Checklists for the CORINE Biotopes Programme and its application in the PHARE countries of Central and East Europe;

including comparisons with relevant conventions and agreements on the conservation of European species and habitats

REPORT

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1. BACKGROUND AND PROJECT HISTORY

1.1 Project aim

The overall objective of the project was to support the extension of the CORINE Biotopes programme into the PHARE countries of East and Central Europe through the provisions and review of specific checklists and review of appropriate parts of the methodology. Candidate checklists of animals and plants for the six PHARE countries of East and Central Europe were to be prepared and recommendations made for extension of the process into a wider Pan-Europe.

1.2 Background and Terms of Reference

The aim of the project was proposed in the Council of Europe/European Environment Agency Task Force CORINE Biotopes meeting in December 1991, and specifications drawn up in the following year.

In accordance with the contract, five tasks were identified in agreement with IUCN European Programme:

1. Preparation of a CORINE Biotope checklist of threatened species for six PHARE countries;

2. Preparation of explanatory notes/guidelines for the checklists;

3. Comparison of CORINE Biotope checklists with other species and habitats convention/treaty lists;

4. Independent review/comment of the CORINE Biotopes species and habitat selection process;

5. Recommendations for the guideline checklist methodology to extend the CORINE Biotopes programme to non EU countries.

The first draft checklists were submitted to IUCN in October 1992 as the *Indicative checklists for the PHARE countries of central and east Europe* (1992) for plants and the *Preliminary draft list of species of conservation concern in the CORINE PHARE countries to be considered for inclusion in the CORINE PHARE list of threatened species 1. Vertebrates, excluding birds* (1992). Avifauna were not included as Birdlife International were separately preparing the bird checklist.

Subsequently the WCMC activities in 1993/94 included:

- An assessment of existing draft WCMC checklists of threatened animals and plants in the PHARE countries of Bulgaria, Czech Republic, Hungary, Poland, Romania and Slovak Republic;

- Review and incorporation of new information on Red Lists of animals and plants in Bulgaria, Czech Republic, Hungary, Poland, Romania and the Slovak Republic;

- Where time available to review existing preliminary list from the *Habitats of the European Community, Central Europe and Northern Europe (1990)*, using information readily available to WCMC and its collaborators;

- Review and incorporation of information from national authorities and key experts, including CORINE PHARE focal points;

- Incorporation of relevant information into WCMC databases.

- Analysis of material received in order to assess the extent to which the species lists were compatible with the CORINE Biotopes checklists of the 12 EU Member States (see methodology in CORINE Technical Handbook);

- Completion of the animal and plant checklists in style and format requested by the CORINE Biotope coordinators.

In February 1994 the final drafts were completed as *CORINE Checklist of threatened plants and animals for the European Union and the extension to the PHARE countries* (1994) Version 1. The lists included species in the existing checklists of threatened species (Appendices F-K inclusive) published in the *CORINE Biotopes Manual, Data Specifications - Part 1 (EUR 12587/2 EN)*(1991) plus additional species from the PHARE region.

These checklists were submitted to IUCN and the CORINE Coordinator at the EEA-TF and presented at the February 1994 Expert Working Meeting of CORINE PHARE national coordinators at DGXI, Brussels. The lists were then forwarded to PHARE national experts for CORINE Biotopes for review, correction and update.

The methodology and checklists of species and habitats were subsequently sent out for independent review to EU Member States CORINE coordinators, IUCN Commissions and Programmes and other expert groups with requests for comment by 30 March 1994 (see Annex 1 for lists of contacts).

The correspondence included the following:

- Documentation on the methodology for CORINE Biotopes site selection at the European Union level *(CORINE Biotopes manual Methodology, (EUR 12587/1 EN)*;

- Contents page illustrating habitat structure, introduction and a sample page of habitat classes as the classification listed in the *CORINE Biotopes manual, Habitats of the European Community, Data Specifications - Part 2, (EUR 12587/3 EN)*

Requests for comment were made on:

- Criteria used to select sites.

  Requested comments on the suitability of this methodology and whether it could be applied to extend the classification to habitats also (or solely) found in eastern and central Europe and the former Soviet Union.

- Alternative classifications that are currently in use or which are being proposed to cover the pan European region (whether a global vegetation classification which is applicable to Europe or one designed specifically for Europe itself).

  Requests were made for comments about the relative merits of the various systems.

Acknowledgements were received from all six countries of the PHARE region. Variable amendments were received including long additional lists of species of national importance from Hungary and Poland.

The final candidate Version 1 checklists of animal and plant species for the EU and PHARE countries were incorporated into the listings and marked within the WCMC global databases of threatened species. The habitats classification was reviewed for potential incorporation into the WCMC site protection database.

In April 1994 additional comments were received from Marc Roekaerts, Ulla Pinborg and Pierre Devilliers on CORINE designated areas, habitats and species, during an IWRB/WCMC wetland information management workshop on 26 April and a WRI/WCMC workshop on Biodiversity Indicators for Policy-Makers on 29 April 1994. Finally in June 1994 lists were encoded into the CORINE Biotopes database by ITE.

1.3 Sources of Information

In order to capture the fullest possible response within the given time frame under the IUCN Terms of Reference a variety of institutions were contacted and data collection methods employed. These included:

- CORINE PHARE Biotopes teams
- CORINE Biotopes teams in the European Union
- Government departments and agencies (eg natural resources, wildlife, fisheries, environment, parks)
- International intergovernmental organisations
- Non-governmental organisations (NGO) and private voluntary organisations

- Universities
- Institutions
- Botanic Gardens
- Private individuals

Data on the species checklists and habitats was gathered using various methods such as:

- Direct questioning through correspondence and interviews
- Review of conventions, agreements and directives
- Review of published documents and other material

Currently EC DGXI, European Environment Agency and the Council of Europe have responsibility for CORINE development and assessments. WCMC worked closely with these bodies and the Institute of Terrestrial Ecology of the UK and Institut Royal des Sciences Naturelles de Belgique, in developing its assessment of the threatened species and habitats and methodologies identified in their lists. WCMC also worked closely with relevant regional organizations, principle collaborators included IUCN and its commissions and programmes, and also WWF International. At the national level, WCMC collaborated directly with the appropriate authorities, CORINE Biotopes natural coordinators focal and independent species and habitats experts. See Annex 1 for lists of contacts.

1.4 Data confidentiality

Some organisations and individuals, particularly those outside government, were sensitive about releasing information. Their confidentiality was maintained.

1.5 Acknowledgements

The successful completion of this project has only been possible through a committed team effort by individuals and organisations from the European region and beyond.

Within Europe, the contribution of the IUCN European Programme is particularly acknowledged, with a special thanks to Dr Zbigniew Karpowicz and Tiina Rajamets. Of equal importance is the fundamental contribution of Michel Cornaert (European Commission), Marc Roekaerts (Council of Europe), Dirk Wascher (European Environmental Agency Task Force), Eric Evrard (PHARE/European Environmental Agency Task Force), Pierre Devillers (CORINE/Institut Royal des Sciences Naturelles de Belgique), Dorian Moss (CORINE/Institute of Terrestrial Ecology of the UK) and Ulla Pinborg (CORINE/National Forest and Nature Agency of Denmark). Also to national CORINE/PHARE project coordinators G. Spiridonov/M. Mileeva, Department, Protected Areas and Forests, Ministry of Environment (Bulgaria), Z. Podhajska/B. Kucera, Cesky Ustat Ochrany Prirody (Czech Republic), T. Patkai, National Authority for Nature

Conservation, Ministry of Environment and Regional Policy (Hungary), M. Oltean, Romanian Academy of Sciences, Institute of Biology (Romania), A. Dyduch-Falniowska, Nature Protection Research Centre, Polish Academy of Sciences (Poland), and P. Gajdos, Institute of Landscape Ecology, Slovak Academy of Sciences (Slovakia) are acknowledged for their work in coordinating national assistance on checklists and in leading the administration of the study within each of the countries, respectively.

Thanks are also expressed to the following individuals and organisations, without whose efforts the study would not have been possible: G. Söderman, National Board of Waters and the Environment (Finland), D. Richard, Secrétariat de la Faune et de la Flore, Museum National d'Histoire Naturelle (France), H. Koeppel, Bundesforschungsanstalt für Natursshultz und Landschaftsökologie, Institut für Landschaftspflege und Landschaftsökologie, (Germany), C. O. Criódain, National Parks and Wildlife Service, Office of Public Works (Ireland), M. Gobbi, Commission for Environmental Impact Assessment, Servizio Conservazione Natura (Italy), J. Thissen, National Reference Centre for Nature, Forests and Landscape (IKC-NBLF), section Biogeographical Information Centre (Netherlands), M. Pancorbo Lopez, Coordinadora Proyecto Hispanat, Institut Nacional Para La Conservacion de la Naturaleza, Subdireccion General de Espaces Naturelles, Ministerio de Agricultura, Pesca y Alimentacion (Spain), J. C. Simon Zerzoso, Botanico Protecto Biotopes/CORINE, Institut Nacional Para La Conservacion de la Naturaleza (Spain), A. Cuadrado Martin, Zoologigo Grupo Biotopes/CORINE, Institut Nacional Para La Conservacion de la Naturaleza (Spain), C. Göransson, Swedish Environmental Protection Agency (Sweden), J. Hopkins, Joint Nature Conservation Committee (UK).

Coordinating the study at the international level, as well as preparation of final outputs, was brought about by the dedicated efforts of staff at WCMC. A special thanks is extended to Johanna Sidey for her outstanding contribution towards project administration, data entry, and report production. Particular mention goes to the following individuals: Graham Drucker (Project Coordinator), Andrea Cole, Brian Groombridge, Harriet Gillett and Chris Magin along with support from Richard Luxmoore and Jeremy Harrison. A special thanks is also reserved for Kerry Walter, Royal Botanic Gardens Edinburgh, for his efforts in designing the conventions database, for his contribution to the development of the project and advise on comparable programmes overseas.

Finally gratitude is extended to all those who participated in the project. Without the time and interest of those who contributed by filling out questionnaires and/or by providing supporting materials and comments, there simply would be no study. It is only hoped that the efforts of these individuals is matched by a product that is of interest and real value.

2. METHODOLOGY FOR THE CORINE BIOTOPES PROCESS

2.1 Background

Based on the recommendations in the Conference of the European Ministers of the Environment (Lucerne, 1993) attempts have been increasingly been devised to identify important sites for nature conservation at the pan European level. This is being seen as a practical method for linking or networking areas of Europe's natural heritage and ensure longterm sustainability of the region.

Towards furthering this goal the European Union and Council of Europe initiated the CORINE (Coordination of Information on the Environment) Programme. The first stages were undertaken entirely within the European Community (European Union) countries alone as of from 1985. In 1991 the Programme was expanded to incorporate the six East European Countries of the PHARE region (Strasbourg, 1991).

Data in CORINE are collected on a number of major themes: the geographic base (coastline, regional boundaries, water pattern, slopes, settlements); nature ("biotopes" or sites of significance for nature conservation, areas designated by statute); land (soils, climate, erosion risk, land cover); air (emission, air quality); water (stream discharge, water quality) and socio-economic data. Collection of data for each theme forms a separate project, and these activities are closely coordinated by an advisory group which meets regularly in Brussels. Following compilation and validation, the data are added to a Geographical Information System (GIS) at the Brussels office of EC DG XI CORINE.

Overall the CORINE Biotopes Programme has the following objectives:

- Systematically identify and list key national threatened species and biotope types of European importance to ensure their future conservation;

- Improve the country-level and regional availability of environmental conservation data; promote improved data quality by use of standard field techniques, habitat classifications and protocols for data capture; and promote the ready flow of data for in-country applications;

- Develop regional communications and thematic databases on sites with regionally important biotopes so as to assist the development of an integrated conservation strategy for the region;

- Provide the basis for a coordinated framework for species and ecosystem conservation, development of regional databases, and promotion of cooperation between the international community, EU Member States and the rest of Europe.

The overall objective of the current CORINE Biotopes programme after EU is to catalogue as many as possible of the sites of nature conservation importance (Biotopes) in the PHARE counties and European Union, whether or not they currently enjoy national or international protection status. For the purpose of site identification, objective criteria have been set up, based on the presence of vulnerable or endangered species of plants or animals or of threatened habitats. A

Technical Handbook lists methodology and checklists of species which are recorded using the standard Linnaean scientific nomenclature.

With the context of the PHARE extension work the actual task of site data collection using the checklists, was initiated after training sessions held in ITE and Brussels. The last was in February 1994 with the PHARE Biotope team coordinators, each of whom was responsible for collation of data for his or her country.

Most of the team members are representatives of national nature conservation bodies but in some cases they are recruited from research institutes or universities. It is their duty to coordinate information from their own data and from other sources such as regional authorities and ornithological site registers and forward it to the CORINE coordinator in Brussels.

2.2 Methodology - identification of CORINE Biotopes checklist species in the EU member states

The existing methodology for the European Union to derive the CORINE Biotope species checklists is found in *CORINE Biotopes Manual, Data Specifications - Part 1 (EUR 12587/2 EN) (1991)*.

The site selection criteria states that any vulnerable European species listed in Appendices F to K of the CORINE Biotopes manual which are present on the site are listed in the site record. If any of these species have been used as criteria for the inclusion of the site in the biotopes inventory, this should be indicated for each such species using one of the following criterion:

**	The site contains more than 1% of the Community population of the species, or is one of only 100 sites or fewer in the EU where the species occurs;
*	The site is one of only five sites or fewer in the region where the species occurs;
$$	One of the most important sites in the EU for the species;
$	One of the five most important sites in the region for the species;
+	The species has been observed in the site but not recently.

In addition, where the information is available, species abundance is included as an estimate of the number of individuals.

2.3 Methodology - identification of CORINE Biotopes checklist species in the PHARE countries

Explanatory notes/guidelines for the species checklists extension to the PHARE countries.

2.3.1 Checklist of threatened animals

The revised draft list of species for the PHARE extension comprises the original listing for

western Europe plus a selection of candidate species for East and Central Europe. The methodology for determining the animal checklists is based on criteria as follows:

- Globally-threatened species from the *1994 IUCN Red List of Threatened Animals*, which occur in any of the PHARE countries and which are not in the original CORINE Biotopes checklist.

- Regional threatened species from the UNECE *European Red List*, which occur in the region and are not in the original CORINE Biotopes checklist.

- Species listed in any of the national Red Books of the PHARE countries which are not in the original CORINE Biotopes checklist, and which in independent judgement may be regarded as rare or threatened in Europe.

  Subspecies listed in national Red Books have not been included, and species have not been included if ranked as threatened in one country but which are widely distributed elsewhere in Europe and not significantly threatened at the regional level. Some of the species included are threatened in Europe but widespread and possibly not threatened outside Europe.

- A few species endemic to the PHARE countries, or nearly so, have been added.

2.3.2 Checklist of threatened plants

The plant list consists of the original CORINE Biotopes checklists for the EU and approximately 100 additional threatened species from the PHARE region. The PHARE region plants checklist was compiled using a combination of the following criteria:

- Species listed as endangered (E) or vulnerable (V) at the national level in one or more of the six countries.

- Species listed as threatened at the global level. This includes IUCN "Threatened" categories: "Endangered" (E), "Vulnerable" (V), "Rare" (R) and "Indeterminate" (I).

Species that are threatened at a national level but whose global distribution is incompletely known, have not been assigned a global threat category. The botanical taxonomic work for pan European countries, the *Flora Europaea* (1962-1980, 1993) was used as basis to validate species distribution within a European context.

2.3.3 General comments

1 See Annex 2 for information concerning the existing IUCN categories (also the proposed new system, Mace et al, 1993).

2 No changes have been made to the existing CORINE biotopes checklist for the EU member states species lists (Appendices F-K in the CORINE biotopes manual, 1(1)).

However it was recognised that revision of the taxonomy and content of these lists was desirable.

3 Vertebrates have been reviewed more comprehensively than invertebrates because more information is available. Invertebrates in the IUCN and the UNECE Red Lists have been added. WCMC have recent and comprehensive national invertebrate Red Lists only for Poland, Czech and Slovak Republics among the PHARE countries; WCMC has suggested for inclusion (without attempting to validate the taxonomy) those species which appear in *both* Red Lists. No invertebrates have been added under criterion four (animal taxa), above.

4 No candidate species have been added from the latest Appendices to the *Convention on the Conservation of European Wildlife and Natural Habitats* (T-PVS (93) 16), as this would also entail changes to the original CORINE Biotope listings.

5 PHARE country animal species suggested for listing have been added after species in the same family already listed; where families have been added these appear after families already listed.

6 A second list of plant species for the PHARE countries was also produced from the WCMC plants database; this list includes 700 species listed with IUCN category "E" or "V" ("Endangered" or "Vulnerable") at a national level in one or more of the six PHARE countries but for which we do not have a record of the full global distribution.

In this Red list if the global distribution was not known to be complete, the global threat category could not logically be assigned. This list was distributed to experts in Europe to establish if any, or none, of these species in addition to the candidate list should be included. Comments from these experts were incorporated in the CORINE Biotope checklists where necessary.

3. CRITICAL REVIEW OF THE CORINE BIOTOPES SPECIES CHECKLISTS

Requests for comment on the animal and plant lists and their methodology were sent out to 86 individual experts and expert groups within the CORINE PHARE and EU framework and through IUCN Commission and Programmes and wildlife/protected area agencies and thematic working groups.

Selected responses include the following:

3.1 Comments on CORINE Biotopes checklists for the PHARE countries

Czech Republic	The draft selection of plants has been accepted without any special comments under the criteria that it was produced. Only recommendation is the re-evaluation of including *Plantago atrata* Hoppe subsp. *sudetica* (Pilger) Holub. This is an endemic taxon with distribution confined to the territory of the Czech Republic.
Ireland	The inclusion of the PHARE countries on the CORINE biotopes database demands the revision of the entire system so that threatened species and sites from those countries are not simply "tacked on" in a cumulative fashion. Are there, for instance, any species on the existing lists which cannot properly be regarded as threatened over the entire extended territory and which should, therefore, be proposed for deletion? e.g. the inclusion of *Dryopteris aemula.*
Netherlands	The proposed additional species, which occur also in the Netherlands are no problem from the national point of view.
Romania	Dr. Dihoru believes that the candidate plant checklist is too poor for Romania and gives some suggestions, both taxonomic and giving more species.
UK	Taxonomy of species is a problem. Many species regarded as most important in countries are endemics. The endemic sub-species become more of a problem because some species are extremely variable, for example a sub-species of *Thalapi alpestre (caerulescens ssp. tatrense)* is proposed on the list but in the UK there are 5-6 very distinctive populations which could be classified as endemic sub-species. The same may apply to many other species such a *Limonium* spp. The draft Plant "list 1" includes several taxa, which, though being Carpathian or West-Carpathian endemics, are tied up with upland and Alpine regions where they are not considered endangered, some of them occur in a relatively large territory in Slovakia: *Cerastium arvense* ssp. *glandulosum, Dianthus praecox, Sepervivum montanum* ssp. *carpaticum, Thlaspi caerulescens* ssp.

tatrense, *Larix decidua* var. *polonica*, *Euphrasia slovaca*, *Laserpitium archangelica*, *Viola biflora*, respectively are relatively copious in the territory of their occurrence. Due to little data about its localities, the inclusion of the taxa *Larix decidua* Mill. car. *polonica* Racib. Oastenf. into the list causes problems.

3.2 Comments referring to lower plants

UK — The bryophytes, lichens and fungi on the CORINE biotopes checklists are inadequate. The bryophytes have been given a European RDB recently and there is a great deal known about the European distribution of at least the macro-lichens and macro-fungi. These should be represented.

3.3 Independent comments on overall CORINE biotopes checklist species

The following section comprises the feed back that this project has produced concerning the original EU CORINE Biotopes species listing and proposed extensions elsewhere.

Finland — We propose that the checklists will be extended to cover the Baltic States, Karelia and the Nordic Countries.

Ireland — The need for taxonomic rigour is crucial so the list should cite a taxonomic authority such as *Flora Europaea* and then adhere to it rigidly or at least state explicitly where it has departed from and why.

Netherlands — It is not very useful to have on the species lists species which are widespread and common in agricultural and urban biotopes. The CORINE Biotopes and the Habitats Directive for which CORINE is a good instrument are site oriented, so inclusion of dispersed species is not adequate in this framework.

Poland — As concerns the checklists of species we believe that the analysis of species distribution in their whole European range and that of threats to them should be the main criteria taken into account. The existing lists such as list of Bern Convention, EEC - CITES etc, are based on different criteria and they should not be a base for CORINE checklists. The CORINE Project has its own purposes so it needs its own criteria, which will allow the identification and conservation of pan-European species diversity.

UK — Using threatened or endangered status in a single country can create serious misunderstandings about the status of species, as in an extreme case it could be the species is common in all other countries. For example, the CORINE threatened plants lists includes *Silene vulgaris* which I assume is rare in one or more

countries of the EU. However it is very abundant in several other, including the UK.

We are concerned that many species on the UK Red Data Books do not appear on the list and even species on Annex II of the Habitat and Species Directive such as *Gentianella anglica* are not on the list. It seems that the whole list needs some sort of revision and a common set of standards applied across Europe. The problem is that what is rare and qualifies for Red Data Book status in one country may be quite common in another.. Perhaps what is needed is a tabulation for Europe of RDB species with endemics highlighted in some way. Users of the list would then know whether the rarity extended throughout Europe or was confined to particular areas or countries.

