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ASSESSING THE CONSERVATION STATUS OF EUROPEAN UNION HABITATS – RESULTS OF THE COMMUNITY REPORT WITH A CASE STUDY OF THE GERMAN NATIONAL REPORT

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ABSTRACT - The EU Habitats Directive requires all member states to report every 6 years on the implementation of the Directive. The report covering the period 2000 – 2006 included for the first time an assessment of the conservation status of the habitats and species listed on annexes I, II, IV & V of the Habitats Directive following an agreed format. Based on national reports submitted from member States the European Topic Centre on Biological Diversity has prepared assessments for each biogeographical region at EU-level. The majority of the habitats of Annex I are not at favourable status although there is much variation both between countries and regions and between habitats. The results will be discussed at European level and at member state level with a case study of the German national report. At the same time a number of methodical problems became apparent both in Germany and at EU-level. Work is already under way to improve the next report for the period 2007 – 2012. The dimension of management needs, threats and pressures and the time scale for improvements of the conservation status are discussed. Habitats linked to agriculture appear to be particularly unfavourable.

KEY WORDS - EU HABITATS DIRECTIVE, NATURA 2000, REPORTS, HABITAT ASSESSMENT, CONSERVATION STATUS, EUROPEAN UNION, GERMANY.

INTRODUCTION

The 1992 EC Habitats Directive requests all Member States to undertake surveillance of habitats and species considered to be of Community interest and listed in Annexes I, II, IV & V. Article 17 of the Directive requires that Member States prepare reports to be sent to the European Commission every 6 years on the implementation of the Directive following an agreed format. The first reports were for the period 1994-2000 and primarily addressed the transposition of the Directive into national laws and the progress towards identifying and designating Special Areas of Conservation. The report for the period 2001-2006 for the first time includes assessments on the conservation status of the habitats and species of Community interest. The assessments are for the 216 habitats and 1 182 species listed in Annexes in their entirety and not just for the habitats and species within the Natura 2000 network (Sites of Community Interest / Special Areas of Conservation).

Discussions for a reporting format began in 2004

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with discussions held by the EC Habitats Committee and its Scientific Working Group together with dedicated workshops organised by the European Topic Centre on Biological Diversity (ETC/BD). This led to the reporting format being adopted by the Habitats Committee in March 2005 (European Commission, 2005). Further discussions resulted in an agreed methodology for preparing assessments for biogeographical regions based on the Member State reports (European Topic Centre on Biological Diversity 2008).

The Article 17 reports prepared by Member States have three sections; (i) general information about the implementation of the Directive, (ii) the assessments of conservation status of species and (iii) for habitats. Conservation status was assessed using a standard methodology which was to facilitate aggregation and comparisons between Member States and biogeographical regions. The parameters for habitats are range, area, structure and functions and future prospects. Member States were encouraged to use expert opinions where there was insufficient data to inform judgements. However, if data were largely missing it was also possible to report the conservation status as 'unknown'. The assessments of the four parameters were combined following an agreed method to give an overall assessment of conservation status.

A separate assessment was carried out for each biogeographical region present in a Member State. Where a Member State is entirely within one region, such as Luxembourg, only one report was required.

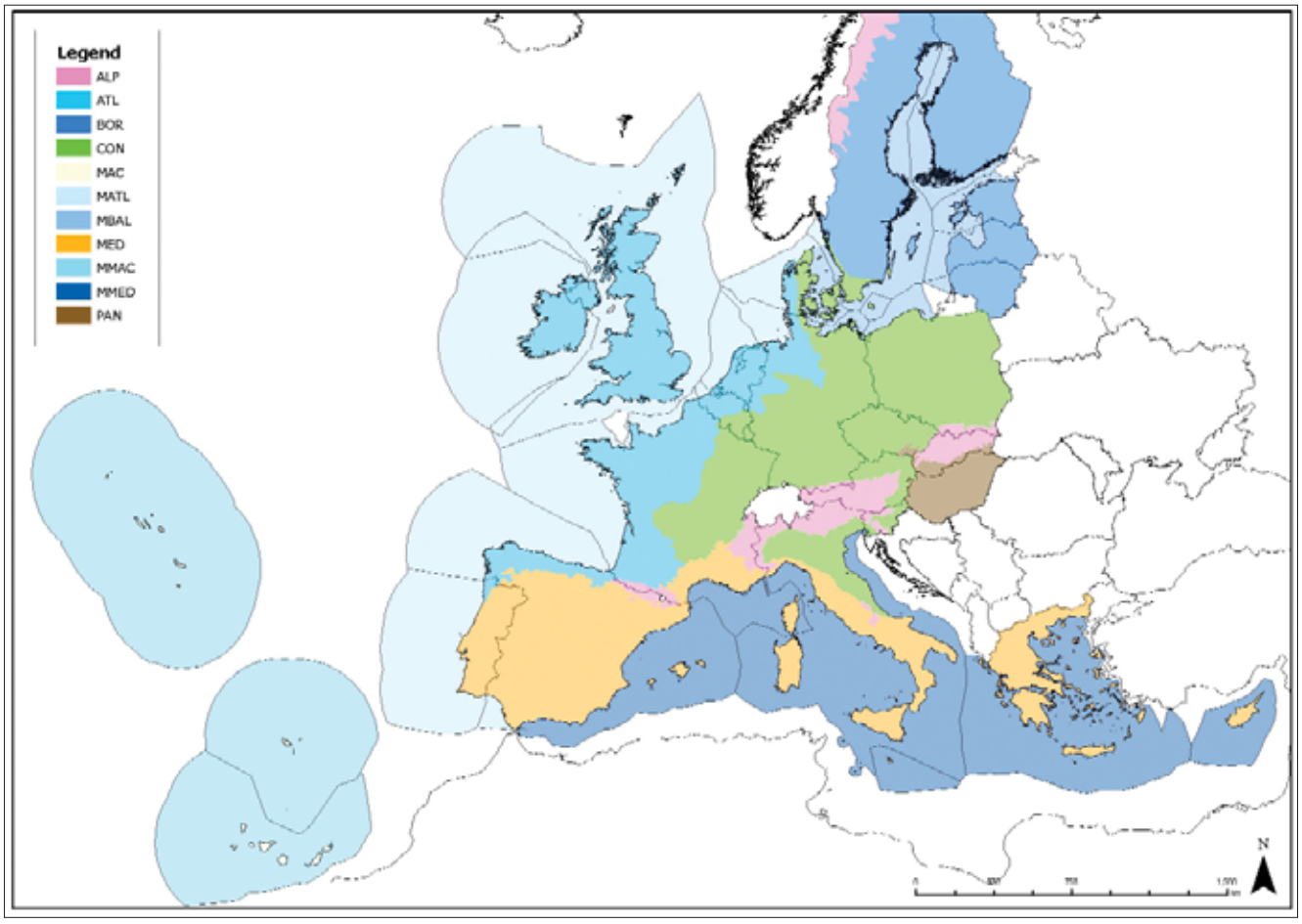

Figure 1: - The biogeographical and marine regions used for Article 17 reporting
Legend: ALP Alpine, ATL Atlantic, BOR Boreal, CON Continental, MAC Macaronesian, MATL marine Atlantic, MBAL marine Baltic, MED Mediterranean, MMAC marine Macaronesian, MMED marine Mediterranean, PAN Pannonic region.

