourable conservation status was not met, speciﬁc measures were formu- lated and objectives quantiﬁed, if data availability allowed to do so. A next step of the HD implementation in Flanders will be the translation of these regional conservation objectives into conser- vation objectives for each SCI. This process has to be ﬁnished by the end of 2010, being six years after the recognition by the EC of the Flemish sites proposed as SCIs (performed in 2004; Article 4 of the HD). In addition, Flanders (represented and endorsed by all sectors) has recently committed itself to realise 70% of these con- servation objectives by 2020 as part of a long-term agreement ([ViA](#_bookmark37) [2009).](#_bookmark37)

For most habitats and species (except for birds) the regional con- servation status in Flanders turns out to be unfavourable. Although the assessment in this study is based on the Belgian reporting to the EC in 2007 ([Paelinckx](#_bookmark18) [et al.](#_bookmark18) [2008b),](#_bookmark18) assessments can slightly differ because additional information on the distribution, speciﬁc structures and functions of habitats, and quantity and quality of the habitat of species has been gathered in the meantime. Further- more, since this study only considers the Flemish region of Belgium, data from the Atlantic biogeographical part of the Walloon region were omitted, and data from the small Flemish Continental bio- geographical region were added. Despite the highly fragmented landscape in Flanders, the restricted area assigned as SCI and SPA (only 12% of the territory is covered), and the poor species con- servation planning up till now, the overall conservation status of

habitats and species roughly coincides with that in other mem- ber states of the Atlantic biogeographical region ([Eionet](#_bookmark27) [2009).](#_bookmark27) This suggests that similar drastic conservation measures will be required in all neighbouring member states to attain a favourable conservation status. Measures are primarily focused on the main- tenance or restoration of habitats within SCIs (but see [Maiorano](#_bookmark38) [et al.](#_bookmark38) [2007](#_bookmark38) for limitations of this approach). However, conﬂicts between the (spatial) needs of several habitats and species may arise within a single SCI. Hence, clearly deﬁning priorities for the sense of urgency or the geographical allocation of the conserva- tion measures is crucial in order to accomplish regional objectives as effectively as possible. In this respect, priority setting may pro- vide information about which habitats or species should initially be dealt with ([Dimopoulos](#_bookmark21) [et al.](#_bookmark21) [2006).](#_bookmark21) Priorities can be set based on their current conservation status, the importance of Flanders for their conservation at the European level (few Flemish habitats and species are very important, i.e. there are no endemic species, and distribution ranges of habitats and species are often marginal), and their distribution among the different SCIs within the territory. For habitats, the drastic area increase required for favourable conser- vation status (median value 42%) is initially planned to be realised through restoration of strongly degraded habitat areas and con- version of poorly developed (not habitat worthy) vegetation types (80%), rather than de novo creation of habitat on sites with other current land use (20%). Creation of new habitat includes, among others, development of abandoned extraction sites or afforestation of former agricultural land. For species, it is assumed that many of them will beneﬁt from the conservation efforts made in favour of several habitat types. This explains why for many species no addi- tional habitat increase is suggested ([Table 1).](#_bookmark5) However, for species bound to habitats that mainly occur outside Natura 2000 areas or habitats that are not protected by the HD (e.g. Common ham- ster *Cricetus cricetus*), this does not necessarily hold true. For these species, other active conservation measures need to be taken in order to improve or extend their actual habitats and to ensure their favourable conservation status.

To evaluate the results of the conservation measures, a rigor- ous, yet ﬂexible monitoring strategy is indispensable and therefore considered an important pillar of the HD (Article 11). Basically, monitoring schemes are meant to show trends in conservation sta- tus between the six-year reporting intervals. However, they will also provide the data that are currently still lacking to assess con- servation status of certain habitats and species, and will allow us to unravel certain patterns and processes that were formerly not well understood. This information can then be used to adjust or ﬁne- tune existing conservation objectives. Such a ﬂexible approach is needed in the face of threats that might jeopardise the sustainable conservation of Europe’s biodiversity, like climate change or the spread of invasive species ([Didham](#_bookmark18) [et al.](#_bookmark18) [2007;](#_bookmark18) [Vos](#_bookmark18) [et al.](#_bookmark18) [2008).](#_bookmark18) Furthermore, monitoring will offer indications of how the Natura 2000 network of protected sites can be improved and further devel- oped, resulting in adequate conservation of habitats and species ([Dimitrakopoulos](#_bookmark20) [et al.](#_bookmark20) [2004;](#_bookmark20) [Maiorano](#_bookmark20) [et al.](#_bookmark20) [2007;](#_bookmark20) [Thomaes](#_bookmark20) [et al.](#_bookmark20) [2008).](#_bookmark20) Speciﬁc monitoring schemes are currently being developed, which will facilitate future reporting to the EC ([Förster](#_bookmark28) [et al.](#_bookmark28) [2008;](#_bookmark28) [Henry](#_bookmark28) [et al.](#_bookmark28) [2008;](#_bookmark28) [Mehtälä](#_bookmark28) [&](#_bookmark28) [Vuorisalo](#_bookmark28) [2007).](#_bookmark28)