Selection of the taxa depends on the criteria used, perseverant application of the criteria issuing from the all-European view can result in the exclusion of several proposed taxa. Methodological group of the project has got a difficult task to keep the list of proposed species consistent.

WWF International

The status "Rare" should not automatically be considered as "Threatened". Need to identify true endemics to Europe because many of the species already listed have a range that extends far beyond Europe. It is possible and recommendable to make a link between listed species and biotopes, especially feasible for plants and invertebrates. He also makes the recommendation to include both species and biotopes for all the EFTA countries, not just for 12 EU and 6 PHARE countries. A new list would therefore correspond more directly with the appendices of the Bern Convention and is more progressive in terms of the ongoing EU-enlargement process.

Council of Europe

The CORINE list is not a good point of departure for this exercise or else the term "Threatened" should be dropped as there is a risk of confusion with IUCN nomenclature. The CORINE list has never been a threatened species list (in the IUCN sense) but rather a list of species receiving particular conservation attention in the EU (for whatever reason). To write a pan-European list the threat category will have to be dropped with many species which receive attention in the EU states but are not at all threatened on a European scale (an example is given of the wolf). The Bern list is a political list which contains many species which are not threatened but that, nevertheless, it was thought that they should be protected in the whole of Europe. Our exercise should be much more defined. Which is your geographical framework of reference EU and PHARE and/or other European states? Will Cyprus and Turkey be included? The ex Soviet-Union, up to the Urals?

3.4 Species lists provided to WCMC for the PHARE countries

Bulgaria

- Latest information in January 1994, Bulgarian Ministry of Environment
- List of plant species which should be added to the CORINE Biotopes Programme - 23 species.

Czech Republic

- 1979 Red List of flora in Czech Socialist Republic
- Draft list of threatened species submitted to the CORINE Biotopes programme, 1992. No new updates had been prepared up to April 1994

Hungary

- List of Threatened Plants (1984)
- Draft list of threatened species submitted to the CORINE Biotopes programme, 1992. New updates had been prepared in March/April 1994

Poland

- List of Threatened Plants (1986)
- List of Threatened Plants in Poland (2nd edition, 1992)
- Polish Red Data Book of threatened Plants (1994)

Romania

- List of rare, endemic and threatened plants in Romania (1984)
- Draft list of threatened species submitted to the CORINE Biotopes programme, 1992"
- Draft list of threatened species on diskette (January 1994)

Slovakia

- List of extinct, endemic and threatened taxa of vascular plants ...of Slovakia
- Draft Red list of ferns and flowering plants of Slovakia (January 1994, 2nd draft)

4. COMPARISON OF THE CORINE BIOTOPES CHECKLISTS WITH RELEVANT LISTS IN EUROPEAN AND GLOBAL TREATIES AND AGREEMENTS

The CORINE Biotopes species checklists have been developed as a mechanism for identifying sites of importance for nature conservation at a European level. The lists are intended to represent "indicator" species, to act as a tool or guide for site selection, rather than to be exhaustive listings of all threatened species within the European context.

The stages within the WCMC project included the following:

1 Identification and acquisition of lists appended to global and regional treaties and agreements relevant to Europe.

Includes comparison with the EU Habitats and Birds Directives, Bern Convention, Bonn Convention, UNECE Red list, CITES, IUCN Global Red list, and where relevant the Baltic Convention and UNEP Regional Seas Programmes and related agreements.

2 Incorporation of relevant information within WCMC databases in standard format.

3 Analysis of material received in order to evaluate differences between CORINE Biotopes checklists with other European Treaties and Agreements.

4 Sending out lists and analysis for independent review.

5 Preparation of comments and recommendations.

4.1 Types of species and habitat lists present in relevant European and global Treaties and agreements

Within European lists of threatened or protected species are found, in addition to the CORINE Biotopes Checklists, in the following:

- IUCN Global Red Lists of Animals and Plants as held in the WCMC species databases;
- Habitats Directive;
- Birds Directive;
- Bern Convention;
- Bonn Convention;
- UNECE European Red List of globally threatened species;

- Barcelona Convention and the Mediterranean Action Plan;
- Baltic Sea Convention;
- Red Data Book of the Baltic Region;
- USSR Red Data Book;
- National Red Data books for European countries;
- CITES Convention Appendices;

Various legal instruments and agreements have used differing approaches to protect the listed rare and endangered species of animal and plant. Aims and objectives range from protection from wildlife trade, to protection only of migratory species, to identification of species under threat at the regional level such as in the Mediterranean or Baltic Seas.

4.1.1 IUCN Global Red lists

The *IUCN Red Lists* of animals and threatened plants of the world are comprehensive global compenda of species **known** to be threatened. The term threatened refers to taxa assigned a relevant status category by IUCN. The Red List is based on information provided through the IUCN Species Survival Commission Specialist Groups. Each species covered in the Red List is assigned a threat category determined by review of the factors affecting it and the extent of the effects these are having throughout its range. Key factors examined include changes in distribution or numbers, degree and type of threat, and population biology. A new IUCN classification has been prepared by Mace et al (1993)(see Annex 2).

4.1.2 Bern Convention

The *Convention on the Conservation of European Wildlife and Natural Habitats* (the Bern Convention) places its heaviest emphasis on the protection of habitats, especially habitats of species listed in the Appendices and endangered habitats.

There are four Appendices. Appendix I is reserved exclusively for "Strictly Protected Flora Species", Appendix II for "Strictly Protected Animal Species", and Appendix III for "Protected Fauna Species".

A revision in 1991 added to the convention species which are at the greatest risk of extinction ie. endangered plants and animals. Additional plant and animals species were added to the Appendices which if the conservation measures were applied would also conserve habitats of conservation importance and sites where other endemic and threatened plants are found. Other additions were species which were not quite in the categories "Endangered" or "Vulnerable" but were rapidly declining due to over-collection.

In the case of Appendix I *Flora Europaea* has been used throughout as the major taxonomic reference point.

For a list of selection criteria for the Appendices see Annex 9.

4.1.3 Habitats Directive

The Council Directive on the *Conservation of natural habitats and of wild fauna and flora* (1992) concerns the conservation of wild animals and plants and their habitats. Three Appendices list threatened species of animal and plant of Community Concern.

Appendix II Animal and plant species of Community Interest whose conservation requires the designation of Special Areas of Conservation

Appendix IV Animal and plant species of Community Interest in need of strict protection

Appendix V Animal and plant species of Community Interest whose taking in the wild and exploitation may be subject to management measures

Criteria for species selection are listed in Article 1 as follows:

Species of Community interest means species which, within the territory referred to in Article 2, are:

i) endangered, except those species whose natural range is marginal in that territory and which are not endangered or vulnerable in the western palaearctic region; or

ii) vulnerable, i.e. believed likely to move into the endangered category in the near future if the causal factors continue operating; or

iii) rare, i.e. with small populations that are not at present endangered or vulnerable, but are at risk. The species are located within restricted geographical areas or are thinly scattered over a more extensive range; or

iv) endemic and requiring particular attention by reason of the specific nature of their habitat and/or the potential impact of their exploitation on their conservation status.

Such status are listed or may be listed in Annex II and/or Annex IV or V;

Priority species means species referred to in (g)(i) for the conservation of which the Community has particular responsibility in view of the proportion of their natural range which falls within the territory referred to in Article 2; these priority species are indicated by an asterisk (*) in Annex II.

For details of the Bonn and CITES Conventions see Annexes 7 and 8.

4.1.4 Other European and regional classifications

4.1.4.1 Baltic Sea Region

The *Convention on the Protection of the Marine Environment of the Baltic Sea Area* (Helsinki

Convention)(1983) has provisions for species conservation. Priority species for conservation in the Baltic Sea region are based on threatened species identified in national red lists for each country of the circum-Baltic region.

In this case there are 16 geographical units:

Aland region, Finland
Finland excluding Aland
Leningrad region, Russia
Estonia
Latvia
Lithuania
Kaliningrad region, Russia
Poland
Germany (former East Germany)
Germany (Schleswig-Holstein)
Denmark
Sweden

The HELCOM Environment Committee started to develop a programme in nature conservation as a first step in the implementation of Article 15 on nature conservation and biodiversity in the new 1992 Helsinki Convention. The environment committee adopted a list of issues that it felt should be included in the future work programme in nature conservation and biodiversity in the baltic region. This includes a strategy and guidelines for the conservation of species, such as the preparation of a comprehensive Red Data book on flora and fauna for the entire Baltic area. It was published by the Swedish Threatened Species Unit, Uppsala (Sweden) in 1993. Taxa have not been assigned threat categories for the Baltic region as a whole, but instead for each country. Anthropogenic species are not included in the red list, listing only "truly native" taxa. For birds, only regularly breeding species are generally considered for national/regional red list.

The Baltic States are currently involved in a range of national, regional and international initiatives which aim to improve the conservation of biodiversity within their countries. One of the key needs for each of these countries, is to collaborate in the collection of data and the production of periodic reports on progress towards achieving the protection and sustainable management of the Baltic.

4.1.4.2 Mediterranean

The *Convention for the Protection of the Mediterranean Sea against Pollution* (Barcelona convention) adopted in 1985 covers 14 Countries of the Mediterranean Basin.

There are 10 priority targets including the protection of endangered marine species and in particular monk seal and marine turtles. This was preceded by the Intergovernmental Meeting on Mediterranean Specially Protected Areas in 1980 with the preparation by IUCN of *List of rare and threatened plants of the states of the Mediterranean basin*, *Mediterranean marine species in possible need of protection*, *Threatened mammals of the Mediterranean*, *Preliminary list of Mediterranean birds in need of special protection* and the *Preliminary list of amphibians and reptiles of the Mediterranean Region, known or considered to be threatened*.

These tend to be taxa considered to be threatened throughout their range, or taxa considered threatened within their Mediterranean range.

4.1.4.3 Commonwealth of Independent States - Former Soviet Union

The former Soviet Union consisted of 16 republics which now all constitute separate and independent countries under the CIS, including the Baltic States of Estonia, Latvia and Lithuania (not members of the CIS), along with Armenia, Azerbaijan, Belorussia, Georgia, Kazakstan, Kirghizia, Moldova, Russian Federation, Tadzhikistan, Turkmenistan, Ukraine and Uzbekistan.

Given the vast territory of the Union, it was found expedient to find a regional approach to species conservation. The identification of objects requiring conservation both on a nationwide scale and in individual areas and regions remained a high priority. Thus alongside the *Red Data Book of USSR* (1978) republic level Red Data books have been compiled in many of the union republics. In every region priority protection was given to species included in the *Red Data Book of USSR*. About 10% of the USSR flora were identified and listed as rare and endangered.

For incorporation in the lists species had to meet one or more of several criteria:

- Protecting a species whose populations were threatened within the Soviet Union, regardless of its presence in other countries;
- Priority given to rare species threatened with immediate danger of extinction;
- Species of real or potential economic value, particularly those with wild populations which were rapidly declining.

So that conservation objectives would be distributed uniformly in the various regions of the former Soviet Union, the committee strove to include species from all regions. It was recognized nevertheless that such areas as the Caucasus and Central Asia had many more endemic species than others.

These species tend to be narrow endemics, species on the edge of their range and species whose populations are small in number. Range size, number, existing conditions, and vitality are taken into account while identifying the species which need protection. Endemics with a narrow range can also be listed as rare species. Plants with narrow ranges in the former USSR whose main range was outside the former Soviet Union were also ranked as rare. Species whose numbers and distributions have decreased due to exploitation are also ranked as rare (Beloussova and Denissova, 1981).

It was in this way that the overall federal strategy of flora was instigated throughout the region (Tikhomirov, 1981).

The CIS republics have prepared their own national lists of threatened and endangered plant species and embarked on official *Red Data Books*.

4.1.5 Regional processes for comparisons beyond Europe

A number of comparable activities are being undertaken to identify threatened species at a regional or multi-state level either for Red List purposes or as indicators of important habitats or sites of biodiversity importance.

4.1.5.1 Australia

Australia is a federation of six states and two self-governing territories. To document the species research produced the volumes of *Flora of Australia* and *Fauna of Australia* (Dyne and Walton, 1987). The distribution and conservation status of species at a federal and state level has been identified (Briggs and Leigh, 1988).

This process has a number of distinctive features specifically tailored to the Australian situation and the basic threat categories accord with the IUCN Red Data book categories. The distribution category of each species (indicated by numbers 1-3) is given in conjunction with the conservation status (E, V, R, X or K). Thus:

1 Species known only from the type collection;

2 Species with a very restricted distribution in Australia and with a maximum geographic range of less than 100km;

3 Species with a range over 100km in Australia but occurring only in small populations which are mainly restricted to highly specific and localised habitats.

In addition, there are the following categories: X Presumed Extinct, E Endangered, V Vulnerable, R Rare (not threatened), K Poorly known, C population reserved, a adequately reserved, t total population reserved, and + species with natural distributions outside Australia.

Regional distribution is based on one or more of 80 Australian regions. The criteria in which the regions are based vary from one state to another. In most states the regions are largely based on phytogeographical areas, although there are some obvious discrepancies between the states as these regional boundaries rarely coincide across state borders. Regions in two Queensland and northern territory are based on traditional pastoral districts, effectively natural floristic regions.

4.1.5.2 Canada

There are about 3,269 native species of vascular plants and about 884 introduced species. A rare plants project, conducted by Argus *et al.* (1990) from the National Museum of Nature in Ottawa, has provided lists and information on some 1,010 vascular plant taxa that are considered to be nationally rare in Canada. The project, which is nearing completion, provides provincial lists of rare plants and is available to the provincial Conservation Data Centres (Argus and Prior, 1990; G. Francis, pers. comm., 1992).

4.1.5.3 China

In 1982 the *China Plant Red Data Book* was initiated under the auspices of the China National

Environmental Protection Agency and the Institute of Botany, Academia Sinica, and identifies species throughout all provinces and autonomous regions. The work has been done on the basis of extensive plant surveys. The conservation status endangered, rare and vulnerable are related to, but not identical to, the IUCN Red List Categories. Each of the species are those under threat of extinction throughout all or significant portions of their biological range, regardless of political boundaries. In the Plant Red Data book 388 taxa are designated as threatened out of a country total of 3,000 vascular plants species in danger of extinction.

A globally threatened species and linked habitats and protected areas database has been developed by J. McKinnon.

4.1.5.4 United States of America

The Heritage Programs and Conservation Data Centers of the Nature Conservancy have identified conservation priority ranking for American species at the global, national and state/subnational levels. The methodology is described in the *Natural Heritage Element Conservation Priority ranking guidelines* Excerpts from Biological and Conservation Data System On-line Help screens (1994). The methodology involves a series of ranking of each species in an established matrix (see below and TNC, 1994).

Species are identified on three sets of levels, globally, nationally, state level:

1 Critically imperiled globally/national/state;

2 imperiled globally/nation/state;

3 Rare or uncommon;

4 Widespread, abundant, and apparently secure, but with cause for long-term concern;

5 Demonstrably widespread, abundant, and secure.

In all cases the process includes a numeric range rank, taxonomic subdivision, and taxonomic qualifiers.

The following table defines the various legitimate combinations of characters which can be used as National and State Ranks.

	Basic Rank	1st Qualifier	Breeding Success	Breeding Qualifier
Extant Native				
Exotics				
Misc.				
Presumed or possibly extirpated				
Not a species				

Ranking is as follows:

N#/S#	Numeric Rank: A numeric rank 1-5 of relative endangerment based primarily on the number of occurrences of the element within the nation/state.
N1/S1	Critically imperiled in the nation/state because of extreme rarity or because of some factors making it especially vulnerable to extirpation from the nation/state (typically 5 or fewer occurrences or very few remaining individuals or acres)
N2/S2	Imperiled in the nation/state because of rarity or because of some factors making it very vulnerable to extirpation from the nation (6-20 occurrences or few remaining individuals or acres)
N3/S3	Rare and uncommon in the nation/state (21-100 occurrences)
N4/S4	Widespread, abundant, and apparently secure in nation/state, with many occurrences, but the Element is of long-term concern usually 100 or more occurrences)
N5/S5	Demonstrably widespread, abundant, and secure in the nation/state, and essentially ineradicable under present conditions

Other factors included in the ranking are "unranked, exotic, accidental, zero occurrences, potential, reported, reported falsely, historical, extirpated, hybrid, synonym, breeding status, qualifiers".

4.1.6 Species-based Approach to Conservation

The species-based approach to identification of biodiversity, developed by the Australian Nature Conservation Agency (ANCA), and utilised in the technical appendix "Towards a Systematic Approach for Identifying Gaps in the Australian System of Protected Areas" involved deriving appropriate data sets to represent continental-level species biodiversity.

Three species groups were selected: eucalypts, land birds and butterflies. These groups were selected because they were available in a form suitable for analysis. Two measures of diversity were derived for each species group: species richness and endemism.

Species richness was defined as the number of species within each 1 degree grid cell. The number of species of eucalypts, land birds and butterflies were summed for each 1 degree grid cell, and mapped into five classes. A species was defined as endemic when it occurred in 10 or less 1 degree grid cells, i.e. a restricted range species. The number of endemic species of eucalypts, land birds and butterflies were summed for each 1 degree grid cell, and mapped into five classes. Species richness and endemism for eucalypts, land birds and butterflies were combined to produce a single map of species richness and endemism.

Data on the index of threat to species biodiversity was derived by comparing the data set on averaged index of richness and endemism for species biodiversity with change in vegetation type.

5. COMPARISONS WITH CORINE BIOTOPES CHECKLIST SPECIES

Data were incorporated into the WCMC species database and comparisons made between the various listings. The ultimate aim of this comparison was to provide new methodological guidelines to be followed in extending the CORINE Biotope list to Eastern Europe and in a wider European context.

The following species lists were compared against the CORINE Biotopes checklist of threatened animals:

- 1994 IUCN Red List for animals
- Appendix II (strictly protected fauna species), Bern Convention
- Annex II, Annex IV, of the EC Habitats Directive 92/43/EEC
- Annex I of the EC Birds Directive 79/409/EEC modified by Directive 85/411/EEC of the Council of 25 July 1985
- UNECE European Red List of globally threatened species
- Red Data book for the Baltic Sea Region
- USSR Red Data book
- National Red Data Books for European countries
- Red Data Book for the Baltic Sea Region

Of the above, the UNECE European Red List of Globally Threatened Animals and Plants comprised mainly of IUCN Red Lists of threatened species which are threatened with extinction on a global scale. It is extracted from the IUCN threatened species data held at WCMC and so in the comparisons below is equivalent to the IUCN Red lists. At the time of adoption by UNECE in 1991 it comprised 60 mammals, 28 birds, 37 reptiles, 19 amphibians, 38 freshwater fishes, 238 invertebrates and about 4,500 vascular plants. The lists were adopted by the UNECE at its 46th session (1991) by decision D (46).

Summarised details of the other lists are present in the table and text below.

5.1 Comparison of threatened mammal species lists

This document compares the mammal species included on the CORINE checklist of threatened species and those listed on Annex II of the Bern Convention with those species from the 12 European Union countries considered globally threatened by IUCN.

The stated selection criteria for the inclusion of mammals on the CORINE checklist are:

a) species considered "Endangered", "Vulnerable" or "Rare" in the following published sources:

Threatened mammals in Europe, C.J. Smit and A. van Wijngaarden (1976), Council of Europe, Nature and Environment Series, 10

Conservation of species of wild flora and vertebrate fauna threatened in the Community, J. Thornback, Nature Conservancy Council (1982).

b) species listed in Annex II of the Bern Convention.

5.1.1 Comparison with the Bern Convention

Examination of the lists shows that many species listed on Annex II of the Bern Convention are not listed in the CORINE Biotopes checklists. There are several apparent reasons:

- Some Annex II species do not occur in the 12 countries of the European Union (e.g. *Pteromys volans*, *Sicista subtilis*).
- Some Annex II species occur in regions of the 12 countries which are not part of the European Union (e.g. *Plecotus teneriffae* from the Canary Islands; and *Ursus maritimus* from Greenland).
- Taxonomic differences. E.g. *Crocidura ariadne* is listed on Annex II of the Bern Convention, but not on CORINE. In a recent mammalian taxonomy (Wilson and Reeder, 1993) it is considered part of *C. suaveolens*, which is widespread and non-threatened.
- CORINE Biotope checklists may not list introduced species. For example, *Erinaceus algirus* = *Atelerix algirus* is on Annex II but not on the CORINE Biotopes checklist: it is an introduced species in the Balearic Islands and Mediterranean France and Spain.

Other Annex II species simply appear to have been omitted from CORINE, notably 12 Cetacean species (e.g. *Orcinus orca*, *Lagenorhynchus acutus*); *Pipistrellus maderensis* from Madeira; *Nyctalus lasiopterus* from the Azores (both Madeira and the Azores are autonomous regions of Portugal, but belong politically and economically to the European Union).