If a Member State is present in two or more biogeographical regions a separate report was required for each biogeographical region. For example for 7110 - Active raised bogs the report prepared by Germany provided separate assessments for the habitat for the Alpine, Atlantic and Continental biogeographical regions as the habitat is found in all three regions.

For marine habitats and species reports were made for four marine regions: marine Atlantic, marine Baltic, marine Macaronesian and marine Mediterranean. These regions are based on reported Economic Exclusion Zones or other territorial claims and were prepared purely for reporting under Article 17.

Material and Methods

The declared aim of the Habitats Directive is "to maintain or restore the favourable conservation status, natural habitats and species of wild fauna and flora of Community interest" (Art. 2 (2)). "Conservation Status" and "Favourable Conservation Status" are thus very important terms and concepts for creating and maintaining the Natura 2000 network. A basic definition is given in the definitions-section of the Directive itself, Art. 1 i for species and Art. 1 e for natural habitats respectively.

Standardized assessments of conservation status require the use of well-defined methods and comparable concepts in all Member States. The definition of 'Favourable Conservation Status' in Article 1 forms the legal background for assessment matrices (one each for species and habitats) that have been developed as part of the agreed reporting format (European Commission, 2005). These matrices assess each of 4 parameters separately (habitat range, area, specific structures and functions and future prospects), and these are combined to give an overall assessment. Each parameter is assessed according to a "traffic-light scheme" as favourable (FV, green), unfavourable-inadequate (U1, amber), unfavourable-bad (U2, red). The matrix defines the thresholds between green, amber and red assessments in two different combined methodical approaches: a) the decline or quantitative change within the reporting period is assessed and b) a comparison is made to a favourable situation (being the theoretical minimum necessary for maintaining or reaching favourable status in the long term, or at least the minimum resource when the Directive came into force). For practical reasons, the assessment of typical species is included in the assessment of structures and functions. Guidelines were produced to try to ensure compatible methods were used by all member states (European Commission, 2006).

It is important to note that the reporting format not only requires Member States to deliver the final results of their assessments of each parameter, but also a number of data, such as the area and range in km², GIS-maps of the area occupied and range, an indication of data quality and favourable reference values used.

These data and assessment results are an integral part of the national reports produced by the Member States and constitute at the same time the information for the Composite report at EU level and to assess the conservation status for each habitat and species over the whole biogeographic regions.

Method for community assessment

The European Topic Centre on Biological Diversity (ETC/BD) estimated that for approximately half of the species and habitats covered by the Article 17 reports the biogeographical assessments will be equal to the national assessment(s) – as the habitats/species are restricted to one single country or occurring in several countries but having the same assessment (e.g. all 'favourable'). For the other half, the assessments of conservation status needed additional work and the development of a specific methodology using the data provided by Member States in their reports.

A number of possible methods for assessing the conservation status of Annex I habitats and species listed on Annexes II, IV and V based on the Article 17 reports from the Member States were discussed at meetings of the Scientific Working Group (SWG) and at workshops held by the ETC/BD in 2007 and 2008.

Following those discussions, a paper documenting the approach used to assess conservation status at the biogeographical or marine region levels was produced by the ETC/BD (European Topic Centre on Biological Diversity, 2008).Three possible methods were identified to assess conservation status of habitats at the regional level (biogeographical and marine) based on data and conclusions from Member States assessments:

METHOD 1 - AGGREGATION OF DATA: aggregate data provided by Member States for quantitative parameters and aggregate conservation status for some qualitative parameters:
i) Aggregate data on 'range' and 'population' from Annex D and use the evaluation matrix (Annex E) to obtain the conservation status of these parameters
ii) For 'structure and functions' and 'future prospects' the conservation status is obtained by weighted aggregation of the respective national assessments
iii) Finally, the overall status is calculated by using the rules given in the last line of the evaluation matrix

METHOD 2 - AGGREGATION OF INDIVIDUAL PARAMETERS: weighted aggregation of each of the four conservation status parameters with an overall assessment using the rules given in the last line of the evaluation matrix

METHOD 3 - AGGREGATION OF OVERALL STATUS: this method uses a weighted aggregation of the overall conservation status and will be used when data on individual parameters is missing or unusable.

All three methods rely, at least partially, on using an area to weight assessments at national level together with 'thresholds' for assessing the conservation status of either each parameter or the overall assessment.

Order of preference	Data to be used for weighting parameters
1st	Area (from MS data)
2nd	Area (from GIS data)
3rd	Range (from MS data)
4th	Range (from GIS data)

Table 1. Agreed preferences for choice of parameter to be used for weighting assessments.

The overall conservation status of a habitat type should reflect the status and proportion of that habitat type present in each Member State and biogeographical/marine region. Weighting is therefore a fundamental aspect of the process of assessing conservation status at regional level for habitats present in more than one Member State. The sequence of the three methods (1,2,3) listed below indicates the preferred weighting for each parameter; the choice of method took into account the availability and quality of the data provided by Member States, in particular it was clear that the Member States had used a variety of methods used for estimating range.

For example, table 2 shows how the parameter 'future prospects' has been reported by the countries in the Boreal biogeographical region for habitat '2110 Embryonic shifting dunes', together with the proportion of the habitat area in each country.

Overall, 43% (18 + 25) of the habitat has been reported as 'favourable' and 57% as 'unfavourable – inadequate'.

Following discussion at the EC in November 2007 and at a workshop held by the ETC/BD in March 2008 the following thresholds were used; they work as a series of sieves or filters, each applied in sequence

If the proportion of a habitat reported as 'Unfavourable – Bad' (U2, red) is greater or equal than

Member State	% of total area of habitat in each country	Assessment for the parameter 'future prospects'
Estonia	18	Favourable
Finland	10	Unfavourable – inadequate
Latvia	13	Unfavourable inadequate
Lithuania	25	Favourable
Sweden	34	Unfavourable – inadequate

Table 2. An example of weighting the Member States assessments to derive a regional assessment - '2110 Embryonic shifting dunes' in the Boreal biogeographical region.

25% the habitat is considered 'Unfavourable – Bad' (U2, red) for the region.

If the proportion of a habitat reported as 'Favourable' (FV, green) is greater or equal than 75% the habitat is considered 'Favourable' (FV, green) for the region.

If the proportion of a habitat reported as 'Unknown' (XX) is greater or equal than 25% the habitat is considered 'Unknown' (XX) for the region.

Any other combination is considered as 'Unfavourable – Inadequate (U1, 'amber')

Although to some extent these are arbitrary, testing showed that most regional assessments were not sensitive to the threshold chosen.