Although the HD intrinsically has been a major step towards a European-wide nature conservation network, the terminology used in the directive is often vague and susceptible for interpreta- tion ([Gaston](#_bookmark29) [et al.](#_bookmark29) [2008).](#_bookmark29) As a consequence, member states follow different trajectories towards its implementation ([Bottin](#_bookmark8) [et al.](#_bookmark8) [2005;](#_bookmark8) [LNV](#_bookmark8) [2006),](#_bookmark8) or use distinct deﬁnitions of habitats and eval- uation methods ([Cantarello](#_bookmark10) [&](#_bookmark10) [Newton](#_bookmark10) [2008;](#_bookmark10) [Mehtälä](#_bookmark10) [&](#_bookmark10) [Vuorisalo](#_bookmark10) [2007).](#_bookmark10) This seriously hampers the process of streamlining results among member states and will urge the need for calibration. Also, it makes the implementation process less transparent and lowers the

**Table 2**

Overview of how other EU member states/regions deal with conservation objectives according to the Habitats Directive. Information was gathered from a directed ques- tionnaire on progress, content and methodology of the process of formulating conservation objectives for habitats and species, both within Sites of Community Importance (SCI) and outside (i.e. at the regional/national scale). Details are presented on when the conservation objectives (mandatory within SCI) are planned to be ﬁnalised, whether some of them are already ﬁnished and legally embedded, if conservation objectives are additionally formulated at the regional/national level (i.e. reckoning with the area not designated as SCI), and whether these objectives are qualitative (QL) or quantitative (QN) regarding area and population criteria. Furthermore, information is shown on ranking SCI according to their importance for habitats and species (SCI priority setting), and if a special notice was made for drawing up regional conservation objectives for birds. For both types of conservation objectives (SCI and regional), the presence of public participation (none: 0; during: 1; afterwards: 2), and the methodological approach (strictly scientiﬁc: S; pragmatic with scientiﬁc basis: P) is mentioned. Data can be unknown (–) or not applicable (n.a.).

Member state and region

SCI conservation objectives

Regional/national conservation objectives Public participation

Method

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Foreseen by | (Partially) Legally embedded | Determined | Area habitats | Population species | SCI priority setting | Birds |  | | |
| Austria  *Burgenland* | – | N | Y | QL | QL | Y | N |  | 1 | P |
| *Oberösterreich* | 2013 | Y | Y | QL/QN | QL/QN | N | Y |  | 1 | P |
| *Tirol* | – | Y | Y | QN | QL/QN | Y | Y |  | 1 | P |
| Belgium |  |  |  |  |  |  |  |  |  |  |
| *Brussels* | 2011 | N | N | n.a. | n.a. | n.a. | n.a. |  | 0 | P |
| *Flanders* | 2012 | N | Y | QN | QL | Y | Y |  | 1 | P |
| *Marine* | 2012 | Y | Y | QN | QL/QN | N | Y |  | 2 | S |
| *Wallonia* | – | Y | N | n.a. | n.a. | n.a. | n.a. |  | 0/2 | P |
| Cyprus | 2012 | Y | Y | QL | QL | Y | Y |  | 1 | P |
| Czech Republic Germany  *Berlin* | 2011–2015  – | Y  Y | Y  Y | QL/QN  QL | QL/QN  QL | N  Y | N  Y |  | 0  1/2 | P  P |
| *Hessen* | Done | Y | N | n.a. | n.a. | n.a. | n.a. |  | 2 | P |
| *Schleswig-Holstein* | Done | Y | N | n.a. | n.a. | n.a. | n.a. |  | 0 | P |
| Denmark | 2011 | N | N | n.a. | n.a. | n.a. | n.a. |  | 1 | P |
| Estonia | 2013 | Y | N | n.a. | n.a. | n.a. | n.a. |  | 1 | S |
| France | – | Y | N | n.a. | n.a. | n.a. | n.a. |  | 1 | P |
| Hungary | 2010 | N | N | n.a. | n.a. | n.a. | n.a. |  | 0 | P |
| Italy | 2012 | Y | – | – | – | – | – |  | 1 | P |
| Luxembourg | 2009 | Y | N | n.a. | n.a. | n.a. | n.a. |  | 1 | P |
| The Netherlands | 2011 | Y | Y | QL | QL/QN | Y | Y |  | 1/2 | P |
| Poland | 2010–2018 | N | N | n.a. | n.a. | n.a. | n.a. |  | 1 | P |
| Slovakia | 2013–2014 | Y | Y | QN | QN | – | Y |  | 1 | S |
| Slovenia | 2014 | Y | N | n.a. | n.a. | n.a. | n.a. |  | 1 | P |

reliability of compiled data sets at the European level that should give an objective idea of the overall progress made so far. In order to avoid some of these issues, member states have started to develop conservation objectives for habitats and species in trans-boundary SCIs, respecting the subsidiary principle. For instance, Flanders and The Netherlands are currently working on two such initiatives, such as the Common Meuse restoration project ([Pedroli](#_bookmark21) [et](#_bookmark21) [al.](#_bookmark21) [2002),](#_bookmark21) and the conservation of heathlands near their border.

In conclusion, the development of regional conservation objec- tives, as outlined in this study, offers a broader framework that integrates two major obligations of the HD: the assessment of the regional conservation status; and, the elaboration of SCI con- servation objectives. By considering both scientiﬁc insights and the socio-economical context, we are conﬁdent that the applied method might be a source of inspiration for other member states to successfully implement Natura 2000.

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