5.1.2 Comparison with the 1994 IUCN Red list

MAMMALS	Total no. of species	No. on CORINE checklist
1994 IUCN Red List	10	9
Bern Convention Appendix II	35	34
EC Habitats Directive Annex II	50*	22

* not including Ursidae and Microchiroptera

Many CORINE Biotopes listed taxa are also considered globally threatened by IUCN. However, some globally threatened taxa present in the 12 European Union countries are not included on CORINE, i.e.:

Ovis orientalis musimon (Listed as Rare by IUCN)
Ovis orientalis ophion (Listed as Vulnerable by IUCN)

These are sometimes considered to be part of *Ovis ammon*, which is listed on CORINE.

Balaenoptera physalus (Listed as Vulnerable by IUCN)
Twelve small Cetacean species (Listed as Insufficiently Known by IUCN) - all of these are also on Annex II of the Bern Convention.

5.1.3 Comparison with the Bonn Convention

The Convention on the Conservation of Migratory Species of Wild Animals (CMS) is not a solely European Convention. Fourteen of the 19 species mentioned in Appendix I are not native to Europe, for example *Gorilla gorilla beringei*, four species of gazelle and *Podocnemis expansa* found in the Americas. Appendix II includes all species of Rhinolophida and Vespertilionida bat, 5 and 24 are respectively indicated in the CORINE Biotopes list.

The marine mammals are incompletely listed in the CORINE Biotopes checklists, only seven species being described. By comparison at least 15 species of Delphinidae have been listed in the Bonn Convention including important populations of:

Lagenorhynchus albirostris
Lagenorhynchus acutus
Grampus griseus
Tursiops truncatus
Stenella coeruleoalba
Delphinus delphis
Orcinus orca
Globicephala melas

5.1.4 Comparison with the CITES Convention

The *Convention on International Trade in Endangered Species of Wild Fauna and Flora* is a global convention. The majority of the species are not found naturally in Europe, exceptions include:

Appendix I:

Megaptera novaeengliae
Balaena mysticetus
Eubalaena species including *E. mysticetus*

Ursus arctos
Monachus monachus
Rupicapra rupricapra ornata

Important exceptions of species which are found in Appendix II but not on the CORINE Biotopes list include the primate *Macaca sylvanus* from Gibraltar (UK).

5.2 Comparison of threatened amphibian and reptile species lists

The CORINE Biotopes guidelines indicate that its list of threatened species includes:

a) species considered "endangered", "vulnerable" or "rare" in the following published sources:

Threatened amphibians and reptiles in Europe by R.E. Honegger (1978), Council of Europe, Nature and Environment Series, 15.

Conservation of species of wild flora and vertebrate fauna threatened in the Community, B. Groombridge, Nature Conservancy Council (1982);

b) species listed in Annex II of the Bern Convention;

c) endemic species or species with a very distinct Community distribution and classed as vulnerable by Honegger (1978) and Nature Conservancy Council (1982);

d) species considered endangered by regional Red Lists covering their only or their main area of distribution in the Community.

The following species lists were compared against the CORINE Biotope checklist of threatened Amphibians and Reptiles.

- 1994 IUCN Red List
- Appendix II (Strictly protected fauna species), Bern Convention
- Annex II, Annex IV, of the EC Habitats Directive 92/43/EEC

REPTILES	Total no. of species	No. on CORINE checklist
1994 IUCN Red List	14	11
Bern Convention Appendix II	75	36
EC Habitats Directive Annex II	19	13

AMPHIBIANS	Total no. of species	No. on CORINE checklist
1994 IUCN Red List	14	6
Bern Convention Appendix II	42	23
EC Habitats Directive Annex II	19	12

5.2.1 Comparison with 1994 IUCN Red List

Species listed in the 1994 IUCN Red List are considered globally threatened.

Results show that a total of 5 amphibian species and 3 reptile species mentioned upon the 1994 Red List have been omitted from the CORINE species checklist.

Five of the species are categorised by IUCN as "Rare"-

Discoglossus jeanneae
Discoglossus montalentii
Euproctus platycephalus
Salamandra lanzai
Podarcis pityuensis

and one "Vulnerable"-

Salamandra aurorae

5.2.2 Comparison with the Bern Convention

On initial examination, Annex II of the Bern Convention has many species which are not mentioned in the CORINE Biotopes checklist. However, taxonomic changes have caused much of the apparent dilemma.

- *Hydromantes genei* is mentioned on the CORINE checklist. This form is now usually regarded as three biological species:- *Hydromantes flavus*, *Hydromantes supramontes*, *Hydromantes imperialis*. The generic name *Speleomantes* is often applied. The biological species are mentioned in Annex II, but not in the CORINE checklist.

- Both *Hyla meridionalis* and *Hyla sarda* belong to the *Hyla arborea* group (D. Frost, 1983), with *Hyla sarda* only recently being elevated from its status as a subspecies of *Hyla arborea*. *Hyla arborea* is listed in the CORINE checklist.

- The omission of *Rana italica* from the CORINE checklist could be attributed to its elevation from the subspecies *Rana graeca italica* to species status by Picariello, Scillitani and Cretella in 1985.

- *Triturus dobrogicus* and *Triturus karelinii* are included in the *Triturus cristatus* group by Frost, 1983.

5.2.3 Comparison with Annex II and Annex IV of EC Habitats Directive 92/43/EEC

- Species mentioned in Annex II of the Directive are "Animal and Plant species of Community interest whose conservation requires the designation of special areas of conservation".

- Milos Viper, *Vipera schweizeri* is a rare snake that is endemic to Greece, yet it is not mentioned by CORINE. It has recently been elevated from subspecies rank.

- *Podarcis pityusensis* Ibiza wall Lizard has also been omitted from the CORINE Biotopes checklists, yet is mentioned in Annex II of the EC Directive.

- In Annex II of the Directive the genus *Speleomantes* is used instead of *Hydromantes* as in the Bern Convention.

- *Discoglossus jeanneae* and *Discoglossus montalentii* have both been omitted from the CORINE Biotope checklists.

Species mentioned in Annex IV of the EC directive are 'Animal and Plant species of Community interest in need of strict protection.

5.2.4 Comparison with the Bonn Convention

Sea turtles are the only migratory species listed.

5.3 Comparison of threatened fish species lists

The CORINE Biotopes manual indicates the list of threatened species includes:

a) species considered "Endangered" in the following published sources:

Threatened freshwater fish of Europe, A. Lelek (1980), Council of Europe, Nature and Environment Series, 18;

Conservation of threatened freshwater fish in Europe, P.S. Maitland (1986), Council of Europe, European Committee for the conservation of Nature and Natural Resources;

Conservation of species of wild flora and vertebrate fauna threatened in the Community; K.E. Banister, Nature Conservancy Council (1982);

b) species considered "Vulnerable" in the following published source:

Conservation of species of wild flora and vertebrate fauna threatened in the Community, K.E. Banister, Nature Conservancy Council (1982);

c) species proposed for listing in Annex II of the Bern Convention (Maitland, loc. cit.);

d) species considered endangered by regional Red Lists covering their only or their main area of distribution in the Community.

The following species lists were compared against the CORINE Biotopes checklist of threatened fish.

- 1994 IUCN Red List
- Appendix II (Strictly protected Fauna species), Bern Convention
- Annex II, Annex IV, of the EC Habitats Directive 92/43/EEC
- Council of Europe, "Conservation of threatened freshwater fish in Europe", Nature and Environment Series, no.46, 1991.

FISH	Total no. of species	No. on CORINE checklist
1994 IUCN Red List	36	7
Bern Convention Appendix II	4	3
EC Habitats Directive Annex II	61	19

5.3.1 Comparison with 1994 IUCN Red List

Species listed in the 1994 IUCN Red List are considered globally threatened.

A total of 28 fish species mentioned on the 1994 IUCN Red list have been omitted on the CORINE checklist. Nine of which are "Rare", and five "Endangered". Many of the omitted fish are from Greece and are included in the 1994 IUCN Red List of threatened species on the basis of the Greek Red Data Book.

5.3.2 Comparison with Annex II of the Bern Convention

The European mudminnow *Umbra krameri* is the only species that has not been incorporated into the CORINE checklist.

It occurs in some waters of Central Europe and can be found along the River Danube. Therefore its distribution falls within the PHARE area. Because of its restricted distribution and population decline it is considered "Vulnerable" in Europe.

5.3.3 Comparison with EC Habitats Directive 92/43/EEC

Thirty nine species of fish with varying distribution throughout Europe are listed in the Red List but not on the CORINE checklist. Two of them have a wide European distribution:

Lampetra planeri
Cottus gobio

However there are several fish with a limited distribution that should be considered for inclusion in CORINE checklists. For example:

Cobitis conspersa
Cobitis larvata
Rutilus lemmingii
Rutilus macrolepidotus
Scardinius graecus

5.3.4 Comparison with Council of Europe, "Conservation of threatened freshwater fish in Europe", Nature and Environment Series, no.46, 1991

Eudontomyzon danfordii is not mentioned in the CORINE checklist yet it can be found within the Danube system and especially in the catchment of the River Tisza. It is regarded as "Vulnerable" due to its restricted distribution.

It must be noted that *Eudontomyzon gracilis* considered by some to be conspecific with *Eudontomyzon danfordii*, and *Eudontomyzon mariae* con-specific with *Eudontomyzon vladykovi* (which is mentioned in the CORINE Biotopes checklist).

Both *Acipenser guldenstaedti* and *Acipenser nudiventris* occur in the River Danube (PHARE region) and are considered "Vulnerable" and "Endangered" respectively. The CORINE checklist fails to mention these two species and therefore should be considered for a revised CORINE Biotopes checklist.

5.3.5 Comparison with the Bonn Convention

The Bonn Convention only list two species of fish, neither of which are listed in CORINE:

Pangasianodon gigas
Acipenser fulvescens

5.4 Comparison of threatened invertebrate species lists

CORINE Biotopes guidelines indicate that the checklist of threatened species includes:

a) species proposed for listing in Annex II of the Bern Convention in:

"Invertebrates in need of special protection in Europe", N.M Collins and S.M. Wells (1987), Council of Europe, Nature and Environment Series

b) species of 24 *Rhopalocera* appearing as "Endangered" or "Vulnerable" in the Community according to information in:

J. Heath (1981), Council of Europe, Nature and Environment Series, 23;

c) species of Odonata considered "Endangered" or "Vulnerable" in:

The protection of dragonflies (Odonata) and their biotopes, J.van Tol and M.J.Verdonk (1988), Council of Europe, Nature and Environment Series, 38;

d) species of Odonata identified as "Vulnerable" in the Community by a preliminary analysis of the group (CORINE Biotopes manual, 86-2.2)

The following species lists were compared against the CORINE Biotopes checklist of Invertebrates:

- 1994 IUCN Red List
- Appendix II (Strictly protected fauna species), Bern Convention
- Annex II, Annex IV, of the EC Habitats Directive 92/43/EEC

INVERTEBRATES	Total no. of species	No. on CORINE list
1994 IUCN Red List	260	63
Bern Convention Appendix II	71	67
EC Habitats Directive Annex II	59	56

5.4.1 Comparison with 1994 IUCN Red List

Many of the invertebrate species listed by IUCN are from the Canary Islands, Madeira and the Azores. CORINE Biotopes list did not include any of the species from these islands. Both Madeira and the Azores are autonomous regions of Portugal, but belong politically and economically to the European Union, therefore invertebrate species ought be included in the

CORINE Biotopes checklists. Species such as *Pseudanodonata complanata*, *Unio crassus*, and *Austropotamobius torrentium* are widespread throughout Europe and therefore are not in the CORINE Biotopes checklist.

5.4.2 Comparison with Appendix II of the Bern Convention

Four species of Insecta have not been included in the CORINE Biotopes checklist.

Calopteryx syriaca
Coenagrion freyi
Cordulegaster trinacriae
Brachythemis fuscopalliata

Both *Calopteryx syriaca* and *Brachythemis fuscopalliata* have been recorded from the Mediterranean coast of Southern Turkey and therefore only just border Europe. *Coenagrion freyi* is confined to the small lakes of the Austrian and Swiss Alps, it is now extinct in Germany. *Coenagrion freyi* is also found in Siberia and Manchuria, but is considered by some to be a sub species of *C. hylas*.

5.4.3 Comparison with Annex II of the EC Habitats Directive 92/43/EEC

Three species of Insecta have been omitted from the CORINE checklist:

Limoniscus violaceus
Lucanus cervus
Osmoderma eremita

The Hermit Beetle (*Osmoderma eremita*) has a sporadic distribution throughout Europe and is considered "Endangered" in Austria, Belgium, Finland, Germany, Hungary, Norway and Sweden. (Council of Europe, Nature and Environment Series, no.35, 1987). It has suffered greatly from habitat destruction or intensive management of ancient woodlands for economic purposes and appearances to be in serious decline throughout much of Europe.

5.4.4 Comparison with the Bonn Convention

The Convention lists no invertebrates in Appendix I and only one in Appendix II:

Danaus plexippus which is an American species.

5.5 Comparisons with the threatened bird species lists

The CORINE Biotopes checklist of threatened species includes:

- Species listed in Annex I of Directive 79/409/EEC modified by Directive

85/411/EEC of the Council of 25 July 1985;

- Species restricted to the Iberian peninsula and the Atlantic Islands, of equivalent vulnerability to Annex I species

Birdlife International proposed the following species to be added to CORINE Biotopes lists for the PHARE region:

Aquila nipalensis
Falco vespertinus
Anthropoides virgo
Glareola nordmanni
Limicola falcinellus
Tringa stagnatilis
Xenus cinereus
Strix uralensis
Melanocorypha leucoptera

5.5.1 Comparison with IUCN Red List

Birdlife International has drafted lists of globally threatened bird species in European the forthcoming publication *Birds in Europe: their conservation status* in August 1994.

Of the species not found in CORINE checklists, two species of bird in Europe qualify as globally threatened, according to the new IUCN Red List criteria (Mace et al, 1993), are listed which are not found in the CORINE Biotopes checklist:

Chettusia gregaria
Loxia scotica

The latter is restricted to parts of Scotland in the UK.

5.5.2 Comparison with the CITES Convention

The *Convention on International Trade in Endangered Species of Wild Fauna and Flora* is a global convention. The majority of the species are not found naturally in Europe, exceptions include one Appendix I species:

Falco peregrinus peregrinus

In addition there are a number of Appendix II species:

Pelecanus crispus
Branta ruficollis
Aquila chrysaetos
Chlamydotis undulata
all *Falco* species of which five have been listed in CORINE Biotopes checklists.

5.5.3 Comparison with the Bonn Convention

Only five of 24 species listed in Appendix I are also found in the CORINE checklist including:

Pelecanus crispus
Haliaeetus albicilla

In Appendix II, 12 species and 9 families (with 57 species listed in CORINE) are identified. The majority of species fall in the Accipitidae and Anatidae. Not uncommon European migratory species have been listed in the Bonn Appendix II, including *Meriops apiaster*.

5.6 Comparisons with the CORINE Biotopes threatened plant lists

This section compares the plant species included on the CORINE checklist of threatened species with those listed on a number of Conventions and International Agreements.

The discussion is largely confined to vascular plants, since insufficient information was readily available to compare listings of lower plant taxa.

The CORINE Biotopes manual indicates its list of threatened species includes:

a) species listed as "endangered" or "vulnerable" at the European level or in a Member State of the European Community in the reports:

List of rare, threatened and endemic plants in Europe, Threatened Plants Committee (1982), Council of Europe, Nature and Environment Series 27;

Conservation of species of wild flora and vertebrate fauna threatened in the Community, C. Leon, Nature Conservancy Council (1982);

b) species of orchids identified as particularly threatened in a preliminary analysis of the group (CORINE Biotopes manual, 86-2.2).

Conservation of species of wild flora and vertebrate fauna threatened in the Community, K.E. Banister, Nature Conservancy Council (1982);

The following species lists were compared against the CORINE checklist of threatened plants.

- WCMC database of threatened plants of the world
- Appendix II (Strictly protected plant species), Bern Convention
- Annex II, Annex IV, of the EC Habitats Directive 92/43/EEC
- UNECE European Red List of Globally threatened species

- Red Data book for the Baltic Sea Region
- USSR Red Data book
- National Red Data books for European countries
- CITES Convention species

Comparisons of the species on the CORINE Biotopes checklist and other Conventions and Treaties identifies a number of species to be found on the IUCN Red lists, Bern Convention, Habitats Directive and CITES but which are absent from the CORINE checklists, for example:

Ceropegia chrysantha which is globally "endangered" and endemic to the Canary Islands. *Silene mariana* which is endemic to Spain and globally "threatened".

A summary of the total number of species in each Treaty or Convention and the proportion of those threatened is illustrated in the following table:

PLANTS	Total no. of listed species	Total no. of threatened species
Habitats Directive Appendices	513 (492+)	349
Bern Convention Appendix II	558	420
EEC CITES Appendix	535	382
UNECE red lists	4500	4500
CORINE Biotopes checklists (EU)	724	506
IUCN Red List in PHARE region	3813	288
IUCN Red List in EU region	5240	2015
IUCN Red List for pan Europe (excluding the EU)*	9492	2648

Notes

\+ Total number of species excluding lower plants

* Species found in the following countries: Albania, Andorra, Armenia, Bosnia and

Herzegovina, Croatia, Cyprus, Czech Republic, Estonia, European Russia, Finland, Hungary, Latvia, Liechtenstein, Malta, Monaco, Norway, Poland, Romania, Slovak Republic, Slovenia, Sweden, Switzerland, Turkey and the Ukraine.

5.6.1 Comparison with IUCN threatened plants lists

At least 70% of the CORINE Biotopes listed taxa are also considered globally threatened by IUCN. 218 species are regarded as not threatened in the 12 European Union. These include:

Some CORINE Biotopes species are listed as extinct including *Diplotaxis siettiana* once found in Spain.

Other CORINE Biotopes species have limited distribution and have become extinct over much of their range. For example:

Marsilea strigosa is severely threatened, being "Endangered" in the EU and "Extinct" in Russia.

Caldesia parnassifolia is "Extinct" in five countries and "Endangered" in most of its range.

Bromus grossus with a total range of three countries, it is "Endangered" in Switzerland but "Extinct" in Belgium and Luxembourg

Coleanthus subtilis is "Extinct" in Italy, Austria and Norway but "Endangered" in Russia and "Rare" or "Vulnerable" in five other countries

Lythrum thesioides is "Extinct" in France, Hungary and Italy and "Vulnerable" in Russia.

Luronium natans is not threatened in much of Europe but endangered in Denmark, Norway and Sweden

A number of species are "Extinct" in one country and "Vulnerable" or "Indeterminate" in the rest of Europe. For example:

Narcissus viridiflorus, *Boletus satanas* and *Elatine alsinastrum* (the latter of which was doubtfully introduced in Denmark. However it is also found in China and Japan)

In other cases the species are "Extinct" in three countries and otherwise have a wide distribution:

Marsilea quadrifolia which is threatened in 21 countries, it is "Indeterminate" or "Vulnerable" in the eastern Palaearctic and known to be "Extinct" in Germany, Poland and Switzerland;

Botrichium simplex which is "Extinct" in six countries and "Endangered" in 10 other European countries. Hoewever it is also found in the USA where state categories range from "Vulnerable" to "Unknown".

Of the 177 globally "endangered" CORINE Biotopes taxa 169 are country endemic. All except two of these taxa are restricted to the Mediterranean and Macaronesia. The exceptions include:

Stipa bavarica from Germany
Limonium recurvum from UK

A summary of the overlap between globally threatened plant species found in Europe (IUCN criteria) with species listed in CORINE Biotopes checklists, international treaties and agreements is illustrated below:

PLANTS	Ex	Ex/E	E	V	R	I	C	K
Habitats Directive Appendices	2	1	146	105	88	9	0	3
Bern Convention Appendix II	5	0	175	122	73	9	0	2
CORINE Biotopes checklists (EU)	1	0	177	242		10	1	3
IUCN Red List in PHARE region	0	0	14	53	199	102	1	2
IUCN Red List in EU region	17	2	273	427		124	2	27
IUCN Red List for pan Europe (including European Russia)	16	14	90	263		331	3	289

5.6.2 Comparison with Bern Convention

Appendix I is reserved exclusively for plants. The original Bern Convention listed only 119 threatened species of higher plants, which at the time were the most acutely threatened with extinction. The revision in 1991 was to add to the convention plants which are at the greatest risk of extinction i.e. endangered plants.

PLANTS	Total no. of species	No. on CORINE checklist
Bern Convention (Appendix I)	558	240

Examination of the lists shows that many species listed in the Appendix to the Bern Convention are not listed in the CORINE Biotopes checklists.

A. Selected examples of Annex I species which are not listed in the CORINE Biotopes list include the following range:

Asplenium hemionitis
Marsilea azorica
Ophioglossum polyphyllum
Alyssum pyrenaicum
Iris marsica
Crocus etruscus
Aquilegia pyrenaica
Cyclamen mirabile

Important species on the CORINE Biotopes list but not present on the Bern Convention include:

Abies pinsapo
Apollonias ceballosi
Ocotea foetens
Persea indica
Drosera corsica

5.6.3 Comparison with the Habitats Directive

5.6 There are two Habitats Directive species listed as extinct and a further 146 as endangered (138 of which are endemic).