Methods for national assessment in Germany

The data for required for the habitat assessments were collected by each of the Länder and combined in a standardized German reporting database including GIS. The conservation status of the relevant habitat types was first assessed by weighting the relative range and area to compile a draft report by the Bundesamt für Naturschutz (BfN, Federal Agency for Nature Conservation). For Structures and functions the area of polygons in each category of the conservation status was reported using the A-B-C assessment scheme of the Standard Data Form (a form describing each Natura 2000 site) and subsequently transferred to the EU traffic light system. A series of biogeographic joint assessment seminars was held by the BfN, the Länder and the Federal Environment Ministry in order to systematically check the draft report and to validate the assessments. These took place for the Continental Region on 27-31 August, for the Atlantic Region on 18-21 September and for the Alpine Region on 24-25 October 2007. The final report was then transferred and uploaded into the EU-reporting database. The second National Report (http://cdr.eionet.europa.eu/de/eu/art17/envr0qzdw) of Germany was formally submitted to the EU Commission on 7 December 2007.

Results

Assessment Results at EU level

At the end of 2008 the EU's Natura 2000 network consisted of 21 612 Sites of Community Interest (SCI) / Special Areas of Conservation (SAC) under the Habitats directive (approximately 570 000 km^2 covering 13% of the EU terrestrial area and 88 000 km^2 of sea) and 5004 Special protected areas (SPA) under the Bird Directive (approximately 451 000

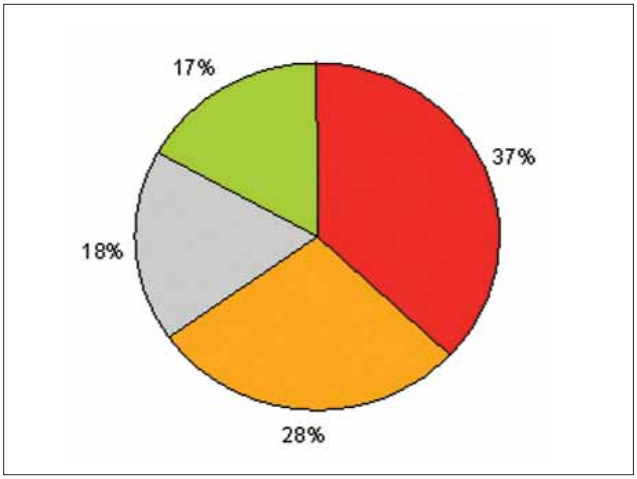

Figure 2: - Habitat assessments for all regions
Legend for this and other figures : Colours indicate Conservation status: Green "Favourable", Amber "unfavourable-inadequate", Red "unfavourable-bad", Grey "Unknown".

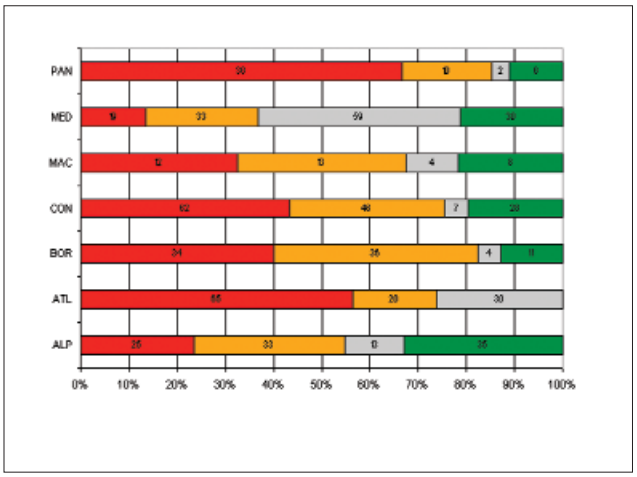

Figure 3: - Assessments for biogeographical regions (Numbers are N° of assessments in each class)
Rocky habitats have the highest proportion of assessments as favourable while 'dunes', 'grasslands' and 'bogs, fens & mires' all have high proportions of assessments as unfavourable.

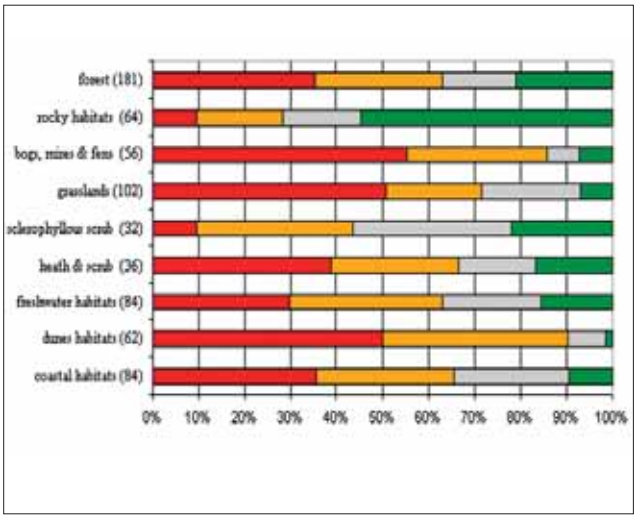

Figure 4: - Assessments for habitat groups (Numbers are N° of assessments in each class).

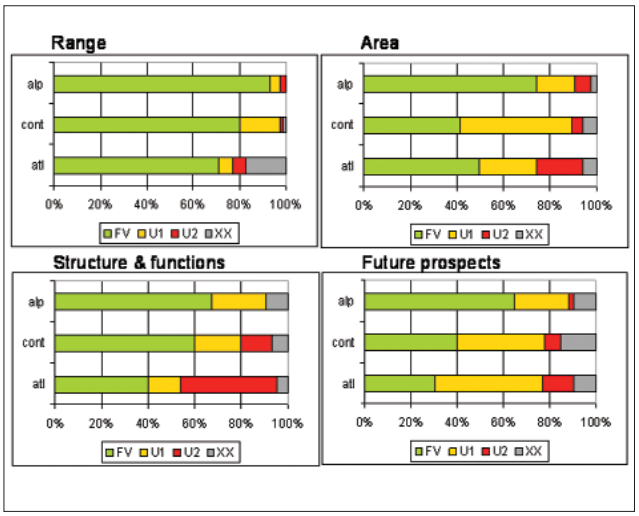

Figure 5: - Habitat assessment results in Germany for the parameters range, area, structures & func-tions and future prospects.

km² covering 10% of the EU terrestrial area and 66 000 km² of sea). The whole Natura 2000 network covers 15 % of the terrestrial area of the European Union. The network is expected to increase in area over the next few years, particularly for marine sites.

The ETC/BD made biogeographical assessments for 213 Annex I habitat types across 11 regions. In total 701 assessments were made for habitat types. It should be noted that several assessments were not possible due to the lack of data or major deficiencies with the data provided by Member States: these represent approximately 1% of the habitats assessments.

Figure 2 shows that the majority of habitat assessments are unfavourable; 70% of the 701 assessments are either unfavourable-inadequate or

unfavourable-bad and only 17% of the assessments are favourable.

There is considerable variation between regions (Fig. 3) and between habitat groups (Fig. 4). Due to the small number of marine habitats (5 in total, with only 3 or 4 in most marine regions) they have been omitted from Figure 3. The Alpine region has the highest proportion of habitats assessed as 'Favourable'. The region with the lowest proportion of habitats assessed as unfavourable is the Mediterranean although this is due to the very high proportion of 'unknown' assessments in this region. The Pannonic region has the highest proportion of unfavourable assessments.

Rocky habitats have the highest proportion of assessments as favourable while 'dunes', 'grasslands' and 'bogs, fens & mires' all have high proportions of assessments as unfavourable.

Member state and biogeographical region assessments are available on a dedicated website (Article 17 Technical Report, http://biodiversity.eionet.europa.eu/article17).

The national level – Germany as a case study

National reports and data according to Art. 17(1) from Member States are the basis for assessing conservation status at EU level. For Germany the Habitats Directive lists in total 91 habitat types on Annex I. With 3 biogeographical regions (Atlantic 20%, Continental 79% and Alpine 1% of Germany) many habitats had to be assessed separately for 2 or 3 regions (677 reports). Site selection and reporting is based on a number of technical handbooks such as a German interpretation habitat manual (Ssymank *et al.* 1998, Ssymank et al. 2008) and agreed assessment matrices for the conservation status of each habitat at local or site level (e.g. Doerpinghaus *et al.* 2003, Bewertungsschemata BfN, http://www.bfn.de/0316_bewertungsschemata.html).

Parameter	In/ out	range	area/ population	Struct.& functions	future prospects
Update SDFs	i	+	+	+	+
Biotope/Habitats mapping	i/o	+	+	(+)	(+)
Species inventories	i/o	+	+	(+)	(+)
Monitoring (statistical Art. 11 approach)	i/o			+	(+)
Expert mapping	i/o	+	+	+	+
National forestry inventory	i/o	+	(+)	(+)	(+)

Table 3. Data sources & data requirements used by Germany for assessing habitats. Legend: SDF Standard Data Forms (official site description), In/Out: data available inside or outside the Natura 2000 sites, + usually delivering substantial data, (+) indicative data or only partly relevant for the parameter.

The Natura 2000 network in Germany consists of 4622 SCI /SAC's under the Habitats directive (approximately 33 000 km^2 of land (9.3% of Germany's terrestrial area) and 21 000 km^2 of sea) and 736 SPA's under the Bird Directive (approximately 451 000 km^2 of land (11.2% of Germany's terrestrial area) and 20 000 km^2 of sea).

The whole German Natura 2000 network covers 15.3% of the terrestrial area. With the exception of some large sites especially along the coasts, in the Economic Exclusion Zone and in the Alps, Germany has proposed a large number of relatively small and often fragmented sites compared to other Member States. Data needs for assessing conservation status according to the agreed formats are relatively high and data quality is variable depending on existing mapping schemes and inventories or available expertise in Member States. In Germany the main data sources are biotope mapping, a status quo mapping and updating of the Standard Data Forms which describe each Natura 2000 site, species inventories and expert mapping / assessments. All these data sources only cover the data needs of certain parameters of the assessment, certain spatial areas or have different qualities partly varying among the Federal States (see Table 3) and will need constant updating. For future reporting, statistical monitoring as required by article 11 (now being implemented) and supplementary data from the national forest inventory will be added.

The results of the overall assessment of habitats vary clearly within biogeographical regions: while Continental and Atlantic region roughly have a quarter in favourable status (green, 25 % and 28% respectively), the Alpine region is much better off with 60% in favourable condition. The percentage of unfavourable bad is with 7% lowest in the Alpine, reaches 21% in the Continental region and is alarmingly high in the Atlantic region with 42%

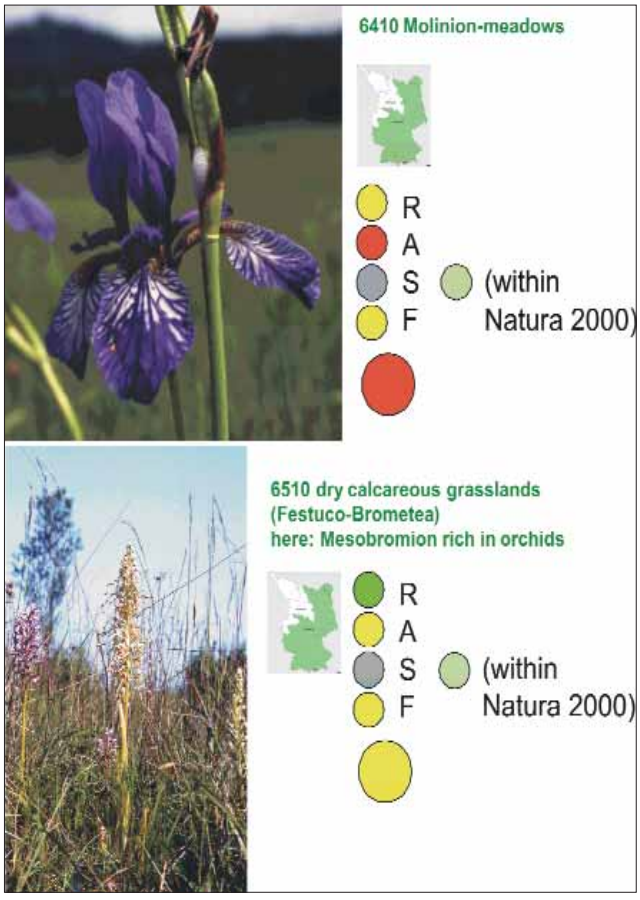

Figure 6: - Examples of the assessment of two grassland habitats in Germany (R = range, A = area, S = structure & functions, F = future prospects)

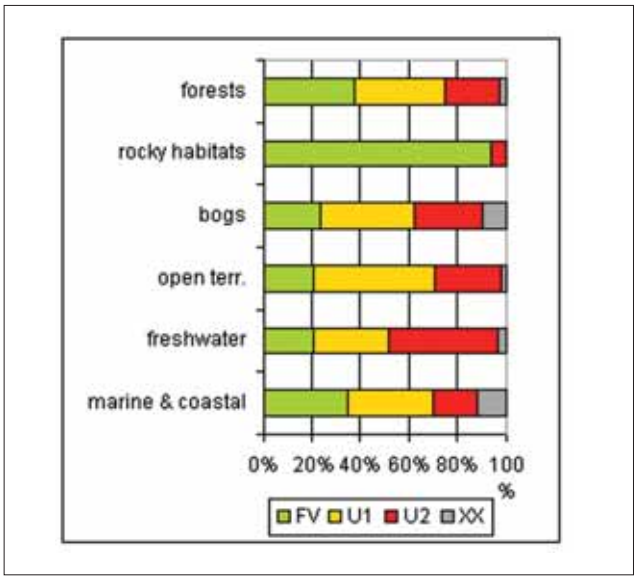

Figure 7: Assessments for habitat groups in Germany

(in Germany mainly the north-western lowlands). However to analyse the situation in more detail it is necessary to look at the results of the 4 parameters (Fig. 5), to identify which parameter is responsible for the overall assessment (Doc. Hab. 04-04 rev. 3, Annex E). Some 5-7% of the assessments were reported as "Unknown" due to missing data, a relatively low proportion compared to many other Member States.