Species listed in Appendix II but not included in the CORINE checklists include:

Silene cintrana which is globally threatened as "Rare" in Portugal and *Silene mariana* which is "Vulnerable" in Spain

Species listed in Appendix IV but not found in the CORINE checklists include:

Iris luitanica
Euphorbia nevadensis

Species listed in Appendix V but not represented in the CORINE checklists include:

Artemisia eriantha with global and west European status unknown but threatened as "Rare" in a number of countries of eastern Europe.

5.7 Over 80% of the Habitats Directive species are endemic to single countries (or to europe in some cases).

PLANTS	Total no. of species	No. on CORINE list
Habitats Directive (Appendix II, IV, V)	513	251

5.6.4 Comparison with the CITES Convention

There are 49 CITES Appendix II species listed in CORINE Biotopes of which only five endemic taxa are globally "Endangered".

Country endemic taxa listed in Appendix II are restricted to the southern member states, barring *Epipactis leptochila* which is found in the UK.

A number of species found widespread in the Palaearctic are listed in CITES Appendix II:

Eg. *Cypripedium calceolus* which is listed for the scarcity of subspecies in 27 countries. Globally it is not threatened, but has national status ranging from "EX", to "E", "V", "R" and "nt".

Liparis loeselii with unknown global status is listed in 60 countries in the Palaearctic and Nearctic realms, 24 countries of Europe and 36 states and provinces of the USA and Canada.

Proposed legislation from the EU lists around 585 individual species, eight families and twelve genera, most of which are additional to the original CITES Appendices species. This EU legislation proposes to go further than the CITES treaty in the protection of species in trade. Two of the families found listed in the proposed legislation that are very important for Europe are Orchidaceae and Primulaceae. Genera such as *Galanthus* and *Cyclamen* are also proposed to be included on the EEC CITES Annexes, the listing of which will ensure that

all the species of those genera are protected by the legislation.

5.6.5 Comparison with the former USSR listings

Species listed include those species endemic to specific regions such as the Caucasus, but also those species whose primary ranges are further south or west, in Western/Central Europe, China, Korea and Japan. The shrub *Myrica gale* is proposed for protection as is *Platanus orientalis* although common in Northwest Europe and North America and in Southwest Asia respectively.

6. COMPARISON OF CORINE HABITATS CLASSIFICATION WITH OTHER EUROPEAN CLASSIFICATIONS

During the last 200 years or more, attempts have been made to make a classification of the natural environment. Attempts to classify ecological units are based on identification of the species which occur in them along with a description of the physical characteristics of the area. Most terrestrial ecosystems are generally identified on the basis of plant communities with similar plant species composition and structure, phytosociological mechanism processes.

The main criteria used in the classification of vegetation are the floristic composition, the dominance and relationship of species to each other, the structure of the community, the general appearance or physiognomy and the periodicity of development and maturity of the community.

There is no effective global habitat classification system. The present systems simplify and combine community ecology and broad categories such as forest and wetland, independent of species composition. Generally these use a combination of a general definition of habitat type with a climatic description such as temperate grassland, or cold desert. Some systems also incorporate global biogeography to take into account the floristic and faunistic differences between regions of the world which may have very similar climate and physical characteristics.

The global classifications include:

The classification of Biogeographical Provinces of the World (Udvardy, 1975)

The Ecoregions of the Continents (Bailey, 1989)

Major World Ecosystems (Olson, 1983)

For details see *Global Biodiversity, Status of the Earth's living Resources* (WCMC, 1992).

The global classifications are too broad at the European scale. In Europe the CORINE Biotopes habitat classification is one of the most widespread, covering the whole of the EU. Proposals have been put forward in 1993 to extend the habitat classification process of CORINE into the Palaearctic realm. In 1994 a draft outline was prepared for extension of the process onto a global basis, by the Institut Royal des Sciences Naturelles de Belgique.

Other regional classifications in use in Europe include the Council of Europe Vegetation map (1987), Habitats Directive (1992), Nordic Countries physical geographical regions (1983), and former Soviet Union bioregions. The Bern Convention does not list habitats but obliges all the parties to protect the habitats of wild flora and fauna species. The Convention also insists that all endangered natural habitats must be protected, regardless of the species they house.

Other proposals include the European Vegetation Survey (1992) and the parallel initiative, the Vegetation Map of Europe, of which regional initiatives underway include those in Central Europe based in Austria.

6.1 CORINE Biotopes Habitat Classification

The present typological list, as the *Habitats of the European Community* (1991) was developed from the categories defined in *Biotopes of significance for nature conservation* (1982) and adopted by the Adoption Committee of Directive 79/409/EEC.

The primary objective of the list is to act as a tool for the description of sites of importance for nature conservation in Europe. All major communities are described, with the attempt to emphasise the "extremely interesting but rare" natural or near-natural communities and the widespread semi-natural communities, which result from a long history of extensive use by man and domestic animals.

Three considerations guided the construction of the list:

- Structure and the arrangement of units were chosen so as to keep a permanent a flexible possibility to adapt the classification to needs for finer division of the classes proposed;
- The units were defined to be easily identified by those collecting data, conservation decision-making and monitoring;
- Attempt to ensure compatibility with other existing schemes.

The habitat classification is complemented by brief descriptions of the units of habitat and of plants that they incorporate. These are intended primarily as a means of facilitating identification by users: a secondary use is in drawing attention to sensitive taxa which the units may host.

In the CORINE Biotopes classification, only natural, near-natural and sub-natural habitats have been treated in detail. All of these have been regarded as being threatened, either because they are rare and extremely localised or because they are dependent on extensive agro-pastoral activities that no longer have a place in the economic fabric. The more "artificial" habitats, which together probably cover the larger part of the territory of the Community, have for the most part been described summarily.

The best-known phytosociological names and synonyms have been listed, regardless of syntaxonomic or nomenclatural implications. Extensive use has been made of the recent syntheses of Ellenberg (1988) and Oberdorfer (1990).

The phytosociological terms used in these definitions are indicative only and are meant to facilitate identification of the unit: "allowance must be made for situations where the definitions include implicit restrictions (for example 'in particular', 'among others') on their use in formally distinguishing between the habitat unit and a phytosociological syntaxon".

Criteria for selection of habitat communities, have been designed to meet a number of objectives, to ensure inclusion of habitats that are:

- Capable of covering large enough surfaces to be important habitats for animal species with high space requirements;
- Physiognomically significant in the landscape;
- Essential to the survival of distinctive populations of rare or sensitive species of plants or animals;
- Necessary constitute elements of larger ecosystems;
- Remarkable because of the ecological processes they demonstrate or because of their aesthetic value.

The level of definition reflects the differential conservation significance and needs of various types of habitats.

The list is intended to be sufficiently flexible to allow the classification to be adjusted to meet specific needs - for example, for sub-division of the agreed classes to record particular localized features.

The list attempts to define ecological units that are easily identified by persons in charge of data collecting, monitoring or conservation decision-making. It aims for compatibility with other existing schemes, in particular with those that concern the whole European Community.

6.2 Differences with other European Classifications

In the CORINE Biotopes process a very wide range of types of vegetation are recorded, the floristic composition of each plant community takes precedence over other criteria, such as dominance and relationship to other species.

Compatibility was attempted in preparing the European Union classification. Primarily this was based on the Council of Europe *Classification of European Ecosystems* designed by J.M Géhu (1984) and the *Map of the Natural Vegetation of the member countries of the European Community and the Council of Europe* (1987).

Specific comments follow, but the following general points apply:

- The CORINE Biotopes hierarchical classification generally is regarded inadequate for the coverage of the marine and tidal ecosystems.
- This leads to very broad habitat types where effective identification and listing of sites could prove difficult to implement.
- CORINE Biotopes methodology does not cover river communities adequately. In general wild rivers and their characteristic vegetation are threatened throughout Europe.
- Mosaics of different habitat units are difficult to classify in the CORINE

Biotopes classification and Agricultural land and Artificial Landscapes poorly dealt with. However in the proposals for the extension to a Palaearctic classification the cultural landscapes have been dealt with in greater detail (see Appendices)

- Difficulties in relating vegetation classifications have been identified. This is primarily due to the differences in methodology, cf the European Vegetation Survey (see below).

Table illustrating a comparison of European habitat classifications and divisions

Habitat units	A	B	C	D	E	F	G	H	I	Total
CORINE[1]	577	174	1541	1702	369	309	20	95	17	4804
Habitat[2]	8	2	10	5	2	3	-	-	-	175
CoE[3]	10	4	20	122	5	3	0	1	0	165

NOTES

CORINE[1] CORINE Biotopes Palaearctic habitat units
Habitat[2] Habitats Directive listing of habitat units
CoE[3] Council of Europe Vegetation Classification and its vegetation units

A Coastal
B Non-Marine
C Scrub and Grassland
D Forest
E Bogs and Marshes
F Inland Rocks, Screes and Sands
G Deserts
H Agricultural Lands and Artificial Landscapes
I Wooded Grasslands and Scrub

6.2.1. Habitats Directive

The Council Directive on the Conservation of natural habitats and of wild fauna and flora (1992) defines a natural habitat as a terrestrial or aquatic area distinguished by geographic, abiotic and biotic features, being entirely natural or semi-natural.

Criteria for selection for listing of habitats include those which:

- are in danger of disappearance in their natural range;
- have a small natural range following their regression or by reason of their intrinsically restricted area;

- present outstanding examples of typical characteristics of one or more of the five following biogeographical regions/: Alpine, Atlantic, Continental, Macaronesian and Mediterranean.

Differences with CORINE Biotopes The hierarchical classification of habitats produced through the CORINE Biotopes programme is the basis for the listing under the Habitats Directive. However only 5% of the total number of units has been listed. Candidate habitats have been removed from the list following selection by scientific and political experts. Analysis of listed habitats in the Directive place the greater proportion (as with CORINE Biotopes) within northwest Europe as opposed to the Mediterranean.

The weakest areas are the Marine and Freshwater Habitats. The freshwater habitats pose problems of classification and the identity of some of the habitats listed on the Annex in unclear.

In particular, the CORINE Biotopes habitat classification does not cover river communities adequately, many of which are now threatened, including Riverine Forests.

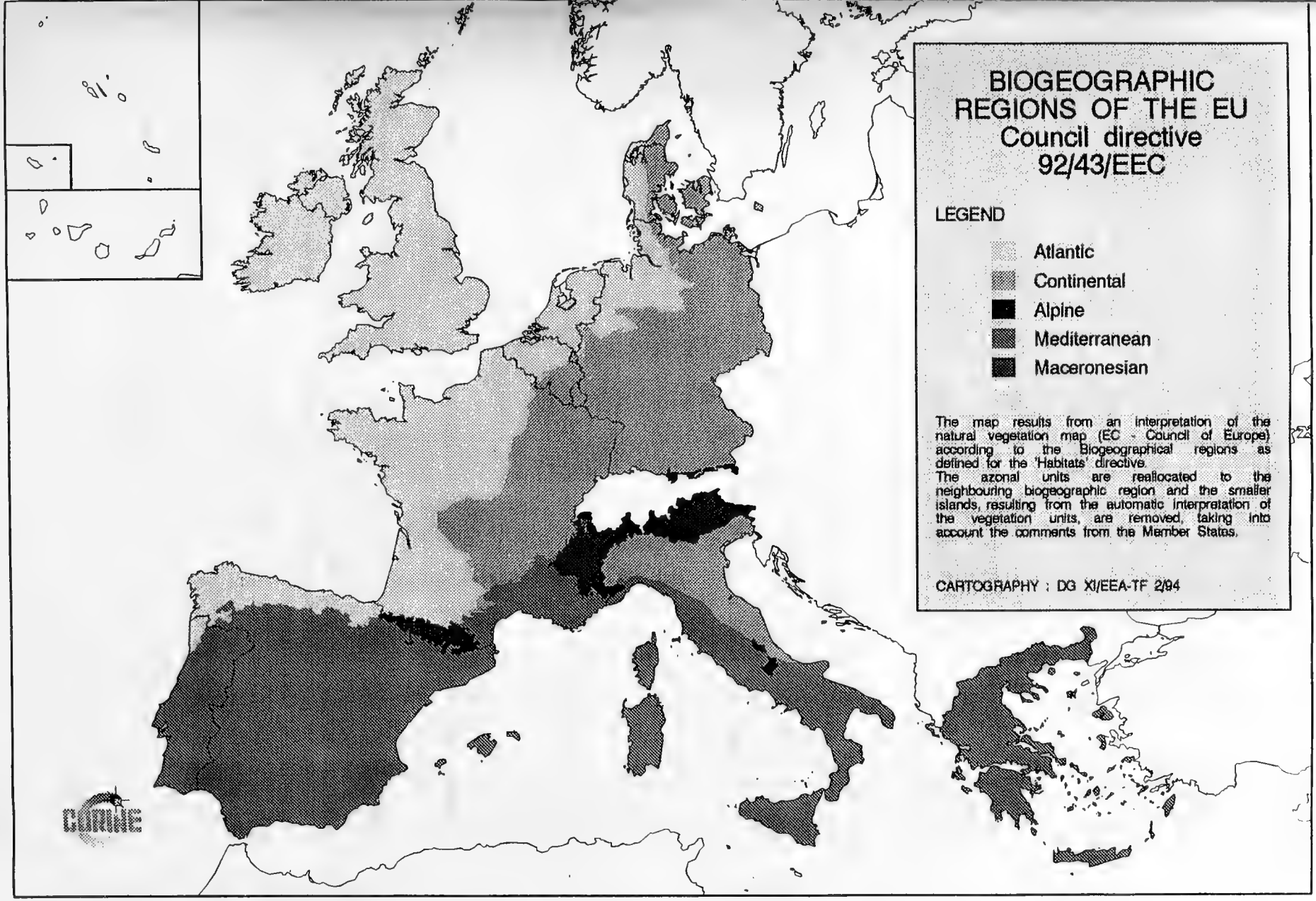
The heathland units included omit some of the highly threatened and important lowland heaths of Britain and Northern France.

6.2.2 Council of Europe *Map of the Natural Vegetation of the member countries of the European Community and the Council of Europe* (1987)

The map of potential natural vegetation of the member states of the Council of Europe was first prepared in 1979 and updated in 1987 in association with the Commission of the European Communities. It depicts the composition and natural distribution of natural edaphic and climax vegetation, actual or potential; the aim being to illustrate the ecological identity, structure and diversity of Europe, its natural ecosystems and its phytocoenotic potential, as one starting point from which to develop a rational policy for the conservation and management of the environment, natural resources and wildlife.

The units represent ecological territories characterised by the predominance of natural or subnatural primary vegetation, of which samples are still present. The vegetation types are described with reference to the phytosociological system in widespread use in Europe, the criterion being phytocoenotic composition in relation with the edapho-climatic environment. However the primary vegetation has been replaced by forms of secondary, semi-natural or artificial vegetation which are now dominant over the areas marked with the original potential natural vegetation in areas which may now be totally used for agriculture, grazing and forestry.

Differences with CORINE Biotopes The vegetation map is primarily concerned with vegetation, and mostly with natural vegetation, rather than the broader habitat concept. In essence the map illustrates potential vegetation cover as opposed to actual descriptions as in CORINE. The CORINE Biotopes classification was constructed to be compatible with the vegetation map.


BIOGEOGRAPHIC
REGIONS OF THE EU
Council directive
92/43/EEC
LEGEND
Atlantic
Continental
Alpine
Mediterranean
Macaronesian
The map results from an interpretation of the natural vegetation map (EC - Council of Europe) according to the Biogeographical regions as defined for the 'Habitats' directive.
The azonal units are reallocated to the neighbouring biogeographic region and the smaller islands, resulting from the automatic interpretation of the vegetation units, are removed, taking into account the comments from the Member States.
CARTOGRAPHY : DG XI/EEA-TF 2/94
CORINE

6.2.3 European Vegetation Survey

In March 1992 a European Vegetation Survey approach was launched, as a basis for scientific research, a working scheme for other branches of environmental science and decision making in the protection of the environment. The extent of the area is a geographic concept and includes besides Europe proper also Iceland, Svalbard, European Russia, Kazakhstan and Turkey, Aegean Cyprus and the Canary Isles. The proposal is a parallel initiative to the Vegetation Map of Europe, coordinated by U. Bohn of Germany (Rodwell, in litt., 1994).

The methodology vis based on phytosociology, with well-documented descriptions of all plant communities. The intention is to include nation-wide plant association-mapping activities within a larger framework of a phytogeographical mapping scheme. Key national vegetation surveys underway include Austria, United Kingdom, Netherlands and Germany. The local approach varies from country to country. The Dutch and German methodology attempts to evaluate both old as well as new data to produce their surveys.

In the UK the need for a classification of plant communities was recognised for a proper understanding of vegetation ecology. Classes, as the National Vegetation Classification, were derived from sampling stands of vegetation and a systematic analysis of the results. Over 13,000 sample quadrats were collected ranging from 2m x 2m up to 50m x 50m according to the scale of the vegetation. All vascular plants, bryophytes and macrolichens were recorded using the Domin scale. Soil and anthropogenic influences were also noted.

Criteria include:

Name of syntaxon
Synonyms
Lists of constant species and characteristic national rarities
Details of floristics and structure for the community and any subcommunities
Habitat relationships
Zonations and successions
Affinities with vegetation types elsewhere in Europe

For every community and its sub-communities there is also a floristic table with constancy values and domin ranges, the core of the entire classification

Differences with CORINE Biotopes The European Vegetation Survey attempts to undertake detailed scientific descriptions of all plant communities, in much finer detail and at more systematic levels than the CORINE approach. It has the advantage over the CORINE process of considering the localised environmental factors such as edaphic and climatic aspects.

Conversion programmes for the UK NVC approach to CORINE process has been undertaken.

6.2.4 Nordic classification

The aim of the Nordic classification has been :

- to provide a survey of the natural conditions in the Nordic countries by means of a physio-geographical division of regions

- to use the present level of knowledge in structuring vegetation types and land forms in the Nordic countries in order to evaluate the countryside in connection with planning

- to test systems for making inventories and processing and accounting for data on natural conditions in connection with the material obtained.

The division of the Nordic countries into physical-geographical regions is based upon parameters and variables that have been used in the evaluation of nature for planning. the fundamental criterion for the limits have been the large vegetation zones. the limits are then adjusted in relation to the geology and dominating land forms, the climatic conditions have only been utilized to a limited extent as they normally coincide with the limits determined by the vegetation. Thus the nordic countries are divided into 76 physical-geographical regions. In most cases there are also sub-regions which have particular characteristics with regard to individual vegetation types, land forms or climatic conditions. Up to 600 vegetation types have been described, corresponding to the 5-10 types described in the phytosociological literature, and grouped according to the following units:

Alpine vegetation
Forests
Mires
Seashore vegetation
Open grassland and heath vegetation
Marine vegetation

Differences with CORINE Biotopes Countries such as Denmark currently apply the Nordic and the CORINE approaches, being a member of the Nordic Council and the EU. However the legislative framework only relates to CORINE Biotopes. Conversions between the approaches are poossible, however on a day to day basis comparison is regarded as not appropriate. The Nordic approach includes area, physiognomy, soil conditions, climate, characteristic species, number of species, landuse, and stability/successions.

6.2.5 Ramsar Convention

The *Convention on Wetlands of International Importance especially as Waterfowl Habitat* (1971) which covers coastal sites within its definition of wetlands, has a wetland typology agreed by a meeting of the Contracting Parties (Regina, Canada, 1990). For example, those elements included in the marine and coastal zone:

Salt marsh, rocky shores, sand/shingle, tidal mudflats, open sea, shallow marine, marine (seagrass/kelp) beds and coastal saline/brackish lagoons.

Differences with CORINE Biotopes Currently underway is the Medwet programme of IWRB which following the Tunisia scientific meeting of April 1994 intends to integrate a

wetland classification incorporating habitat elements from CORINE Biotopes and Ramsar Conventions.

6.2.6 IUCN Marine Biogeographic Classification

Following the lead of the IUCN Regional Reviews for the IVth World Congress on National Parks and Protected Areas (Caracas, Venezuela, 1992), it was intended to develop a global representative system of marine protected areas based on representing biogeographic variation and biodiversity at all levels (ecosystem, habitat and species).

The basis of the IUCN marine classification system was applied from the "Classification of coastal and marine environments" in *Environmental Conservation* (Hayden, Ray and Dolan, 1984). This system developed a zoophysiographic 2-dimensional classification of the world's ocean realms and marginal seas and archipelagos. This classification scheme involves relating a classification of the physical environment to marine faunal provinces.

6.3 Other regional classifications relevant to Europe, the Palaearctic Realm and beyond

6.3.1 Russian Federation and the former Soviet Union

Biodiversity conservation in Russia both at the federal and regional levels is within the context of 14 distinct biogeographical regions or bioregions (Zabelin, 1994), and within the wider former Soviet Union the system of physical and geographical regions totals 88 (Gvozdetsky et al, nd). The bioregions are distinguished by the geographical distribution of species assemblages, climate, and certain physical features such as soils, geological and geomorphological characteristics of the land, latitudinal zonality, altitudinal zonality, and regionality.