Range is for most habitats in Germany nowadays relatively stable (historical losses where only partly taken into account for defining Favourable Conservation Status) and was assessed favourable for most habitat types. The losses in some habitat types like for example in the lowland and mountain hay meadows (6510, 6520) even resulted in an unfavourable-inadequate range. Losses in area are often occurring within the range and result in a lower absolute surface or density of occurrences which can in some cases also influence the distribution of habitat types since the Directive came into force are reflected in percentages of 40% or more unfavourable (amber and red) in the Atlantic and Continental regions. An example is the Mesobromion meadows (habitat 6210) in Germany. Changes in quality of the habitats due to rising pressures and intensification of land-use are mainly reflected in bad assessments in structures and functions and partly in the assessment of future prospects. These are the same general patterns as observed before at EU-level.

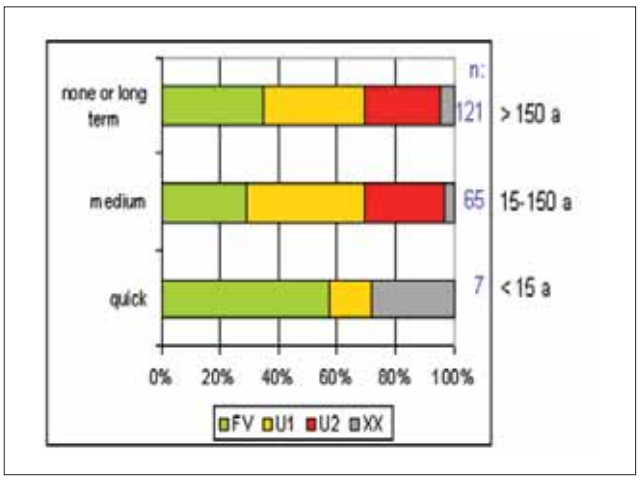

Figure 8: - Conservation status of Annex I habitats at different time scales of regeneration ability.

Two examples of grassland habitats illustrate this. Dry calcareous grasslands (Mesobromion, habitat code 6210, Fig. 6) have their main occurrences in the Jurassic mountain ranges in the Continental region and in the Alps. The range was assessed as favourable, while intensification, abandonment and direct loss of area for various reasons all resulted in loss of area and a fragmentation of remaining occurrences. The habitat type is red-listed in the German National Red Data Book (Riecken *et al.* 2006) as category 2 (heavily endangered) with restoration difficult and a declining trend. For the national report in the Continental region area and future prospects were assessed as unfavourable-inadequate. The situation for the habitat type 6410 (Molinion-meadows) is even worse as changes in land-use have resulted in massive losses which even touched upon the range and resulted in an unfavourable-inadequate for this parameter. The national Red Data Book lists them as category 1 (threatened by extinction, equivalent to the IUCN 'Critically endangered') with restoration difficult and a declining trend. Area was consequently assessed as unfavourable-bad, future prospects with unfavourable-inadequate. Structures and functions were not assessed (unknown), as the data outside the protected areas and outside Natura 2000 are missing or inconsistent, but most probably the situation is unfavourable. The small still existing remnants within protected sites (inside Natura 2000) have received much attention from nature conservation and are usually under conservation management and actually more or less stable in their species composition, therefore the structures and functions inside were estimated to be favourable. However the overall assessment clearly remains unfavourable-bad.

Looking at the different groups of habitats (Fig. 7) there are large differences in their conservation status: rocky habitats with chasmophytic vegetation

and screes were largely assessed as favourable (>90%) in all regions, while especially bogs, freshwater habitats and open terrestrial habitats (grasslands, heath and others) are the groups where a large percentage (approximately 80%) are more or less unfavourable. All these habitat types suffer from changes in hydrology (drainage, modification of natural flooding regime, lowering of groundwater table etc.) and/or changes in land-use and modern agriculture. Marine habitats and forests show an intermediate situation.

The German National Report is available on the BfN website (Nationaler Bericht Deutschland, http://www.bfn.de/0316_bericht2007.html). A printed report in 2 volumes with the main results for every species and habitat and a brochure for the wider public is available (BMU & BfN 2009, BfN 2009).

Discussion

Although a standard method was used by all 25 countries with guidance to assist those responsible for the national assessments, it is clear that there are differences between countries, both in the precision of data reported (e.g. area of habitat), the criteria used for assessments and the use of expert judgement to avoid reporting 'unknown'. For example almost all forest types in Denmark have been reported as 'favourable' whereas very few other countries in the Atlantic and Continental regions have assessed more than a few of their forests as favourable. It appears this is due to the criteria used to assess 'structure and function' for forests in Denmark being different from those used elsewhere.

For some Mediterranean countries such as Italy and Greece data was only available from protected sites for many habitats (Ministero dell'Ambiente e della Tutela del Territorio e del Mare - Direzione per la Protezione della Natura, 2008) and this may be partly responsible for the high proportion of assessments as 'favourable' in these countries. The proportion of assessments as 'unknown was also higher in this region, both for species and habitats. Data quality is discussed in more detail in a paper by the ETC/BD (European Topic Centre on Biological Diversity, 2009).

Regeneration ability of habitats

Restoring habitats to a favourable conservation status is not just a matter of money and appropriate management: In most cases restoration will take a long time, well beyond one or two reporting periods and thus short term programmes are not likely to really help. The analysis of trends might show quicker results (trend decreasing, stable or increasing, while the Conservation Status is still unfavourable). In Germany regeneration ability was assessed for all biotope types in the National Red Data book for biotopes in 5 different categories. As this list is largely compatible with Annex I habitats (although often several biotope types belonging to one habitat type) it was possible to assign regeneration ability to German Annex I habitats (Fig. 8) with 3 broad classes. These are quick regeneration possible (less than 15 years required), medium regeneration ability (15-150 a) and none or long term regeneration ability (over 150 years). Based on this classification the analysis of conservation status is very alarming: The majority of unfavourable inadequate and unfavourable bad assessments over all biogeographic regions is within the habitats with medium and long term regeneration ability (Fig. 9).

Threats and pressures for habitats

The EU-reference-list used in 2007 (taken from the explanatory notes to the standard data form (European Commission, 1997) includes 176 activities / threats under 9 different headings but is not consistently hierarchical and has been used in a heterogeneous way by member states during the last reporting period. In particular, the activities / threats were not ranked in order of importance. Thus it is difficult to analyse these results and interpretation is difficult as some threats were systematically missing (e.g. climate change).

For Germany the reports lists in total 3688 threats and pressures for the habitat types of Annex I. A preliminary analysis is given in Fig. 9.

The largest percentage of threats and pressures identified can be attributed to intensive land-use (agriculture and forestry, see also Schröder et al. 2008) with 28%, changes in water balance and hydrology range with 20% on the second place and changes in land-use with 17% (e.g. turning grassland into arable fields or forests). Pollution is with 11% probably underestimated and eutrophication does with its 7% only account mainly for direct active nutrient input. Many changes in land-use, the lowering of the ground-water table or intensification of land-use usually also result in indirect eutrophication, which still is a major player in the conservation status of habitats in Germany. Critical loads have not been taken into account systematically for assessing the conservation status in Germany in the national report and are exceeded in many cases.

Future pressures on many habitats will probably increase. Climate change may in the long term be a factor changing the species composition and possibly also the functional relationships of many habitat types. However climate change will certainly not reduce the value of the EU-wide Natura 2000 network: most sites are multi-interest sites and even if some species migrate the European scale of the network and the often broad habitat definitions (for example including similar beech forests from Italy to southern Sweden under one habitat type) ensure that the network will be valuable even in a changing environment. Rather the contrary, Natura 2000 will help buffer climate change (many forests and most bog systems are included as biological CO_2 stores), the network allows for migrations and includes in many cases the potential sites for newcomers or for an adaption of the habitats (low intensity of land use, low nutrient and pollutant input...). Additional coherence via application of Article 10 will of course be needed and some sites could be enlarged to include the whole range altitudinal belts, management planning should take climate change into account. However over the coming decades the immediate threats to biodiversity and Natura 2000 are changes in land-use which play a major role: there is an increasing demand for bio energy (bio fuel, biomass-production), new techniques and privatization in forestry make resources such as so far untouched ravine forests (habitat 9180) economically interesting for complete "harvesting", the use of GMO's in agriculture are new challenges and first evidence of a decline in pollinators in Europe are alarming (Food and Agriculture Organisation, FAO, 2008). The possibilities for functional compensation or regeneration of habitats are still largely overestimated in many impact assessments (appropriate assessments) with a risk of a slow permanent loss of high quality habitat areas within Natura 2000. Eutrophication and fragmentation are still increasing in many European countries. Thus careful management of Natura 2000-sites and redefining sustainable land-use in terms of maintaining the biodiversity and not only the sustainability of the desired products are key issues of the success of maintaining European biodiversity for future generations.

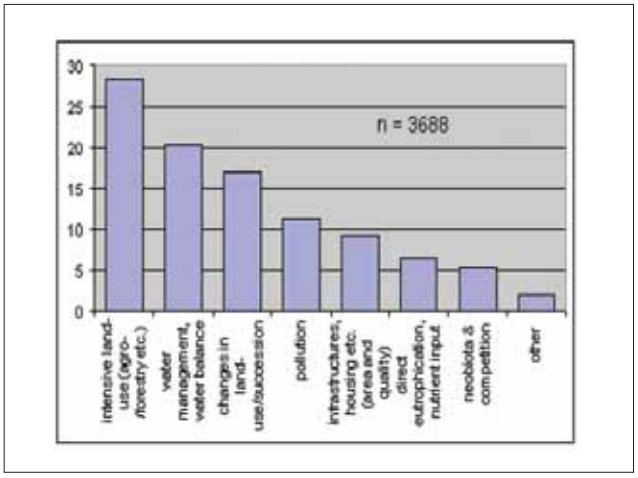

Figure 9: - Overview of threats and pressures for Annex I habitats in the German national report

Conservation status of habitats linked to agriculture

Ostermann (1998) listed Annex I habitats he con-

sidered to be dependent on agriculture, for example grasslands dependent on extensive grazing. This list has been revised by the EEA-ETC/BD to include habitats added to the annex in 2004 and 2007 following the enlargement of the European Union from 15 to 27 countries (Halada *et al.*, unpublished). The proportion of assessments for biogeographical regions falling into each class ('Favourable', etc) was calculated for these habitats and of the non-agricultural habitats and the results are shown in Figure 10.

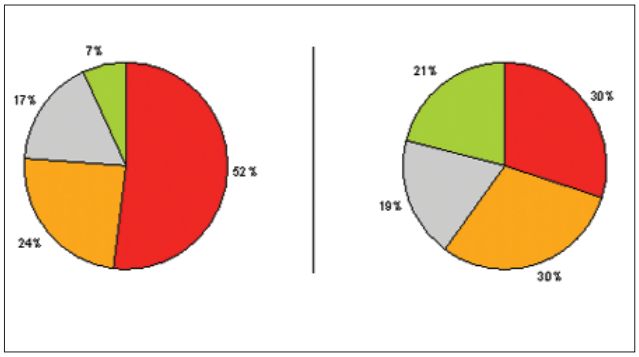

Figure 10: - Assessments of conservation status of habitats dependent (left) or not dependent (right) on agriculture (see text for details)

It is clear that the habitat types linked to agriculture, in general, have a worse conservation status with only 7% favourable compared to 21% for non-agricultural habitats. There is variation between regions with no Member State reporting a habitat dependent on agriculture as favourable in the Atlantic region. Excluding Macaronesia, which has very few habitats dependent on agriculture, the highest percentage of favourable is in the Continental with 9% followed by the Alpine and Boreal regions which both have 7% (see table 4). The trends observed at a European scale can also be seen within Germany (Figure 11) suggesting the pattern observed is real and not an artefact of the methodology used to produce the regional assessments.

It is difficult to compare the Mediterranean with other regions as the proportion of unknown is very high although the data would suggest these habitats are more favourable in this region than elsewhere. However, it is not clear that the same criteria have been applied by countries such as Italy and Greece as elsewhere in Europe when assessing conservation status and in both countries data was only available from protected sites (Ministero dell'Ambiente e della Tutela del Territorio e del Mare - Direzione per la Protezione della Natura, 2008).

The bad conservation status of agricultural habitats in the Atlantic region could be linked to the pressures in this region which includes a high proportion of farmland including some of the most intensively farmed land in the European Union. The Pannonic region also has a very high proportion of its agricultural habitats assessed as unfavourable with 82% as Unfavourable-bad.

Other studies have shown that populations of species associated with farming tend to be declining faster than other groups, for example Heer, Kapos & Brink (2005) reported a 25% decline in farmland species since 1970, with other species groups showing declines of 5% or less . The same study reported greater declines in the EU15 compared to the EU10 which is consistent with declines in both species populations and the poor conservation status of habitats associated with agriculture being linked to the high proportion of land in Western Europe, in particular the Atlantic region, used for intensive agriculture. Similar trends have been reported for birds (Gregory *et al.*, 2005) and butterflies (Van Dyke *et al.,* 2009).