The following bioregions have been identified for Russia:

Arctic
Kola-Karelian and Eastern European Forest
European Forest-Steppe, Steppe, and Caspian Semidesert
Ural Mountains
Greater Caucasus
Western Siberia Forest
Western Siberian Forest-Steppe and Steppe
Central Siberian
Altai-Sayansky
Baikal
Zabaikal
Yano-Kolymsky
Amur-Sakhalin
Kamchatka-Okhotsk Sea

The bioregion approach permits assessment of the adequacy and effectiveness of the level of protection in light of each bioregion's unique set of landscape features, ecological dynamics, threats, and patterns of biodiversity. Moreover, the biogeographical approach enables tailoring of conservation strategies to the particular needs of each ecosystem. The introduction of new criteria, such as the effect of anthropogenic factors upon individual natural complexes have also been included.

6.3.2 People's Republic of China

Biogeographically, China is situated in both the Palaearctic and Oriental Realms. China contains an extensive range of natural ecosystems. With the single exception of equatorial rain forest, every type of natural ecosystem found in the northern hemisphere is represented in China. Divisions are based on the major vegetation and floristic regions of the republic (McKinnon, in litt., 1993). The main ecosystems in China can be divided into several types, such as forest, steppe, desert, farmland, wetland and marine ecosystems. For example the Forestry ecosystems are divided into coniferous, broad-leaved and mixed coniferous and broad-leaved forest:

Cold-temperate coniferous forests
Temperate mixed coniferous and broad-leaved forest
Warm temperate deciduous broad leaved and coniferous forest
Subtropical evergreen and broadleaved and coniferous forest
Tropical rainforests and seasonal rainforests

Several biogeographic classification systems have been proposed for China but none have been found acceptable to the participants during the development of the biodiversity conservation action plan (GEF, 1993). Because such a classification provides an important foundation for assessing and conserving a nation's biodiversity, a biogeographic classification system should be established for this purpose.

The system in China parallels that of the CORINE Biotopes Habitat classification as defined in the CORINE Biotopes Palaearctic Habitats classification draft (1994).

6.3.3 Commonwealth of Australia

At the national level, the ANPWS (now ANCA) initiated the national index of ecosystems programme in 1984 in order to assist the states and territories to adopt a systematic approach to their protected areas network. The programme is reviewing the application of major ecosystem classifications covering Australia and developing methods and providing assistance to state and territory agencies to identify and conserve major ecosystems within their jurisdiction.

The national index of ecosystems project is being managed by the ERIN unit of ANPWS. Currently different processes are underway although consensus on agreed national classifications for vegetation will no doubt emerge in time through the application of technology and standard data sets. At the state level different processes occur, from broad level habitat priorities and legislation in Victoria to a tentative classification and assessment

of the threat conservation status of communities in New South Wales, to floristic data bases at the regional, sub-regional and local phytogeographic scale to determine patterns and assess conservation status.

6.3.4 Provinces of Canada

The natural regions concept was first adopted in 1971 as a basis for the systematic planning of national parks, and was known as the National Parks System Plan. The principle of this plan, now superseded by the Environment Canada 1990 systems plan, was to protect outstanding representative samples of each of Canada's natural landscapes (Finkelstein, 1992). Of 48 "natural regions", the Canadian Parks Service (Parks Canada) defined 39 terrestrial and 29 marine regions, and, following the Endangered Spaces campaign of 1989, the goal is to represent at least one national park in each region by the year 2000 (Government of Canada, 1991; Kun, 1981).

The 39 natural regions (terrestrial) defined by the Canadian Parks Service are broadly divided into: Western mountains; interior plains; Canadian shield; Hudson Bay lowlands; St Lawrence lowlands; Appalachians; Arctic lowlands; and High Arctic islands. Vegetation ranges from: Arctic tundra, north of the tree line; Alpine tundra on western mountains above the tree line; coniferous forest, covering about three-quarters of Canada, dominated by white spruce and black spruce extending from Newfoundland to Alaska; a complex assemblage of sub-Alpine, montane and coastal coniferous forest in British Columbia; grassland prairie of various types in a narrow band across central and western Canada; between the prairie and coniferous forest in the centre, a transition zone characterised by trembling aspen; between the coniferous forest and the tundra, transitional Taiga, characterised by open spruce woodlands with lichen ground cover; and in eastern Canada, around the Great Lakes region, mainly deciduous forest predominated by maple, oaks and conifers (Davis *et al.*, 1986; Skoggan, 1978/ 1979).

The most recent ecological classification, the Ecological Land Classification System, is based on identifying ecoregions and other levels of generalisation in a natural hierarchy: areas of the earth's surface characterised by distinctive ecological responses to climate, physiography and hydrology as expressed by the development of vegetation, soils and fauna. Nationally, about 177 ecoregions have been identified, and are divided into 15 less detailed "ecozones", 45 "ecoprovinces" and 5,400 more detailed "ecodistricts" (Rubec *et al.*, 1992; Wiken, 1986).

6.4 Proposed CORINE Biotopes Palaearctic and Global Habitat Classification

With the expansion of the CORINE process beyond the EU boundaries, it became inevitable to restructure the classification to take into account the geo-political pan Europe and the wider Palaearctic Realm, beyond the original area of interest.

In 1993 The Institut Royal des Sciences Naturelles de Belgique extended to central and northern Europe the classification of habitats under the CORINE Biotopes project. Needs of future consistency had encouraged the CORINE Biotopes team to develop the standard to a wider palaearctic context and to insure its compatibility with a workable global system in collaboration with Council of Europe and European Commission.

Originally it was deemed necessary both to verify any further possible extensions on the Eurasian continent by immediate expanding the basic framework so as to encompass the entire Palaearctic realm and to ensure that it could fit within a global system of habitat classification that will in any case be necessary within the framework of the Biodiversity Convention.

The extension of the habitats classification to cover the Palaearctic realm is ordered according to the same methodology as that used for the CORINE Biotopes *Habitats of the European Community* typology, the habitats of the Palaearctic realm include descriptions of the units provided , these descriptions intended at facilitating identification by data collectors, and also drawing attention to sensitive taxa present, comprise a phytosociological characterisation of an indicative nature, brief ecological allocation, and lists of characteristic, differential or conspicuous species.

The integrated system proposed rests on the matrix-use of two existing sets of upper category describers, the Udvardy biogeographical realms and a list of upper units of habitats derived from the 2-digit Corine categories on the other hand:

Palaearctic
Nearctic
Afrotropical
Indomalayan
Oceania
Australian
Antarctic
Neotropical

See Annex 5 for a complete lists of the proposed CORINE habitat units for the Palaearctic.

Higher habitat units within any realm are then designated by combination of a realm with that of the Biotope class. Lower divisions are specified to each realm and not necessarily homologous between units. The higher units were derived directly from the CORINE Biotopes project and their extension to global applicability has largely drawn upon the ecological analyses of Walter (1979) and Water and Breckle (1986, 1991) upon the characterisation of major plant formations of the world by Rieley and Page (1990 and for major marine habitats, upon the synthesis of Barnes and Hughes (1988).

The system works within Biogeographic realm but at the lower level the classification of units would diverge preventing direct comparison of subunits across realms. Thus one could compare juniper and cypress woods in Greece with the corresponding North American equivalent, pinon-juniper woodlands, of central Arizona. However the lower unit hierarchy would not permit direct comparison. Cosmopolitan homologies would be possible such as the coral reef communities in the Afrotropical realm and Palaearctic realm.

In the current version of the preliminary draft Palaearctic Habitats classification, the habitat units and subdivisions are usually still insufficiently detailed and have yet to be developed further.

7. CONCLUSIONS AND GENERAL RECOMMENDATIONS

7.1 CORINE Biotopes: Threatened species lists

The CORINE Biotopes Project was designed as a form of gap analysis for identification of sites of nature conservation importance at a regional level to "identify and describe biotopes of major importance for nature conservation in the Community" (CORINE Biotopes manual, methodology. EUR 12587/1). Of the four principal selection criteria, two are concerned with habitat type and richness, two are concerned with species. These last refer to:

- The presence of threatened species of plants or animals,
- The richness of a site for a taxonomic group.

The lists of threatened species to be recorded for site assessment purposes (Appendices A-K in the biotopes manual) were based on the Annexes to the Bern Convention, the IUCN world status categories and a variety of expert opinion.

These lists of threatened species may have been adequate for their original purpose and within their original context, but some limitations are evident:

- Because the threatened species lists are compiled from several sources, there is no objective overall set of criteria for inclusion and some precision will therefore be lost from the site assessment process,
- A number of standard data sources used in developing checklists, such as the *Flora Europaea*, may be out of date. For example, some of the information on taxonomy and distribution has been superseded, or excludes important geopolitical areas such as the Canary isles. However these are certainly adequate to remain, at the present time at least, as the standards for expanding the checklists to encompass the whole of Europe.
- If the CORINE methodology is extended progressively beyond the original EU area, the original threatened species appendices will provide a progressively less satisfactory basis for site assessment,
- Because no firm criteria were drafted originally, modifying the threatened species lists to take account of larger areas with more countries can be inconsistent and excessively subjective.

General procedure

1 It is suggested that reasonably objective and consistent criteria be developed that will allow the original lists to be revised as appropriate, whether for the EU area or for any larger area to which attention may be given in future.

2 Many of the species originally listed have a small part of their world range in the EU area, and were considered threatened within the EU mainly or entirely for this reason. As the area of concern enlarges, a progressively larger part of the range of such species will be included, to the point where they are no longer of special concern on the basis of restricted range. The lists will therefore need to be revised by adding or removing species.

3 A revised system for listing threatened species will need to take account of differing levels of taxonomic expertise in different countries, and the different availability of field survey data. Some taxonomic groups are in themselves difficult to survey, record and monitor.

4 Comparison of the CORINE Biotopes methodology for species illustrates the wide diversity of techniques and criteria for selection within a European and global context. Alternative rigorous approaches such as those in Australia and the USA ought be reviewed in depth for comparison of methodologies.

5 The development of the checklists ought take into account the proposed IUCN global threatened species criteria (Mace et al, 1993) as illustrated by their use for globally threatened European birds by Birdlife International.

7.2 CORINE Biotopes: Habitat classification

The CORINE Biotopes habitat classification is based on floristic composition. Since the more detailed and advanced quantitative descriptive approach, involving the precise measurement of vegetational features such as density of population, cover, frequency, height, biomass, age, structure, human impact, as well as soil type and climate, is not regarded as appropriate for such large vegetational units as in a pan European context. Nor in many cases is the knowledge available, as has been realised in the development of national campaigns under the European Vegetation Classification, which is proving to be extremely time consuming and costly.

CORINE Biotopes, with its increasing hierarchical composition, the more rigidly the detailed community is defined the more site-specific it becomes hence:

- The more limited its use in analysis and planning at a pan European or global scale.

By contrast, very general habitat classifications based on forest, grassland, wetland are based on the physical characteristics and appearances of an area, independent of species compositions.

- Difficult to define and delimit in a universally applicable way as they cover such a wide range of possible conditions.

For any extension of the CORINE Biotopes habitats classification process into the rest of Europe the following is recommended:

- Use of the latest draft of the CORINE Biotopes Habitats classification (1994) to cover the Palaearctic realm.

- It covers the vegetation communities of the Nordic region, based on compatibility with the Nordic classification, and extends into the whole of the former Soviet Union.

With an absence of an effective alternative this draft list would be an adequate starting point towards extending the CORINE process into the rest of Europe. However particular issues that ought be looked at in further depth include:

- Linking the floristic composition to edaphic, climatic and anthropogenic factors

- Linking or subdividing into European bioregions cf Russian Federation system

- Review increased linkage with the Bern Convention and its proposed use as a framework to implement the Convention on Biological Diversity within Europe.

8. RECOMMENDATIONS

Amongst the tasks which will be tackled by the newly established European Environment Agency in Copenhagen (Denmark) will be the continuing development of CORINE (Article 2 of the Council Regulation on the establishment of the European Environment Agency).

Summary

This report effectively recommends that the CORINE Biotopes methodology is a suitable tool for identification of sites of conservation importance on a regional scale.

Stages towards development of a pan European CORINE Biotopes system ought involve the application of the existing CORINE Biotopes methodology with due concern for wider biogeographical interests and needs. Key activities ought include:

1 Harmonisation of information on species and habitats information and site identification, on a national or regional scale.

2 That extended methodologies incorporate lists of habitats and species of relevant EU Directives, regional/global treaties and programmes.

3 The preparation of CORINE Biotope user manuals for the application of the methodology to non EU States. Annexes will include amended lists of habitats and species based on a standard methodology (see below for recommended process).

4 The promotion of workshops for the transfer of the expertise and standard methodologies to:

European Russia
Far East/Siberia
Central Asia
North Africa
Middle East
Arctic region

5 That a review of the existing checklists in the EU Member States is undertaken and amendments incorporated into a more rational pan European list.

The recommended activities towards developing and strengthening these goals include the following:

PHASE 1 - DEVELOPMENT OF METHODOLOGY

8.1. Combined ecosystem and species-based biodiversity

The two component ecosystem and species- based CORINE Biotopes

methodology is a form of gap analysis to define major areas of interest for biodiversity conservation at a regional level. As such it is one of the global pioneers in developing supra-national site conservation techniques.

Unlike many national initiatives the CORINE Biotopes process is further supported by international legislation (Habitats Directive) to protect those species and habitats through a protected area network of Special Areas of Conservation (Natura 2000).

Recommendations:

- **Undertake a detailed comparison of CORINE Biotopes methodology with alternate activities worldwide.**

  Comparable ecosystem projects in Australia and Canada ought be looked at in further detail, as well as those being devised for the Circum Arctic region. This will be particularly necessary in the event of the wider application of the CORINE Biotopes methodology in a global context.

- **Review existing pan Holarctic systems.**

  Based on the above review for Canada and the Arctic, identify mechanisms towards the development of a pan Holarctic and wider Palaearctic (former USSR and Central Asia) CORINE Biotopes gap analysis. Initial activities could involve participation in the Arctic Environmental Database of WCMC, Scott Polar Research Institute and Moscow State University, a programme which will eventually work with UNEP towards a pan Arctic programme in Eurasia and the Americas.

8.2 Global Status of Threatened Species

Recommendations:

- **Use IUCN Global Red List species in the standard methodology.**

  Whatever the geopolitical coverage of the CORINE Biotopes project, all species present that are listed in the current IUCN Global Red Lists of threatened animals and plants should be included (with the exception of "Insufficiently Known" species, which are only suspected to be threatened). These species are by definition globally threatened, and systematic recording of their presence would contribute to site assessment.

- **Use standard taxonomic works.**

  Extension of the checklists ought to use standard works as mentioned

in the methodology section, such as the *Flora Europaea* in the case of plants. In the latter case it is a matter of high priority to incorporate all the species data from this work into the WCMC database for the forthcoming IUCN threatened plants of the world publication.

- **Incorporate new IUCN threatened species criteria.**

  The new IUCN threatened species criteria of Mace et al (1993) ought be incorporated into any selection of global red lists within Europe wherever possible.

8.3 National status

Recommendations:

- **Incorporate nation red list and country endemic species in standard methodology.**

  Use of all animal species endemic to a single country, plant species at the "endangered" and "vulnerable" level, and considered by appropriate authorities to be threatened in that country should be included. In principle, these species would appear in the IUCN global Red List if considered threatened using IUCN status criteria, but in practice, there is often some degree of mismatch.

- **Promote preparation of national red lists in all European countries.**

  It would be preferable for all countries to generate national Red Data Books or Red Lists, with a status category system modelled on the IUCN system.

- **Incorporate new IUCN threatened species criteria.**

  The new IUCN threatened species criteria of Mace et al (1993) ought be incorporated into any selection of national red lists wherever possible.

8.4 Status in CORINE area

Recommendations:

- **Compile lists of "species in decline" in the major part of their range.**

  Species and habitats which on sound evidence are demonstrably in decline in the major part (>50%) of their range in the CORINE area (irrespective of their global distribution area) should be recorded.

- **Use revised IUCN threatened species category system.**

  The new IUCN category system of Mace et al (1993) in preparation offers a suitable system for categorising species in relation to some given area of the earth.

- **Undertake preliminary compilation surveys of the status and distribution of major habitat classes.**

  Further work is needed for habitats, however in the interim the Council of Europe Vegetation map will go some way towards supporting this goal. Collaboration with the Council of Europe ought be sought.

- **Identification of European threatened landscapes.**

  It is recommended to incorporate in the CORINE Biotopes methodology the criteria for identification of threatened landscapes as being developed by IUCN CESP. Subsequently lists of key threatened landscapes ought be undertaken.

8.5 Range in CORINE area

Recommendations:

- **Identify minimal range criteria for checklist species/habitats.**

  Species and habitats that have an extremely small range, and are therefore at risk from chance factors, and are restricted to the CORINE Biotopes area, should be recorded. What should be defined as "an extremely small range" needs further discussion, and might vary between taxonomic groups (it might, for example, be a mountain peak of 5 ha for an insect, or a stream of 20 km for a fish).

8.6 Conventions and agreements

Recommendations:

- **Strengthen the CORINE methodology through linking with International/Regional Treaties and Agreements.**

  To the extent that the intention of the CORINE Biotopes project remains to record for site assessment purposes those species considered threatened, the CORINE lists should be modified at intervals to reflect other current listings of threatened species and habitats associated with major conventions and agreements in effect over all or a significant portion of the CORINE area.

  These ought include:

  - EU Habitats Directive
  - EU Birds Directive
  - Bern Convention (Appendix II)
  - Bonn Convention on Migratory Species (Appendix I).

  For habitats these should include the Habitats Directive and Ramsar Convention. The IUCN CNPPA has proposed the development of legislation on the protection of European landscapes (1993), based on the Cultural landscape criteria of the World Heritage Convention.

- **Ensure compatibility of criteria.**

  The species taxonomy will in many instances require standardisation, and it is also desirable to examine closely the criteria used in such conventions in order to ensure the compatibility of lists.

8.7 Taxonomy of existing lists

Within the remit of this study no changes have been made by WCMC to the existing CORINE Biotopes species lists for the EU (Appendices F-K in the CORINE Biotopes manual, 1(1)).

Revision of the taxonomy and content of these lists is desirable. Some species originally regarded as threatened would not now be regarded as threatened in a wider Europe. Similarly, some species on Red Lists in eastern Europe would not be regarded as threatened in a wider Europe. Recent taxonomic changes to species in the EU area would result in new species being added to the original CORINE Biotopes list.

Recommendations:

- **Undertake full review of existing species taxonomy.**

- **Ensure further extension of activities adopt standard taxonomy.**

  The entire task of recording, evaluating status and assessing sites would be much aided by adoption of standard taxonomic checklists. Several possible sources exist. With specific regard for animal taxa, it is strongly suggested that, because of continuing ambiguity and other uncertainty over the limits and significance of many named subspecies, only species-level populations be listed.

8.8 Standard habitat classification

Recommendations:

- **Continue to use and develop the revised CORINE Biotopes habitat classification.**

  With the absence of any other recognised standard pan-European habitat checklist, it is recommended to use the Provisional draft Palaearctic habitats checklist and database (1993/1994) developed by the Institut Royal des Sciences Naturelles de Belgique.

- **Develop listings for cultural land/seascape habitat classes.**

  Particular needs of the existing CORINE Biotopes habitat classification include the need to strengthen the cultural land/seascape classes.

- **Collaborate in other regional global/regional classifications relevant to Europe.**

  Due regard ought be taken for any new developments under global habitat classifications such as under UNEP/FAO, global **Habitat Indicators for Policy Makers** as being developed by WRI, WCMC and CORINE and regional initiatives such as the **European Vegetation Survey** and the **Circum Polar Vegetation mapping project**. Close association ought also be maintained with biodiversity initiatives in the Russian Federation and China with WWF International, UNEP and the World Bank.

8.9 Marine and coastal

Priority needs include the strengthening of all habitat and species information relating to the marine and coastal ecosystems.

Recommendations:

- **Devise a more detailed CORINE Biotopes marine and coastal habitat classification.**

  As a first practical step towards strengthening the existing CORINE Biotopes marine habitats it is recommended to review the paper entitled "Classification of coastal and marine environments" (Hayden, Ray and Dolan, 1984), which was used as the basis for the IUCN classification system to be allied at a regional level.

- **Review IUCN Biogeographic classifications for the marine environment.**

  Review the biogeographic classification being developed for IUCN CNPPA working groups including by members from the Great Barrier Reef Marine Park Authority (Australia), and the new wetland classification by IWRB in association with Birdlife International, Ramsar Secretariat and WCMC.

PHASE 2 - Extension of the methodology

8.10 Encourage the extension of the CORINE Biotopes methodology to a wider Europe

Priority recommendations include:

1 Prepare users manual (including revised habitat and species checklists) for application in the expanded CORINE Biotopes region.

2 Promote workshops for transfer of the expertise to a wider Europe.

3 Encourage the building of databases of species and habitats across Europe using standard methodology based on, or interchangeable with, the CORINE Biotopes classification.

Based on Recommendation 6 of the CORINE Biotopes Manual (1991) prepare project proposals for the extension of the CORINE Biotopes methodology into:

- **European CIS**, with priorities for the Russian Federation and the Ukraine. To be undertaken in parallel with the country initiatives of the IUCN East European Programme and biodiversity/protected area programmes of the World Bank and WWF International in association with the Ministry of Environmental Protection, Academy of Science, UNESCO MAB and Moscow State University.