Improvements required for future reporting

There are clearly important gaps in the data required for assessing the conservation status of the Annex I habitats, in some countries even basic inventory data seems unavailable for some habitats and information on trends is often lacking. Several countries have said that the Article 17 reporting process has helped them identify weaknesses in existing monitoring programmes and many countries are cur-

Assessment	Alpine		Atlantic		Boreal		Continental		Macaronesia		Mediterranean		Pannonic	
	N°	%	N°	%	N°	%	N°	%	N°	%	N°	%	N°	%
U2	11	39	25	66	18	62	24	53	1	17	5	16	18	82
U1	10	36	7	18	8	28	14	31	3	50	8	26	2	9
XX	5	18	6	16	1	3	3	7	0	0	17	55	1	5
FV	2	7	0	0	2	7	4	9	2	33	1	3	1	5
total	28	100	38	100	29	100	45	100	6	100	31	100	22	100

Table 4. Conservation assessment of habitats dependent on agriculture for each biogeographical region

rently establishing biodiversity monitoring networks (*e.g.* Latvia, see http://www.lva.gov.lv/monitor/vnmp.htm) and better information should be available for the next Article 17 report in 2013.

Although guidelines were provided it is clear that they were not sufficient to ensure that the data reported was compatible across the European Union, this has been recognised by the European Commission and a working group on reporting has been established which, among other topics, will provide improved guidelines for future reports.

Standardisation is particularly needed for:

Definition of Range
Reporting of 'structure & function', including the treatment of typical species
Format for spatial data

The reporting of threats and pressures needs improving and a revised list has been prepared (Circa library, reporting group, http://circa.europa.eu/Public/irc/env/monnat/library?l=/expert_reporting/work-package_revision/pressures_-threats&vm=detailed&sb=Title), threats and pressures also need to ranked or only the most important reported.

CONCLUSION

This is the first time that the conservation status of habitats has been assessed across such a large area encompassing so many countries, earlier evaluations of similar areas in the USA and Australia (Nicholson *et al.*, 2009) only cover single countries. Many problems were encountered, both in sourcing the

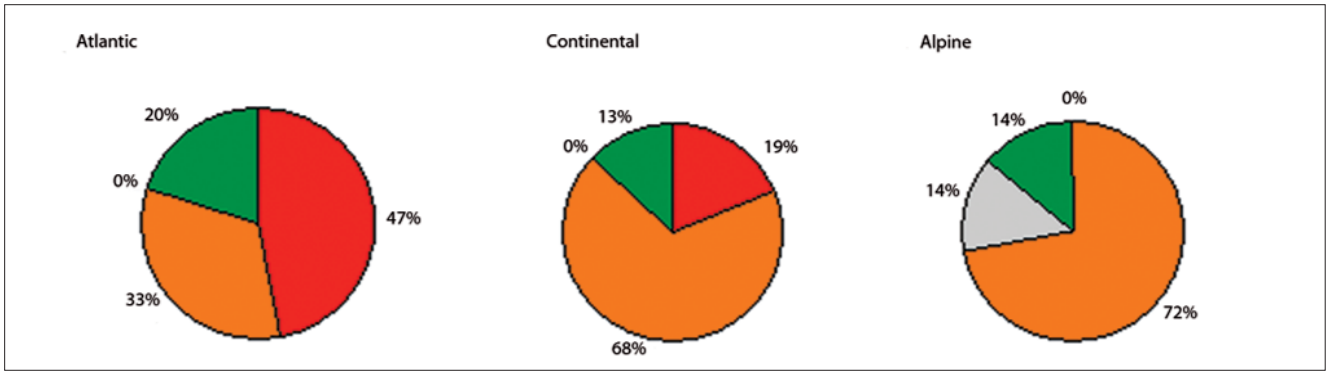

Figure 11 - Assessments of habitats linked to agriculture in Germany for the Atlantic, Continental and Alpine biogeographical regions, data taken from Schröder et al (2008).

required data and in the method used for assessments. However gaps in data have been identified and work is already underway to improve the reporting process, in particular, to improve data compatibility where this is clearly needed.

Despite these problems, it is clear that many habitats in the European Union cannot be described as being in a favourable condition and that changes to policy and improved management of sites are required if the European Union is to achieve its stated aim of stopping the loss of biodiversity by 2010 or to address the issues raised in the European Commission's "Message from Athens".

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Annex I: - List of the Habitat Directive Annex I habitats depending on agricultural practices in the EU
Legend: D – dependent on agricultural management: f – fully dependent, p – partly dependent. N –relationship with extensive farming practices only holds true for only some sub-types or for part of their distribution or doubts exist on the habitat type's dependence on agricultural management

Code	Habitat name	D	N
1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	p	X
1340	Inland salt meadows	p	
1530	Pannonic salt steppes and salt marshes	p	
1630	Boreal Baltic coastal meadows	p	
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)	p	X
2140	Decalcified fixed dunes with *Empetrum nigrum*	p	X
2150	Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)	p	X
2160	Dunes with *Hippophaë rhamnoides*	p	X
2170	Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)	p	X
21A0	Machairs	f	
2310	Dry sandy heaths with *Calluna* and *Genista*	f	
2320	Dry sandy heaths with *Calluna* and *Empetrum nigrum*	f	
2330	Inland dunes with open *Corynephorus* and *Agrostis* grasslands	f	
2340	Pannonic inland dunes	f	
4010	Northern Atlantic wet heaths with *Erica tetralix*	p	X
4020	Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*	f	
4030	European dry heaths	f	
4040	Dry Atlantic coastal heaths with *Erica vegans*	f	
4060	Alpine and Boreal heaths	p	X
4090	Endemic oro-Mediterranean heaths with gorse	p	
5130	*Juniperus communis* formations on heaths or calcareous grasslands	p	
5420	*Sarcopoterium spinosum* phryganas	p	
5430	Endemic phryganas of *the Euphorbio-Verbascion*	p	
6110	Rupicolous calcareous or basophilic grasslands of the *Alysso-Sedion albi*	p	
6120	Xeric sand calcareous grasslands	p	
6140	Siliceous Pyrenean *Festuca eskia* grasslands	p	
6150	Siliceous alpine and boreal grasslands	p	
6160	Oro-*Iberian Festuca indigesta* grasslands	p	
6170	Alpine and subalpine calcareous grasslands	p	
6180	Macaronesian mesophile grasslands	p	
6190	Rupicolous pannonic grasslands (*Stipo-Festucetalia pallentis*)	f	
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*)	p	X
6220	Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea*	f	

Code	Habitat name	D	N
6230	Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and sub-mountain areas, in continental Europe)	f	
6240	Sub-pannonic steppic grassland	p	X
6250	Pannonic loess steppic grasslands	f	
6260	Pannonic sand steppes	f	
6270	Fennoscandian lowland species-rich dry to mesic grasslands	f	
6280	Nordic alvar and precambrian calcareous flatrocks	f	
62A0	Eastern sub-Mediterranean dry grasslands (*Scorzoneratalia villosae*)	f	
62C0	Ponto-Sarmatic steppes	p	X
62D0	Oro-Moesian acidophilous grasslands	p	X
6310	Dehesas with evergreen *Quercus* spp.	f	
6410	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	f	
6420	Mediterranean tall humid herb grasslands of the *Molinio-Holoschoenion*	p	
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	p	X
6440	Alluvial meadows of river valleys of the *Cnidion dubii*	f	
6450	Northern boreal alluvial meadows	f	
6510	Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)	f	
6520	Mountain hay meadows	f	
6530	Fennoscandian wooded meadows	f	
7140	Transition mires and quaking bogs	p	X
7150	Depressions on peat substrates of the *Rhynchosporion*	p	
7210	Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	p	X
7230	Alkaline fens	p	
8230	Siliceous rock with pioneer vegetation of the *Sedo-Scleranthion* or of the *Sedo albi-Veronicion dillenii*	p	X
8240	Limestone pavements	p	
9070	Fennoscandian wooded pastures	f	

Annex II: - Habitat types of Annex I habitats directive in Germany with their management needs and regeneration ability
Legend: M – dependent on management and or appropriate land-use: f – fully dependent, p – partly dependent or in some subtypes dependent, n – not dependent.
R – regeneration ability: 1 – quick (< 15 years), 2 – medium (15-150 years), 3 none/long term regeneration (> 150 years).
Note: Dependency on management is not identical with the dependency on agriculture as listed in Annex I for the EU for two major reasons. Firstly, the German assessment includes all types of management/ land-use, for example forestry and forest habitat types secondly, some habitat types display regionally different characteristics and may be completely independent of management in Germany, while in other Member States certain subtypes are partially dependent. Not dependent on management or land-use means that without any human intervention the habitat type can develop and will stay or develop into a good conservation status. This does not exclude that some kind of land-use may be possible.

Code	Habitat name	M	R
1110	Sandbanks which are slightly covered by sea water all the time	n	1
1130	Estuaries	n	3
1140	Mudflats and sandflats not covered by seawater at low tide	n	3
1150*	Coastal lagoons	n	3
1160	Large shallow inlets and bays	n	3
1170	Reefs	n	3
1210	Annual vegetation of drift lines	n	3
1220	Perennial vegetation of stony banks	n	2
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	n	3
1310	Salicornia and other annuals colonizing mud and sand	n	2
1320	Spartina swards (Spartinion maritimae)	n	1
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	p	2
1340*	Inland salt meadows	p	3
2110	Embryonic shifting dunes	n	1
2120	Shifting dunes along the shoreline with Ammophila arenaria ('white dunes')	n	2
2130*	Fixed coastal dunes with herbaceous vegetation ('grey dunes')	n	2
2140*	Decalcified fixed dunes with Empetrum nigrum	n	2
2150*	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	n	2
2160	Dunes with Hippophaë rhamnoides	n	1
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	n	2
2180	Wooded dunes of the Atlantic, Continental and Boreal region	n	3
2190	Humid dune slacks	n	2
2310	Dry sand heaths with Calluna and Genista	f	2
2320	Dry sand heaths with Calluna and Empetrum nigrum	f	2
2330	Inland dunes with open Corynephorus and Agrostis grasslands	f	2
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	n	3
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	n	3
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	n	3
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	n	2
3160	Natural dystrophic lakes and ponds	n	3
3180*	Turloughs	n	3
3190	Lakes of gypsum karst	n	3
3220	Alpine rivers and the herbaceous vegetation along their banks	n	3
3230	Alpine rivers and their ligneous vegetation with Myricaria germanica	n	3
3240	Alpine rivers and their ligneous vegetation with Salix elaeagnos	n	3
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	n	3
3270	Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation	n	2
4010	Northern Atlantic wet heaths with Erica tetralix	p	3
4030	European dry heaths	f	2
4060	Alpine and Boreal heaths	p	3
4070*	Bushes with Pinus mugo and Rhododendron hirsutum (Mugo-Rhododendretum hirsuti)	p	2
40A0*	Subcontinental peri-Pannonic scrub	p	3
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	n	2
5130	Juniperus communis formations on heaths or calcareous grasslands	f	2
6110*	Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi	p	3
6120*	Xeric sand calcareous grasslands	f	2
6130	Calaminarian grasslands of the Violetalia calaminariae	n	3
6150	Siliceous alpine and boreal grasslands	n	2

6170	Alpine and subalpine calcareous grasslands	p	3
6210*	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	p	3
6230*	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	f	2
6240*	Sub-Pannonic steppic grasslands	p	3
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	f	2
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	p	2
6440	Alluvial meadows of river valleys of the Cnidion dubii	f	2
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	f	2
6520	Mountain hay meadows	f	2
7110*	Active raised bogs	n	3
7120	Degraded raised bogs still capable of natural regeneration	n	3
7140	Transition mires and quaking bogs	n	3
7150	Depressions on peat substrates of the Rhynchosporion	p	2
7210*	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	p	2
7220*	Petrifying springs with tufa formation (Cratoneurion)	n	3
7230	Alkaline fens	p	3
7240*	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	n	3
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	n	2
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	n	2
8150	Medio-European upland siliceous screes	n	3
8160*	Medio-European calcareous scree of hill and montane levels	n	3
8210	Calcareous rocky slopes with chasmophytic vegetation	n	3
8220	Siliceous rocky slopes with chasmophytic vegetation	n	3
8230	Siliceous rock with pioneer vegetation of the Sedo-Scleranthion or of the Sedo albi-Veronicion dillenii	n	3
8310	Caves not open to the public	n	3
8340	Permanent glaciers	n	3
9110	Luzulo-Fagetum beech forests	n	3
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	p	3
9130	Asperulo-Fagetum beech forests	n	3
9140	Medio-European subalpine beech woods with Acer and Rumex arifolius	n	3
9150	Medio-European limestone beech forests of the Cephalanthero-Fagion	n	3
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	p	3
9170	Galio-Carpinetum oak-hornbeam forests	p	3
9180*	Tilio-Acerion forests of slopes, screes and ravines	n	3
9190	Old acidophilous oak woods with Quercus robur on sandy plains	p	3
91D0*	Bog woodland	n	3
91E0*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	n	3
91F0	Riparian mixed forests of Quercus robur, Ulmus laevis and Ulmus minor, Fraxinus excelsior or Fraxinus angustifolia, along the great rivers (Ulmenion minoris)	n	3
91G0*	Pannonic woods with Quercus petraea and Carpinus betulus	n	3
91T0	Central European lichen Scots pine forests	p	3
91U0	Sarmatic steppe pine forest	p	3
9410	Acidophilous Picea forests of the montane to alpine levels (Vaccinio-Piceetea)	n	3
9420	Alpine Larix decidua and/or Pinus cembra forests	n	3