- **Eastern Mediterranean**, with priorities for Turkey, former

Yugoslavia and Albania. Secondary targets ought be for Cyprus, Malta, Syria, Lebanon and Israel. To be undertaken in parallel with the country initiatives of the IUCN East European Programme and biodiversity/Specially Protected Area Mediterranean programmes of the World Bank, UNEP Regional Seas Programme under the Barcelona Convention, and national initiatives such as the important birds and plants programmes of DHKD/FFPS/Birdlife International.

- **Southern Mediterranean**, with priorities for Morocco, Tunisia and Egypt. To be undertaken in parallel with the country initiatives of the CORINE Landcover programmes in Morocco and Tunisia along with activities of the IUCN North Africa Programme and biodiversity/Specially Protected Area Mediterranean programmes of the World Bank, WCMC, and UNEP Regional Seas Programme under the Barcelona Convention, and the Medwet programme of IWRB.

8.11 Other issues

8.11.1 CORINE Red Data Book

Recommendations:

- **Promote the publication of a Red Data Book of threatened species and habitats.**

  If an explicit and repeatable methodology could be developed, publication of a CORINE Red Data Book of threatened species and habitats, would serve as a useful source of information and raise public and academic awareness of threatened species issues in the region.

  This could be linked to the IUCN SSC Red Lists and the IUCN CESP proposed Red Data book of globally threatened landscapes.

- **Promote the preparation of Red Data Books for the CIS and Central Asia.**

  Priority needs for regional Red Data books include the northern Palaearctic realm of the former Soviet Union (CIS) and Central Asia.

  The regional checklist of threatened species, published as the USSR Red Data book, is no longer in use following independence of the various republics. However the need for regional-wide threatened species lists are perhaps of greater urgency than previously.

8.11.2 "Responsibility"

Recommendations:

- **Develop species and habitats lists linked to country/regional responsibilities"**

  It might be useful to record all species and habitats which have more than 50% of their range within the CORINE Biotopes area; the countries covered would by definition bear major responsibility for the survival of such species and habitats. This is likely, however, to result in excessively long lists, particularly if invertebrates, plants and vegetation associations are covered comprehensively.

8.11.3 Data management and maintenance

Recommendations:

- **Ensure the continued maintenance of a central databank and increase user access.**

  The master taxonomic checklists, lists of species of concern and habitats should continue to be maintained centrally with the development of continual on-line access (by Internet or similar means) for all CORINE recorders and organisations.

- **Protocols for revising these lists at regular intervals must be developed, to reflect changes in status or systematic position.**

- **Much wider dissemination of the CORINE Biotopes information is imperative, recommendations towards this could include:**

  - Setting up a CORINE Biotopes Internet node providing access to general information of the CORINE Programme, maps and data.

  - New methods of multi-media information technology ought be explored including CD-I.

  - Promote the development of education awareness documentation relating to CORINE Biotopes.

8.12 Training workshops

Recommendations:

- Promote workshops to standardise methodology. Key workshop themes ought review:

  - Development of the checklist methodologies
  - Habitat classifications in the wider Europe
  - Data transfer and wider dissemination

- Promote workshops to transfer expertise and assist with in-country capacity building. Recommended priorities include:

  - Russian Federation
  - Central Asian Republics
  - Middle East/North Africa
  - Arctic Region

Checklists for the CORINE Biotopes Programme and its application in the PHARE countries of Central and East Europe;

including comparisons with relevant conventions and agreements on the conservation of European species and habitats

ANNEXES

Prepared by the World Conservation Monitoring Centre

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ANNEX 1: List of European experts whose views were sought as part of the project

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* J. Hopkins, Joint Nature Conservation Committee

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* A. Phillips, Commission on National Parks and Protected Areas
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B. General species, ecosystems and habitats

* J. Massey-Stewart, London Initiative for Russia
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* Paul Harding: European Invertebrate Survey

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* V. Haywood, Flora Europaea

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Notes

* Responded to information requests

ANNEX 2: The proposed new criteria for Listing Species on the IUCN Red List (Mace et al)

The Development of New Criteria for Listing Species on the IUCN Red List

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IUCN has long felt the need to revise its Categories of Threat. A previous attempt to improve definitions for the categories was based on a workshop held at the IUCN General Assembly in Madrid in November 1984, and resulted in the publication, *The Road to Extinction.* However, new developments in the field of conservation biology, especially the recognition of factors that contribute towards extinction risks to species, now present the opportunity for the development of more objective and scientifically-based methods. In 1988, the SSC started a new process by inviting Dr. Georgina Mace to propose a new population-based system for the IUCN categories. This resulted in a paper by Mace & Lande (Mace, G. M. & R. Lande. 1991, Assessing extinction threats: toward a reevaluation of IUCN Threatened Species Categories, *Conservation Biology 5,* 148-157). The Mace-Lande criteria, as they are known within SSC, have been applied on an experimental basis to a range of taxa through assessment programs by various SSC Specialist Groups. The Mace-Lande criteria have been recognized as needing further development if they are to be applied more widely; at present they are most appropriate for higher vertebrates. In addition, other authors have proposed criteria based on patterns of distribution, or patterns of use rather than on population characteristics alone, and some reconciliation of these approaches was needed. Consequently during 1992, several activities were undertaken to propose new definitions for the categories of threat, and new criteria for the inclusion of species in these categories.

The technical workshop

A technical workshop was held in London on November 9-11, 1992, aimed at addressing scientific aspects of the listing process. The meeting was chaired by Simon Stuart, organized by Georgina Mace and Simon Stuart and funded by CITES and the IUCN Inter-Commission Fund. Prior to the meeting, several different experts were invited to prepare papers describing different options for listing species. These included: options for distribution-based criteria (David Given), an overview of the utility of various population and distribution variables in assessing extinction risk in different major taxonomic groupings (John Lawton and staff of the Centre for Population Biology, Imperial College at Silwood Park, London), options for management-based criteria (Justin Cooke), a review of the application of Mace-Lande criteria (Georgina Mace) and an overview of the MASS system (which combines population and distribution-based approaches) (John MacKinnon).

The papers were circulated to all workshop participants in advance. There were 33 participants at the workshop, representing a wide diversity of interests in SSC. Over the three days, a variety of topics was covered, starting with a general discussion of the nature of the definitions and criteria and the basis for a workable system. The use of the categories of Critical, Endangered, Vulnerable and Susceptible, with decreasing levels of threat, were agreed upon, as well as some qualitative definitions for each of them. Most of the time was spent in working groups representing major taxonomic groupings (plants, invertebrates, lower vertebrates, higher vertebrates). These used the background information and their own perspectives to develop criteria for each of the categories. At the end of this process it became clear that the work of the invertebrate and lower vertebrate working groups had converged substantially, and these were combined into one set of criteria. At the conclusion of the workshop, therefore, there were three different sets of criteria, for higher vertebrates, plants, and lower vertebrates and invertebrates. As a result of their independent origins, these sets of criteria contained some anomalies and inconsistencies, and a drafting group was formed to develop the workshop output into a single coherent document that could be forwarded to SSC. The drafting group members were chosen with at least one representative from each of the working groups, to maintain continuity, and all were working in southeast England.

The Drafting Group

The drafting group met three times during December and January, following the technical workshop, and developed draft criteria that were circulated back to all workshop participants in January 1993. Comments received on this draft were considered at a final meeting held in February. The following issues predominated discussions of the drafting group.

Consolidation of taxonomically based criteria into a single list. Following the London workshop, the criteria were distinct for the major groups considered (higher vertebrates, lower vertebrates and invertebrates, plants). There were felt to be two major problems with this. First that the different groups did not always reflect similar life-forms, and therefore some taxa would be judged by inappropriate criteria. Second, there were inconsistencies in the criteria applied across the major taxonomic groups, which it would always be hard to minimize. It was felt that the system would be simpler, with fewer potential contradictions, if the criteria could be consolidated into a single list, even if this did make the list longer and more complex. There were many similarities between the criteria developed for different groups, and a single list was compiled which is expected to function similarly to any taxon-specific one for almost all cases.

Inconsistencies among criteria within and between categories. Once the consolidation process was complete it became clear that there were still many potential inconsistencies between criteria within each of the categories. One of the major problems was to match area/habitat based criteria to population-based criteria. A slightly different approach was taken here, which involves the use of range area and geographical extent, instead of measures of habitat specificity, because of the insuperable difficulties in quantifying habitat type. This should present a workable system, although extensive validation (see below) will be required in setting appropriate values.

A second concern here was the criterion based solely on population decline rates. Clearly this can result in the listing of some very large, apparently secure populations, since there is no link to a minimum population size. However, it was felt that the rates of decline included here were significant enough that they should cause concern for almost all populations, and that linking this to population size would exclude the listing of many populations with limited census data.

The nature of the 'Susceptible' category. As at the workshop, the inclusion of the 'Susceptible' category was the subject of much debate. Because it represents a low extinction risk it was hard to develop good quantitative criteria for it, and the value of including it at all was discussed. It's main value is for highlighting taxa that are at risk simply because of their small range and susceptibility to human activities. Thus, these taxa are not immediately threatened, but they need identifying and listing in some way in order to highlight their potential extreme vulnerability. As a result, Susceptible was included as a non-quantitative category, which does not fall on a continuum with the other quantitative criteria and is only to be applied to taxa that do not qualify for the other, quantitative criteria.

Dealing with poor data. The criteria have been developed in the full awareness that the quantity of high quality population or distribution data is negligible for most species. It is hoped though that even small amounts of data can be used to evaluate taxa against the criteria. However, there comes a point at which the data quality/quantity is so poor that evaluation is not possible. In these cases the 'Insufficiently known' category may be applied, but this does not now indicate threatened status. If there were really so little information then it is probably unreasonable to expect a listing as 'threatened'.

Validation. All of the quantitative criteria in the draft criteria require validation, and as mentioned above, there is particular concern about the area-based criteria. The drafting group made a strong recommendation that before any general acceptance or application of new quantitative criteria they should be validated by at least the following methods: (a) testing against independently derived subjective criteria to see if some previously applied classes of endangerment are consistently under- or over- represented; (b) testing for objectivity, i.e. do different classifiers (experts, non-experts or whatever is appropriate) come up with the same categories for the same data?; (c) testing

against data on species' extinctions and, where validated, against population models; (d) testing to see if all groups of species can be successfully categorized using these draft criteria, and if not, what modifications might need to be made.

Please note that these are *draft* criteria. We realize that they need more work. In particular, *they need constructive suggestions and positive input from you, the reader of this article.* Our intention is to end up with a new system of IUCN categories that commands as wide a level of support as possible. This depends on your participation in this process at this stage. Your comments along the following lines would be most helpful:

- Please indicate how some of the species with which you are familiar would be categorized under this draft system, and which criteria you used to categorize them. To give some examples, you could say that the Imperial amazon is Critical (CR) under Criterion A, or the black rhinoceros is Endangered (EN) under Criteria B2a and D1.

- How do these new classifications differ from existing more subjective classifications (such as the current IUCN Categories of Threat)? Are the differences good or bad?

- Can you name any species that you feel is clearly threatened but which cannot be classified under this system? Please state why it is that these species cannot be classified, and what changes would be needed in the criteria so that they can be successfully classified.

Please send your comments on the draft new categories by June 30, 1993 to: Dr. Georgina Mace, Institute of Zoology, Zoological Society of London, Regent's Park, London, NW1 4RY, U.K. Fax: 71-586-2870.

Draft IUCN Categories of Threat for Species

Preamble

This document presents the consolidated definitions and criteria prepared by the drafting group from the taxonomically-based criteria that were developed by working groups for higher vertebrates, lower vertebrates, invertebrates and plants at the London meeting in November 1992. *Please note that these are draft criteria and validation is required before they are applied.* The following points present important information on the use and interpretation of the criteria and categories:

1. **Taxonomic level.** The criteria can be applied to any taxonomic unit at or below the species level, within any specified geographical or political area. The term 'taxa' as used below applies to any level. In presenting the results of applying the criteria, the unit and area under consideration should be made explicit. The categorization process should only be applied to wild populations of species inside their natural range.

2. **Implications of listing.** Extinction is seen as a probabilistic or chance process. Thus a listing in a higher category implies a higher expectation of extinction, and over the time frames under consideration more taxa listed here are expected to go extinct (without effective conservation action) than taxa listed in the lower risk categories. However, the fact that some taxa listed at high risk persist does not necessarily mean their initial assessment was inaccurate.

3. **Nature of the categories.** The categories of Critical, Endangered, and Vulnerable are nested. Thus all taxa listed as Critical qualify for Vulnerable and Endangered, and all listed as Endangered qualify for Vulnerable. The 'Susceptible' category is distinct from these in its emphasis, but implies a lower level of threat currently acting on the taxon. The categories of Critical, Endangered, Vulnerable, and Susceptible together are

described as 'threatened'.

4. **Data quantity and quality.** The criteria are clearly quantitative in nature. However, the absence of high quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasized to be sufficient throughout. One benefit of this process should be to increase the quantity and quality of population and distribution data available for many taxa, which are an essential component of conservation planning.

5. **Uncertainty.** The criteria shall be evaluated on the basis of the available evidence on taxon numbers, trend and distribution, making due allowance for statistical and other uncertainties. Therefore, where data are insufficient to determine with a high degree of confidence, whether or not the criteria for a category of threat are met, the category of higher threat shall be chosen. Where data are insufficient to assign a category, the category of 'Insufficiently known' may be used. This does not however indicate threatened status.

6. **Conservation actions in the listing process.** These criteria are to be applied to the present situation for the taxon in question, whether or not conservation actions are currently in place. Therefore, if past conservation action has been successful, a taxon may not be listed, even though it would be if that action were to cease. An important implication here is that a taxon may be deserving of conservation action even if it is not listed as threatened.

7. **Documentation.** All taxon lists including categorization resulting from these criteria should state the criteria that were operative in triggering the category. If more than one criterion, or sub-criterion were met, then each should be listed. However, failure to mention a criterion should not necessarily imply that the criterion was not met. Therefore, should a re-evaluation indicate that the documented criterion is no longer met, then down-listing should not automatically follow. Instead, the taxon should be re-evaluated with respect to all criteria to indicate its status.

8. **Threats and priorities.** The category of threat does not necessarily represent the priority for conservation action. The category of threat provides an assessment of the likelihood of extinction under current circumstances. In contrast, a system for assessing priorities for action will include numerous other factors, such as the likelihood that restorative action will be successful, political, economic and logistical considerations, and perhaps the taxonomic distinctiveness of the taxon in question.

9. **Re-evaluation.** Evaluation of taxa against these criteria should not be seen as a single event. As circumstances change, re-evaluation will be necessary, and listing of taxa and their categories should stress the taxa for which re-evaluation should occur within a short time frame, or under some specified circumstance. This is especially important for taxa listed under Safe/Low Risk, but which are close to qualifying as Vulnerable or Susceptible.

10. **Transition rules.** There are also some transition rules to govern the movement of taxa between categories. These are as follows: (a) A species may be moved from category of higher threat to a category of lower threat if none of the criteria of the higher category has applied for 5 years or more; (b) If subsequent investigation shows that the original classification is no longer appropriate as a result of new information or revision of information used in the initial listing, the species may be transferred to the appropriate category, or be removed from the categories altogether, without delay.

11. **Definitions.** Many terms in the criteria are defined in a specific way for the purposes of classification. These are presented below and must be consulted before applying the criteria.

Definitions

Continuing decline: A continuing decline is defined as a clear downward trend over a period appropriate to the taxon or its habitat. In the case of population estimates and changes in habitat a continuing decline will transcend normal fluctuations. Normal fluctuations are found in those species populations and habitats that are characterized by regular or irregular cycles in abundance or extent. Where evidence for a continued decline is presented an observed decline should be shown not to be part of a normal fluctuation.

Extreme fluctuations: Extreme fluctuations occur in a number of species where population size varies widely, rapidly and frequently. Extreme fluctuations are defined here as a variation of greater than an order of magnitude around the mean population size.

Geographic extent: Geographic extent is defined as the area encompassing the known, inferred or projected sites of occurrence of a taxon, excluding cases of vagrancy. This can often be measured by a minimum convex polygon.

Generation length: Generation length is defined as the average age of parents in the population.

Location: Location defines a geographically distinct group of individuals.

Mature individuals: The number of mature individuals is defined as the number of individuals known, estimated or inferred to be physiologically capable of reproduction. Where the population is characterized by normal or extreme fluctuations, the minimum number should be used.
(Note: This measure is intended to count individuals physiologically capable of reproduction and should therefore include, for example, plants which have lost their pollinators or animals which are behaviorally or otherwise reproductively suppressed. Reproducing units within a clone should be counted as individuals.)

Population: Population is defined as the total number of individuals of the taxon. For functional reasons, primarily due to differences between life-forms, population numbers are expressed as numbers of mature individuals only.

Quantitative analysis: A quantitative analysis is defined here as the technique of population viability analysis (PVA), or any other quantitative form of analysis, which estimates the extinction probability of a species or population based on the known life history and specified management or non-management options. In presenting the results of quantitative analyses the structural equations and the data should be explicit.

Range area: Range area is defined as the total area occupied by a taxon within its geographic extent excluding cases of vagrancy. The criteria state specific cutoff points in km2, but clearly this presents problems in scale of measurement. To avoid errors in classification, the range area should be measured on grid squares of an appropriate scale. For example, for a classification of Critical, the minimum grid size must be 10 km x 10 km or less.

Severely fragmented: Severely fragmented is defined as the case where increased extinction risks to the taxon result from the fact that most individuals within a taxon are found in small and relatively isolated sub-populations. This results in an increased probability that these small populations will go extinct, with a reduced probability of recolonization.

Sub-populations: Sub-populations are defined as groups of individuals in the population between which there is little exchange (typically 1 successful migrant individual or gamete per year).

The Categories

Extinct (EX)

A taxon is **Extinct** when there is no reasonable doubt that the last individual has died.

Extinct in the Wild (EW)

A taxon is **Extinct in the wild** when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) outside the historic range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

Critical (CR)

A taxon is **Critical** when it is facing an extremely high probability of extinction in the wild in the immediate future. A taxon is defined as Critical by *any of* the following criteria (A to E):

A. Population estimated to number less than 50 mature individuals.

B. Population estimated to number less than 250 mature individuals *and* to have *both of* the following characteristics:

   1. Population structure in the form of *either of* the following: (a) severely fragmented i.e. no sub-population is known or estimated to contain more than 50 mature individuals; (b) found only at a single location.

   2. Continuing decline, observed, inferred or projected, in *either of* the following: (a) number of mature individuals; (b) area, extent, and/or quality of habitat.

C. Geographic extent estimated to be less than 100 km^2 *or* range area estimated to be less than 10 km^2, *and* estimates indicating *any two of* the following:

   1. Severely fragmented *or* found only at a single location.

   2. Continuing decline, observed, inferred or projected, in *any of* the following: (a) geographic extent; (b) range area; (c) area, extent and/or quality of habitat; (d) number of locations; (e) number of mature individuals.

   3. Extreme fluctuations in *any of* the following: (a) geographic extent; (b) range area; (c) number of locations.

D. Decline in population in the form of *either of* the following:

   1. An observed precipitous and continuing decline in the number of mature individuals (typically more than 25% per year over 5 years).

   2. A continuing decline as specified in D1 inferred or projected from *any of* the following: (a) a decline in area, extent and/or quality of habitat; (b) levels of exploitation; (c) the effects of introduced species, pathogens, competitors, or parasites.

E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 5 years or 2 generations, whichever is the longer.

Endangered (EN)

A taxon is **Endangered** when it is not Critical but is facing a very high probability of extinction in the wild in the near future. A taxon is defined as Endangered by *any of* the following criteria (A

to E):

A. Population estimated to number less than 250 mature individuals.

B. Population estimated to number less than 2,500 mature individuals *and* to have *both of* the following characteristics.

1. Population structure in the form of *either of* the following: (a) severely fragmented i.e. no sub-population is known or estimated to contain more than 250 mature individuals; (b) found only at a single location.

2. Continuing decline, observed, inferred or projected, in *either of* the following: (a) number of mature individuals; (b) area, extent, and/or quality of habitat.

C. Geographic extent estimated to be less than 5,000 km^2 *or* range area estimated to be less than 500 km^2, *and* estimates indicating *any two of* the following:

1. Severely fragmented *or* found only at no more than two locations.

2. Continuing decline, inferred, observed or projected, in *any of* the following: (a) geographic extent; (b) range area; (c) area, extent, and/or quality of habitat; (d) number of locations; (e) number of mature individuals.

3. Extreme fluctuations in *any of* the following: (a) geographic extent; (b) range area; (c) number of locations.

D. Decline in population in the form of *either of* the following:

1. An observed marked and continuing decline in the number of mature individuals (typically more than 50% in total within 5 years or 2 generations, whichever is the longer).

2. A continuing decline as specified in D1 inferred or projected from *any of* the following: (a) a decline in area, extent and/or quality of habitat; (b) levels of exploitation; (c) the effects of introduced species, pathogens, competitors, or parasites.

E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or 5 generations, whichever is the longer.

Vulnerable (VU)

A taxon is **Vulnerable** when it is not Critical or Endangered but is facing a high probability of extinction in the wild in the medium-term future. The taxon is defined as Vulnerable by *any of* the following criteria (A to E):

A. Population estimated to number less than 1,000 mature individuals.

B. Population estimated to number less than 10,000 mature individuals *and* to have *both of* the following characteristics.

1. Population structure in the form of *either of* the following: (a) severely fragmented i.e. no sub-population is known or estimated to contain more than 1,000 mature individuals; (b) found only at a single location.

2. Continuing decline, observed, inferred or projected, in *either of* the following: (a) number of mature individuals; (b) area, extent, and/or quality of habitat.

C. Geographic extent estimated to be less than 20,000 km^2 or range area estimated to be less than 2,000 km^2, and estimates indicating *any two of* the following:

1. Severely fragmented *or* found at no more than five locations.

2. Continuing decline, inferred, observed or projected, in *any of* the following: (a) geographic extent; (b) range area; (c) area, extent, and/or quality of habitat; (d) number of locations; (e) number of mature individuals.

3. Extreme fluctuations in *any of* the following: (a) geographic extent; (b) range area; (c) number of locations.

D. Decline in population in the form of *either of* the following:

1. An observed continuing decline in the number of mature individuals (typically more than a 50% in total within 10 years or 3 generations, whichever is the longer).

2. A continuing decline as specified in D1 inferred or projected from *any of* the following: (a) a decline in area, extent and/or quality of habitat; (b) levels of exploitation; (c) the effects of introduced species, pathogens, competitors, or parasites.

E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 50 years or 10 generations, whichever is the longer.

Susceptible (SU)

A taxon is **Susceptible** when it does not qualify for any of the quantitative categories above, but is of concern because its range area is restricted (typically less than 100 km^2), and/or it is found at few locations, which render it prone to the effects of human activities.

Safe/Low Risk (S/LR)

A taxon is **Safe/Low Risk** when it has been evaluated, and found not to qualify for any of the threatened categories listed above. It may still be subject to levels of extinction risk well above historical levels. When listing a taxon in this category, consideration should be given to stating a time, or a set of circumstances, under which re-evaluation is recommended. This should help to identify the taxa listed here that are most at risk.

Insufficiently Known (IK)

A taxon is **Insufficiently Known** when an evaluation of its Red List category has been attempted, but available data are inadequate to assign a category.

Not Evaluated (NE)

A taxon is **Not Evaluated** when it is not yet evaluated with respect to its Red List category.

ANNEX 3: Criteria for listing species and habitats in wildlife treaties and agreements relevant to Europe

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Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)

The Bern Convention places its heaviest emphasis on the protection of habitats, especially habitats of species in the Appendices and endangered habitats.

The original Bern Convention listed only 119 threatened species of higher plants, which at the time were the most acutely threatened with extinction.

The revision in 1991 added plants which are at the greatest risk of extinction i.e. endangered plants. Also plant species were added to the appendix which if conservation measures were applied would also conserve habitats of conservation importance and sites where other endemic and threatened plants are found. Other additions were species which were not quite in the categories "Endangered" or "Vulnerable" but were rapidly declining due to over-collection were added to the appendix. They needed to be protected to check their progression towards the "E" and "V" status.

Flora Europaea has been used throughout as the major taxonomic reference point for plants.

The following is an extract from *The Berne Convention Revision of Appendix I flora* prepared in August 1990 by the Threatened Plants Unit of WCMC.

Criteria

1. All higher plant taxa "Endangered" (*sensu* IUCN Red Data Book categories) within Europe, excluding those that are widespread outside and which only marginally extend into Europe.

Justification: These continue to be the taxa closest to extinction in Europe and they therefore remain top priorities for conservation in the region. (Macaronesia is treated separately under criterion 4.)

2. A selection of higher plant taxa which are "Vulnerable" within Europe, excluding those that are widespread outside and which only marginally extend into Europe.
Justification: To include all "Vulnerable" taxa would make the Appendix unworkable because of its length. A selection, therefore, of 'Vulnerable' taxa will be made on the basis of one or more of the following sub-criteria:

i) Endemic to Europe or significant proportion of world population present in Europe; ii) Occurrence in a threatened habitat type(s); iii) Genetic resource value, e.g. wild crop relatives and taxa of medicinal, scientific or other useful value/potential; iv) High conservation profile, to raise profile of the Appendix as a whole (e.g. insectivorous taxa, orchids); v) Occurrence in a site(s) of plant endemism and/or diversity (e.g. plants from the Sierra Nevada in Spain).

3.A small number of additional higher plant taxa which require complete prohibition of exploitation.

Justification: To conserve those plants suffering from exploitation, commercial or otherwise, e.g. taxa of Turkish *Cyclamen* or Portuguese *Narcissus*. Although the taxa concerned may still be quite widespread in the wild, steps to conserve them need to be taken now, to prevent them becoming "Vulnerable" or "Endangered". This criterion therefore allows the inclusion of certain horticulturally popular plant groups, especially alpines and orchids.

4. A selection of Plants of Macaronesia

Justification: Because of the very high numbers of taxa (over 200) that would qualify for the Appendix if these criteria were adopted en bloc for the threatened plants of Macaronesia, it is proposed that Macaronesia is treated separately- This will be done by applying more rigorously the

present criteria. Essentially, all Macaronesian threatened taxa (i.e. not only those "Vulnerable") will be selected using the sub-criteria i-v of Criteria 2, in addition to criteria 3, 5, 6 and 7.

5. "Extinct" higher plant taxa.

Justification: If these taxa re-appear in the wild then some provision should be available to protect them because it is highly probable that their populations will be extremely small and very vulnerable. Since the number of known Extinct taxa across Europe is very small, less then 20, the Appendix should include them as far as possible.

6. Selected higher plant groups demonstrating reproductive anomalies will, in general, be excluded.

Justification: Certain groups which are notoriously difficult to work with taxonomically (e.g. *Rubus*, *Taraxacum*, *Hieracium*), are just as difficult for the conservationist. It is therefore proposed that such groups are excluded, in general, from the revised Appendix because of the difficulties with their identification.

7.A small selection of threatened lower plants.

Justification: Lower plants (mosses, lichens, algae, fungi) have tended to be badly neglected by conservationists, probably due to limited knowledge about their conservation status. Documentation, however, is increasing both about their wild populations and their conservation requirements.
A small selection of them, therefore, is proposed for inclusion in the Appendix to represent their conservation needs at an international level.

The IUCN Red Data Book Categories

The Red Data Book categories are used by the World Conservation Monitoring Centre (WCMC) and the Species Survival Commission (SSC) of IUCN - the World Conservation Union to indicate the degree of threat to individual taxa in their wild habitats. They are used for both plants and animals. Currently, over 30,000 taxa of plants have been coded with other than "?" at the world level.

Below are the formal definitions of the categories. Note: There is a degree of subjectivity to the application of these categories, a subjectivity that will be diminished by a thorough understanding of and a strict adherence to these definitions.

Extinct (Ex)
Taxa that are no longer known to exist in the wild after *repeated* searches of the type localities and other known or likely places.

Endangered (E)
Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Vulnerable (V)
Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Included are taxa of which most or all the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from serious adverse factors throughout their range.

Rare (R)
Taxa with small world populations that are not at present Endangered or Vulnerable but are at risk. These taxa are usually localised within restricted geographic areas or habitats or are thinly scattered over a more extensive range.

Indeterminate (I)
Taxa known to be Extinct, Endangered, Vulnerable, or Rare but where there is not

enough information to say which of the four categories is appropriate.

Insufficiently Known (K)
Taxa that are *suspected* but not definitely known to belong to any of the above categories because of the lack of information.

Out of Danger (O)
Taxa formerly included in one of the above categories. but are now considered relatively secure because effective conservation measures have been taken. or because the previous threat to their survival has been removed.

Not threatened (nt) Taxa that are not in any of the above categories.
No information (?) Taxa for which there is no information.

In addition to the categories listed above, occasionally "hybrid" categories such as E/Ex are used.

Economic Commission for Europe, *'European Red List or Globally Threatened Animals and Plants'* United Nations, 1991
'Recommendations to ECE Governments on the application of the European Red List

Conscious of the need to achieve the aim of conserving the common European heritage of wildlife, particularly globally threatened animal and plant species, and promoting therefore the implementation of the ECE *Declaration on conservation of Flora , Fauna and their Habitats*, the Economic Commission for Europe recommends that ECE Governments:

1. Take account of the European Red List when formulating, adopting, and implementing priorities in conservation policies and strategies, both at national and international levels;

2. Implement appropriate protective measures for species included in the European Red List which are threatened within their territory. For those species which may not currently be threatened in a particular country, populations should at least be monitored so that conservation measures may ne introduced as soon as necessary;

3. Update or undertake the preparation of comprehensive national Red Data Books using the internationally accepted IUCN status categories. Entries for species appearing in the European Red list, for which a country has a particular international responsibility, should be annotated appropriately. Particular attention should be paid to the increasing volume of information relevant to the conservation of lower orders of invertebrates (e.g. reptiles, amphibians and fish), invertebrate animals and plants;

4. Strengthen national programmes for surveying and monitoring flora, fauna and their habitats with particular emphasis on species included in the European Red List, and maintain national data bases of species status and other environmental parameters, as impacts on wildlife may provide early warning of deleterious environmental changes;

5. Identify, protect and provide for the effective management of important habitats for threatened species;

6. Collaborate to reintroduce threatened species, where appropriate, from member countries in which the species population is stable and closely related genetically to countries where the species has become extinct, provided that the causal factors for the species' extinction are known and no longer operate and that sufficient suitable habitat is available to ensure the long-term survival of a viable population.

7. Consider the possibilities offered by direct manipulative methods, such as artificial propagation, captive breeding, restocking and translocation, so as to enhance populations of threatened flora and fauna bearing in mind the consequences from ecological and genetic viewpoints, and that such measures may bring about;

8. Strengthen cooperation so as to secure the conservation of globally threatened species in Europe. For this purpose, ECE Governments should, *inter alia:*

a) Broaden participation in existing international wildlife conservation conventions bearing in mind that many species on the European Red List are included in annexes or appendices to such conventions;

b) Promote the development of joint research programmes concerning threatened plants and animals, including migratory species, and sharing nature conservation experience particularly with regard to approaches to the monitoring programmes and exchange of information on population trends, especially those of threatened species;

c) Ensure that relevant up-to-date species status and trend data are sent to international databases, such as those of the UNEP/IUCN/WWF World Conservation Monitoring Centre, ICBP and the International Waterfowl and Wetlands Research Bureau (IWRB), as well as to relevant international scientific societies and associations involved in nature conservation.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

This is taken from W. Wijnstekers (1992), *The Evolution of CITES - A reference to the Convention on International Trade in Endangered Species of Wild Fauna and Flora,* Third Edition.

1. Appendix I shall include:

all species threatened with extinction which are or may be affected by trade. Trade in specimens of these species must be subject to particularly strict regulation in order not to endanger further their survival and must only be authorized in exceptional circumstances.

2. Appendix II shall include:

(a) all species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival; and (b) other species which must be subject to regulation in order that trade in specimens of certain species.

The criteria are known as the Bern criteria.

It was decided that in determining the appropriate Appendix into which a species or other taxon should be placed, the biological and trade status of the taxon should be evaluated together.

Appendix I criteria with regard to the biological status:

To qualify for Appendix I, a species must be currently threatened with extinction. Information of any of the following types should be required, in order of preference:

a) scientific reports on the population size or geographic range of the species over a number of years,
b) scientific reports on the population size or geographic range of the species based on single surveys,
c) reports by reliable observers other than scientists on the population size or geographic range of the species over a number of years,
d) reports from various sources on habitat destruction, heavy trade or other potential causes of extinction.

Genera should be listed if most of their species are threatened with extinction and if identification of individual species within the genus is difficult. The same should apply to the listing of any smaller taxa within larger ones. If most of the smaller taxa are not threatened, but identification of individual species is difficult, the entire larger taxon should be placed on Appendix II.
Taxa listed in Appendix I because of difficulty in separating them from endangered forms within the same taxa, should be annotated as such in the Appendix.

Appendix I criteria with regard to the trade status: Species meeting the biological criteria should be listed in Appendix I if they are or may be affected by international trade. This should include any species that might be expected to be traded for any purpose, scientific or otherwise. Particular attention should be given to any species for which such trade might, over a period of time, involve numbers of specimens constituting a significant portion of the total population size necessary for the continued survival of the species.

The biological status and the trade status of a species are obviously related. When biological data show a species to be declining seriously, there need be only a probability of trade. When trade is known to occur, information on the biological status need not be as complete. This principle especially applies to groups of related species, where trade can readily shift from one species that is well-known to another for which there is little biological information.

Appendix II criteria with regard to the biological status:

To qualify for Appendix II, species need not currently be threatened with extinction, but there should be some indication that they might become so. Such an indication might be a decreasing or very limited population size or geographic range of distribution. Information on the biological status should be one of the types required for Appendix I species. Genera should be listed if some of their species are threatened and identification of individual species within the genus is difficult. The same should apply to listing any smaller taxa within larger ones.
Appendix II criteria with regard to the trade status: Species meeting the biological criteria should be listed if they presently are subject to trade or are likely to become subject to trade. The latter situation can arise where heavy trade in one species is extended to include similar species if demand grows or if supplies of the one species are depleted.

The amount of trade that a species can sustain without threat of extinction generally will be greater for species in Appendix II than for those in Appendix I, so there should be evidence of actual or expected trade in such a volume as to constitute a potential threat to the survival of the species. Appendix II serves in part as a monitoring tool to gather such trade data.

a) that the criteria be interpreted as applying where the population of a species in the wild is known to be so low that, if it were to be exploited in any way, it may be exterminated before effective steps could be taken to save it; and

b) that, however, if the addition of a species to Appendix I would draw public attention to its rarity, this be also taken into consideration.

Also known as the 'Berne criteria' are the criteria laid down for the deletion of species and other taxa from Appendices I and II.

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).

Criteria:

'g) *species of Community interest* means species which, within the territory referred to in Article 2, are:

i) endangered, except those species whose natural range is marginal in that territory and which are not endangered or vulnerable in the western palaearctic region; or

ii) vulnerable, i.e. believed likely to move into the endangered category in the near future if the causal factors continue operating; or

iii) rare, i.e. with small populations that are not at present endangered or vulnerable, but are at risk. The species are located within restricted geographical areas or are thinly scattered over a more extensive range; or

iv) endemic and requiring particular attention by reason of the specific nature of their

habitat and/or the potential impact of their exploitation on their conservation status.

Such status are listed or may be listed in Annex II and/or Annex IV or V;

h) *priority species* means species referred to in (g)(i) for the conservation of which the Community has particular responsibility in view of the proportion of their natural range which falls within the territory referred to in Article 2; these priority species are indicated by an asterisk (*) in Annex II;'

Convention on the Conservation of Migratory Species of Wild Animals (CMS)(as amended by the Conference of the Parties in 1985, 1988 and 1991) (Bonn Convention).

'Article IV Migratory Species to be the Subject of Agreements: Appendix II

1.Appendix II shall list migratory species which have an un-favourable conservation status and which require international agreements for their conservation and management, as well as those which have a conservation status which would significantly benefit from the international co-operation that could be achieved by an international agreement.

2. If the circumstances so warrant, a migratory species may be listed both in Appendix I and Appendix II.

3. Parties that are Range States of migratory species listed in Appendix II shall endeavour to conclude AGREEMENTS where these would benefit the species and should give priority to those species in an unfavourable conservation status.

4. Parties are encouraged to take action with a view to concluding agreements for any population ir any geographically separate part of the population of any species or lower taxon of wild animals, members of which periodically cross one or more national jurisdiction boundaries.

5. The Secretariat shall be provided with a copy of each AGREEMENT concluded pursuant to the provisions of this Article.'

ANNEX 4: EU CORINE Biotope checklists and proposed extension for the PHARE Countries (Version 1 of February 1994)

ANNEX 4: EU CORINE Biotope checklists and proposed extension for the PHARE Countries (Version 1 of February 1994)

Note + denotes those additional proposed species for the PHARE extension countries only

F CHECK-LIST OF THREATENED MAMMALS

ORDER
FAMILY
Genus species

INSECTIVORA
TALPIDAE
Galemys pyrenaicus

SORICIDAE
Sorex caecutiens +
Neromys anomalus +
Neomys fodiens +

CHIROPTERA
RHINOLOPHIDAE
Rhinolophus ferrumequinum
Rhinolophus hipposideros
Rhinolophus euryale
Rhinolophus blasii
Rhinolophus mehelyi

VESPERTILIONIDAE
Myotis daubentonii
Myotis nathalinae
Myotis capaccinii
Myotis dasycneme
Myotis mystacinus
Myotis brandtii
Myotis emarginatus
Myotis nattereri
Myotis bechsteinii
Myotis myotis
Myotis blythi
Plecotus auritus
Plecotus austriacus
Miniopterus schreibersii
Barbastella barbastellus
Pipistrellus nathusii
Pipistrellus kuhli
Pipistrellus savii
Eptesicus serotinus
Eptesicus nilssoni
Eptesicus murinus
Nyctalus noctula
Nyctalus lasiopterus
Nyctalus leisleri
Vespertilio murinus +

MOLOSSIDAE
Tadarida teniotis

RODENTIA
SCIURIDAE
Sciurus anomalus
Castor fiber
Spermophilus suslicus +

CASTORIDAE
Castor fiber

CRICETIDAE
Cricetus cricetus
Microtus oeconomus
Microtus tatricus +

ZAPODIDAE
Sicista betulina

HYSTRICIDAE
Hystrix cristata

MURIDAE
Cricetulus migratorius +
Mesocricetus newtoni +
Spalax graecus +
Spalax microphthalmus +
Nannospalax leucodon +
(= Spalax leucodon)
Pitymys tatricus +

GLIRIDAE
Muscardinus avellanarius +
Dryomys nitedula +
Myomimus roachi +

CETACEA
BALAENOPTERIDAE
Sibbaldus musculus
Megaptera novaeengliae

BALAENIDAE
Eubalaena glacialis
Balaena mysticetus

DELPHINIDAE
Delphinus delphis
Tursiops truncatus

PHOCAENIDAE
Phocaena phocaena

CARNIVORA
CANIDAE
Canis lupus
Canis aureus +

URSIDAE
Ursus arctos

MUSTELIDAE
Mustela lutreola
Lutra lutra
*Vormela peregusna**

VIVERRIDAE
Genetta genetta

FELIDAE
Lynx lynx
Lynx pardina
Felis sylvestris

PINNIPEDIA
PHOCIDAE
Monachus monachus
Phoca vitulina
Halichoerus grypus

ARTIODACTYLA
CERVIDAE
Cervus elaphus corsicanus

BOVIDAE
Capra pyrenaica
Capra aegragus
Rupicapra rupicapra
(ssp. ornata, cartusiana, balcanica)
Ovis ammon

** addition to list proposed by Mr Hallmann*

G CHECK-LIST OF THREATENED BIRDS

ORDER
FAMILY
Genus species

GAVIIFORMES
GAVIIDAE
Gavia stellata
Gavia arctica
Gavia immer

PODICIPEDIFORMES
PODICIPEDIDAE
Podiceps auritus

PROCELLARIIFORMES
PROCELLARIIDAE
Pterodroma (mollis) madeira
Pterodroma (mollis) feae
Bulweria bulwerii
Calonectris diomedea
Puffinus puffinus mauretanicus
Puffinus assimilis

HYDROBATIDAE
Pelagodroma marina
Hydrobates pelagicus
Oceanodroma leucorhoa
Oceanodroma castro

PELECANIFORMES
PELECANIDAE
Pelecanus onocrotalus
Pelecanus crispus

PHALACROCORACIDAE
Phalacrocorax carbo sinensis
Phalacrocorax (aristotelis) desmarestii
Phalacrocorax pygmeus

CICONIIFORMES
ARDEIDAE
Botaurus stellaris
Ixobrychus minutus
Nycticorax nycticorax
Ardeola ralloides
Egretta garzetta
Egretta alba
Ardea purpurea

CICONIIDAE
Ciconia nigra
Ciconia ciconia

THRESKIORNITHIDAE
Plegadis falcinellus
Platalea leucorodia

PHOENICOPTERIDAE
Phoenicopterus ruber

ANSERIFORMES
ANATIDAE
Cygnus (columbianus) bewickii
Cygnus cygnus
Anser (albifrons) flavirostris
Anser erythropus
Branta leucopsis
Branta ruficollis
Tadorna ferruginea
Marmaronetta angustirostris
Aythya nyroca
Oxyura leucocephala

FALCONIFORMES
PANDIONIDAE
Pandion haliaetus

ACCIPITRIDAE
Pernis apivorus
Elanus caeruleus
Milvus migrans
Milvus milvus
Haliaeetus albicilla
Gypaetus barbatus
Neophron percnopterus
Gyps fulvus
Aegypius monachus
Circaetus gallicus
Circus aeruginosus
Circus cyaneus
Circus macrourus
Circus pygargus
Accipiter gentilis arrigonii
Accipiter nisus granti
Accipiter brevipes
Buteo buteo insularum
Buteo buteo rothschildii
Buteo rufinus
Aquila pomarina
Aquila clanga

Aquila heliaca
Aquila chrysaetos
Hieraaetus pennatus
Hieraaetus fasciatus

FALCONIDAE
Falco tinnunculus dacotiae
Falco naumanni
Falco columbarius
Falco eleonorae
Falco biarmicus
Falco peregrinus
Falco pelegrinoides
*Falco cherrug**

GALLIFORMES
TETRAONIDAE
Bonasa bonasia
Lagopus mutus pyrenaicus
Lagopus mutus helveticus
Tetrao tetrix tetrix
Tetrao urogallus

PHASIANIDAE
Alectoris graeca saxatilis
Alectoris graeca whitakeri
Alectoris barbara
Perdix perdix italica
Coturnix coturnix confusa
Coturnix coturnix conturbans

GRUIFORMES
TURNICIDAE
Turnix sylvatica

GRUIDAE
Grus grus

RALLIDAE
Porzana porzana
Porzana parva
Porzana pusilla
Crex crex
Fulica cristata
Porphyrio porphyrio

OTIDIDAE
Tetrax tetrax
Chlamydotis undulata
Otis tarda

CHARADRIIFORMES
HAEMATOPODIDAE
Haematopus moquini meadewaldoi

RECURVIROSTRIDAE
Himantopus himantopus
Recurvirostra avosetta

BURHINIDAE
Burhinus oedicnemus

GLAREOLIDAE
Cursorius cursor
Glareola pratincola

CHARADRIIDAE
Charadrius morinellus
Pluvialis apricaria
Hoplopterus spinosus

SCOLOPACIDAE
Philomachus pugnax
Gallinago media
Numenius tenuirostris
Tringa glareola
Phalaropus lobatus

LARIDAE
Larus melanocephalus
Larus genei
Larus audouinii
Gelochelidon nilotica
Sterna caspia
Sterna sandvicensis
Sterna dougallii
Sterna hirundo
Sterna paradisaea
Sterna albifrons
Chlidonias hybridus
Chlidonias niger
*Chlidonias leucopterus**

ALCIDAE
Uria aalge ibericus

COLUMBIFORMES
PTEROCLIDAE
Pterocles orientalis
Pterocles alchata

COLUMBIDAE
Columba palumbus azorica
Columba trocaz
Columba bollii
Columba junoniae

CUCULIFORMES
CUCULIDAE
*Clamator glandarius**

STRIGIFORMES
STRIGIDAE
Bubo bubo
Nyctea scandiaca
Glaucidium passerinum
Asio flammeus
Aegolius funereus

CAPRIMULGIFORMES
CAPRIMULGIDAE
Caprimulgus europaeus

CORACIIFORMES
ALCEDINIDAE
Alcedo atthis

CORACIIDAE
Coracias garrulus

PICIFORMES
PICIDAE
Picus canus
Dryocopus martius
Dendrocopos major canariensis
Dendrocopos major thanneri
Dendrocopos medius
Dendrocopos leucotos
Dendrocopos syriacus
Picoides tridactylus

PASSERIFORMES
ALAUDIDAE
Chersophilus duponti
Melanocorypha calandra
Calandrella brachydactyla
Calandrella rufescens
Galerida theklae
Lullula arborea

MOTACILLIDAE
Anthus campestris

LANIIDAE
Lanius collurio
Lanius minor
*Lanius nubicus**

TROGLODYTIDAE
Troglodytes troglodytes fridariensis

TURDIDAE
Cercotrichas galactotes
Luscinia svecica
Saxicola dacotiae
Oenanthe leucura

SYLVIIDAE
Acrocephalus melanopogon
Acrocephalus paludicola
Hippolais olivetorum
Sylvia sarda
Sylvia undata
Sylvia rueppelli
Sylvia nisoria
Sylvia conspicillata bella
Phylloscopus collybita exsul
Regulus teneriffae

MUSCICAPIDAE
Ficedula parva
Ficedula semitorquata
Ficedula albicollis

SITTIDAE
Sitta krueperi
Sitta whiteheadi

EMBERIZIDAE
Emberiza cineracea
Emberiza hortulana
Emberiza caesia

FRINGILLIDAE
Fringilla coelebs ombriosa
Fringilla teydea
Loxia scotica
Bucanetes githagineus
Pyrrhula murina
Carduelis cannabina nana

CORVIDAE
Pyrrhocorax pyrrhocorax

* *addition proposed by Mr Hallmann*

H CHECK-LIST OF THREATENED AMPHIBIANS AND REPTILES

ORDER
FAMILY
Genus species

AMPHIBIA

CAUDATA
SALAMANDRIDAE
Mertensiella (Salamandra) luschani
Salamandrina terdigitata
Chioglossa lusitanica
Triturus cristatus
Triturus italicus
Triturus montandoni +

PLETHODONTIDAE
Hydromantes genei
Hydromantes italicus

PROTEIDAE
Proteus anguinus

SALIENTIA
DISCOGLOSSIDAE
Bombina variegata
Bombina bombina
Discoglossus pictus
Discoglossus sardus
Alytes obstetricans
Alytes cisternasii
Alytes muletensis

PELOBATIDAE
Pelobates cultripes
Pelobates fuscus
Pelobates syriacus
Pelodytes punctatus

BUFONIDAE
Bufo calamita
Bufo viridis

HYLIDAE
Hyla arborea

RANIDAE
Rana arvalis
Rana dalmatina
Rana latastei

REPTILIA

TESTUDINES
TESTUDINIDAE
Testudo hermanni
Testudo graeca
Testudo marginata

EMYDIDAE
Emys orbicularis
Mauremys caspica

DERMOCHELYIDAE
Dermochelys coriacea

CHELONIIDAE
Caretta caretta
Lepidochelys kempii
*Chelonia mydas**
*Eretmochelys imbricata**

SQUAMATA (SAURIA)
GEKKONIDAE
Phyllodactylus europaeus
Cyrtodactylus kotschyi

AGAMIDAE
Agama stellio

CHAMAELEONTIDAE
Chamaeleo chamaeleon

LACERTIDAE
Algyroides marchi
Algyroides fitzingeri
Lacerta lepida
Lacerta viridis
Lacerta agilis
Lacerta monticola
Lacerta horvathi
Gallotia simonyi
Gallotia atlantica
Podarcis sicula
Podarcis melisellensis
Podarcis lilfordi
Podarcis muralis
Eremias arguta +

SCINCIDAE
Ablepharus kitaibelii

AMPHISBAENIDAE
Blanus cinereus

SQUAMATA (SERPENTES)
COLUBRIDAE
Coluber hippocrepis
Coluber rubriceps +
Elaphe situla
Elaphe quatuorlineata
Elaphe longissima
Natrix tessellata
Natrix natrix cetti
Coronella austriaca
Macroprotodon cucullatus

VIPERIDAE
Vipera ursinii
(including rakosiensis +)
Vipera berus
Vipera aspis
Vipera xanthina
Vipera lebetina
*Vipera ammodytes**
*Vipera latastei**

BOIDAE
Eryx jaculus +

* *addition proposed by the Council of Europe*

I CHECK-LIST OF THREATENED FISH

ORDER
FAMILY
Genus species

CYCLOSTOMATA

HYPEROARTIA
PETROMYZONIDAE
Eudontomyzon (mariae) vladykovi
Eudontomyzon mariae +
Eudontomyzon danfordi +
Eudontomyzon gracilis +
Lampetra fluviatilis
Petromyzon marinus

PISCES: PALAEOPTERYGII

CHONDROSTEI
ACIPENSERIDAE
Acipenser sturio
Acipenser naccarii
Acipenser güldenstaedti +
Acipenser nudiventris +
Acipenser ruthenus +
Acipenser stellatus +

PISCES: NEOPTERYGII (TELEOSTEI)

ISOSPONDYLI
CLUPEIDAE
Alosa alosa
Alosa fallax
Clupeonella cultriventris +
(= C. delicatula)

SALMONIDAE
Salmo salar
Salmo trutta (native populations)
Hucho hucho
Salvelinus alpinus

COREGONIDAE
Coregonus albula
Coregonus autumnalis
Coregonus lavaretus
Coregonus nasus
Coregonus oxyrhynchus
Coregonus peled
Coregonus pidschian

THYMALLIDAE
Thymallus thymallus

UMBRIDAE
Umbra krameri +

OSTARIOPHYSI
CYPRINIDAE
Abramis ballerus
Abramis sapa
Alburnoides bipunctatus
Aspius aspius
Chalcalburnus chalcoides
Cyprinus carpio (native populations)
Gobio uranoscopus
Rutilus frisii
Barbus peloponensis
Leuciscus idus
Leuciscus souffia
Pararhodeus ghigii
Rhodeus sericeus
Rutilus pigus
Rutilus frisii
Leucaspius delineatus +
Phoxinus percnurus +
(=Moroco percnurus)
Pelecus cultratus +
Gobio albipinnatus +
Gobio kessleri +

COBITIDAE
Misgurnus fossilis

Cobitis aurata +
Cobitis elongata +
Cobitis romanica +
Nemacheilus angorae +

SILURIDAE
Siluris glanis

MICROCYPRINI
CYPRINODONTIDAE
Aphanius iberus
Valencia hispanica

ANACANTHINI
GADIDAE
Lota lota

PERCOMORPHI

BLENNIIDAE
Blennius fluviatilis

PERCIDAE
Gymnocephalus schraetzer
Zingel zingel
Zingel asper
Zingel streber
Percarina demidoffi +
Gymnocephalus baloni +
Romanichthys valsanicola +
Stizostedion marinum +
Stizostedion volgense +

GOBIIDAE
Benthophiloides brauneri +
Benthophilus stellatus +
Pomatoshistus caucasicus +
(= Knipowitschia caucasicus)
Pomatoshistus longecaudatus +
(= Knipowitschia longicaudata)
Gobius kessleri +
(= Neogobius kessleri)
Gobius syrman +
(= Neogobius syrman)
Proterorhinus marmoratus +

J CHECK-LIST OF THREATENED INVERTEBRATES

PHYLUM
CLASS
ORDER
FAMILY
Genus species

CNIDARIA
HEXACORALLIA

ACTINARIA
EDWARDSIIDAE
Nematostella vectensis

MOLLUSCA
GASTROPODA

ARCHAEOGASTROPODA
NERITIDAE
Theodoxus transversalis +

MESOGASTROPODA
VIVIPARIDAE
Viviparus acerosus +

HYDROBIIDAE
Belgrandiella komenskyi +
Paladilhia hngarica +
Sadleriana pannonica +

MELANOPSIDAE
Fagotia esperi +

BASOMMATOPHORA
LYMNAEIDAE
Myxas glutinosa

PLANORBIDAE
Segmentina nitida

STYLOMMATOPHORA

SUCCINEIDAE
Catinella arenaria
Oxyloma sarsii

VERTIGINIDAE
Vertigo angustior
Vertigo geyeri
Vertigo genesii
Vertigo moulinsiana

PUPILLIDAE
Leiostyla abbreviata
Leiostyla cassida
Leiostyla corneocostata
Leiostyla gibba
Leiostyla lamellosa

ENDODONTIDAE
Discus guerinianus
Discus defloratus

ARIONIDAE
Geomalacus maculosus
Arion vejdorskyi +

CLAUSILIIDAE
Balea perversa

HELICIDAE
Helix pomatia
Helix subplicata
Elona quimperiana
Caseolus calculus
Caseolus commixta
Caseolus sphaerula
Discula leacockiana
Discula tabellata
Discula testudinalis
Discula turricula
Geomitra moniziana
Chilostoma cingulellum +
Chilostoma rossmaessleri +

COCHLICOPIDAE
Cochlicopa nitens +

VALLONIIDAE
Spelaeodiscus tatricus +
Vallonia declivis +
Vallonia enniensis +

LIMACIDAE
Deroceras fatrense +

BIVALVIA

EULAMELLIBRANCHIA
MARGARITIFERIDAE
Margaritifera margaritifera
Margaritifera auricularia

UNIONIIDAE
Pseudanodonta complanata +
Unio crassus +

ANNELIDA
HIRUDINEA

GNATHOBDELLAE
HIRUDINIDAE
Hirudo medicinalis

ARTHROPODA
INSECTA

ODONATA
COENAGRIIDAE
Coenagrion armatum
Coenagrion caerulescens
Coenagrion hastulatum
Coenagrion hylas
Coenagrion lunulatum
Coenagrion mercuriale
Coenagrion ornatum
Coenagrion scitulum
Nehalennia speciosa
Ischnura genei
Cenagrion tenellum

LESTIDAE
Sympecma fusca
Sympecma braueri
Lestes dryas

CORDULEGASTERIDAE
Cordulegaster bidentatus
Cordulegaster boltonii
Cordulegaster heros

GOMPHIDAE
Gomphus flavipes
Gomphus graslini
Gomphus simillimus
Gomphus vulgatissimus
Ophiogomphus cecilia
Onychogomphus costae
Onychogomphus forcipatus
Onychogomphus uncatus
Lindenia tetraphylla

AESHNIDAE
Boyeria irene
Aeshna caerulea
Aeshna subarctica
Aeshna viridis
Anaciaeschna isosceles
Brachytron pratense +

CORDULIIDAE
Oxygastra curtisii
Somatochlora arctica
Somatochlora flavomaculata
Epitheca bimaculata
Macromia splendens

LIBELLULIDAE
Sympetrum depressiusculum
Sympetrum nigrifemur
Leucorrhinia albifrons
Leucorrhinia caudalis
Leucorrhinia dubia
Leucorrhinia pectoralis
Leucorrhinia rubicunda

ORTHOPTERA
TETTIGONIIDAE
Saga pedo
Baetica ustulata
Gampsocleis glabra +

ACRIDIDAE
Odontopodisma rubripes +

DICTYOPTERA
BLATTIDAE
Apteromantis aptera

MANTIDAE
Mantis religiosa +

TRICHOPTERA
HYDROPSYCHIDAE
Hydropsyche tobiasi

LEPTOCERIDAE
Oecetis tripunctata +

LEPIDOPTERA (RHOPALOCERA)

HESPERIIDAE
Syrichtus tessellum
Heteropterus morpheus
Carterocephalus palaemon
Borbo borbonica
Syrichtus cribellum +

PAPILIONIDAE
Papilio hospiton
Papilio alexanor
Zerynthia polyxena
Zerynthia rumina
Archon apollinus
Parnassius apollo
Parnasslus phoebus
Parnassius mnemosyne

PIERIDAE
Pieris ergane
Pontia chloridice
Elphinstonia charlonia
Colias palaeno
Colias libanotica
Colias myrmidone
Colias balcanica
Leptidea morsei +

LYCAENIDAE
Callophrys avis
Lycaena helle
Lycaena dispar
Cupido lorquinii
Turanana panagea
Maculinea alcon
Maculinea rebeli
Maculinea arion
Maculinea teleius
Maculinea nausithous
Pseudophilotes bavius
Scolitantides orion
Plebejus pylaon
Vacciniina optilete
Agriades pyrenaicus
Plebicula golgus
Polyommatus eroides +

NYMPHALIDAE
Apatura iris
Apatura ilia
Apatura metis
Limenitis populi
Neptis sappho
Vanessa indica
Fabriciana elisa
Brenthis hecate
Boloria aquilonaris
Proclossiana eunomia
Melitaea trivia
Melitaea deione
Mellicta britomartis
Euphydryas maturna
Euphydryas aurinia
Argyronome laodice +
Neptis rivularis +
Nymphalis vau-album +
Nymphalis xanthomelas +

SATYRIDAE
Melanargia arge
Oeneis glacialis
Erebia eriphyle
Erebia christi
Erebia sudetica
Erebia calcaria
Coenonympha tullia
Coenonympha hero
Coenonympha oedippus
Lopinga achine

DANAIDAE
Danaus plexippus

NOCTUIDAE
Syngrapha microgamma +

SATURNIIDAE
Saturnia pyri +

GEOMETRIDAE
Eupithecia gelidata +
Gnophus obscurata +

HEPIALIDAE
Hepialus carna +

LEPIDOPTERA (HETEROCERA)
LASIOCAMPIDAE
Eriogaster catax
Phyllodesma ilicifolia

SATURNIIDAE
Graellsia isabelae
Saturnia pyri +

SPHINGIDAE
Hyles hippophaes
Proserpinus proserpina

COLEOPTERA
CARABIDAE
Calosoma sycophanta
Carabus intricatus
Carabus olympiae

Osmoderma eremita

DYSTICIDAE
Dytiscus latissimus
Graphoderus bilineatus
Agabus clypealis +

BUPRESTIDAE
Buprestis splendens

CUCULIDAE
Cucujus cinnaberinus

CERAMBYCIDAE
Cerambyx cerdo
Morimus funereus
Rosalia alpina

HYMENOPTERA

FORMICIDAE
Formica rufa
Formica aquilonia
Formica lugubris
Formica polyctena
Formica pratensis
Formica uralensis +

MEGACHILIDAE
Anthidium montanum +

EPHEMEROPTERA
AMETROPODIDAE
Ametropus fragilis +

HEPTAGENIIDAE
Arthroplea congener +

LEPTOPHLEBIIDAE
Choroterpes picteti +

PALINGENIIDAE
Palingenia longicauda +

PLECOPTERA
CAPNIIDAE
Capnopsis schilleri +

TAENIOPTERYGIDAE
Brachyptera braueri +

PERLODIDAE
Isogenus nubecula +

Isoperla obsucura +

CHLOROPERLIDAE
Xanthoperla apicalis +

NEUROPTERA
MANTISPIDAE
Mantispa styriaca +

ASCALAPHIDAE
Libelloides macaronius +

MYRMELEONTIDAE
Acanthaclisis occitanica +
Dendroleon pantherinus +
Distoleon tetragrammicus +
Myrmeleon formicarius +

CRUSTACEA

DECAPODA
ASTACIDAE
Astacus astacus
Austropotamobius pallipes
Austropotamobius torrentium +

ANOSTRACA
BRANCHINECTIDAE
Branchinecta paludosa +

AMPHIPODA
GAMMARIDAE
Echinogammarus ischnus +

ARACHNIDA

ARANAEA
PISAURIDAE
Dolomedes plantarius

HEXATHELIDAE
Macrothele calpeiana

ATYPIDAE
Atypus muralis +

CHECKLIST OF THREATENED PLANTS

ALISMATACEAE
Caldesia parnassifolia
Damasonium minimum
Echinodorus repens
Luronium natans

AMARYLLIDACEAE
Galanthus reginae-olgae
Leucojum nicaeense
Leucojum vernum ssp. *carpaticum* +
Narcissus scaberulus
Narcissus viridiflorus

APOCYNACEAE
Rhazya orientalis

AQUIFOLIACEAE
Ilex perado ssp. *platyphylla*

ARACEAE
Dracunculus canariensis

ASCLEPIADACEAE
Caralluma burchardii
Caralluma europaea
Ceropegia ceratophora
Ceropegia krainzii

ASPIDIACEAE
Diplazium caudatum

ASPLENIACEAE
Asplenium jahandiezii

BALANOPHORACEAE
Cynomorium coccineum

BERBERIDACEAE
Berberis maderensis
Gymnospermium altaicum ssp. *odessanum*

BETULACEAE
Betula humilis

BOLETACEAE
Boletus satanas +

BORAGINACEAE
Anchusa aggregata
Anchusa crispa
Buglossoides gastonii
Cerinthe glabra ssp. *tatrica* +
Echium acanthocarpum
Echium auberianum
Echium callithyrsum
Echium cantabricum
Echium gentianoides
Echium giganteum
Echium handiense
Echium pininana
Echium simplex
Echium wildpretii ssp. *wildpretii*
Elizaldia calycina
Lithodora oleifolia
Macrotomia densiflora
Myosotis rehsteineri
Omphalodes littoralis ssp. *gallaecica*
Omphalodes littoralis ssp. *littoralis*
Omphalodes luciliae
Onosma elegantissima
Onosma psammophila
Onosma pseudarenaria +
Onosma tornensis +
Solenanthus albanicus
Solenanthus stamineus
Symphytum cycladense

CALLITRICHACEAE
Callitriche pulchra

CAMPANULACEAE
Asyneuma giganteum
Azorina vidalii
Campanula aizoon ssp. *aizoon*
Campanula canariensis
Campanula forsythii
Campanula gelida +
Campanula moravica +
Campanula morettiana
Campanula petraea
Campanula sabatia
Campanula xylocarpa +
Musschia wollastonii
Physoplexis comosa
Symphyandra samothracica
Trachelium asperuloides

CAPRIFOLIACEAE
Lonicera hellenica

CARYOPHYLLACEAE
Arenaria controversa
Arenaria hispida

Arenaria peloponnesiaca
Arenaria provincialis
Bufonia teneriffae
Cerastium alsinifolium +
Cerastium arvense ssp. *glandulosum* +
Cerastium sventenii
Dianthus gallicus
Dianthus gratianopolitanus
Dianthus langeanus
Dianthus praecox +
Dianthus praecox ssp. *lumnitzeri* +
Dianthus pulviniformis
Dianthus pungens
Dianthus rupicola
Dianthus serotinus +
Gypsophila papillosa
Loeflingia tavaresiana
Minuartia glaucina +
Minuartia pichleri
Minuartia stojanovii
Moehringia grisebachii +
Moehringia jankae +
Moehringia papulosa
Moehringia tommasinii
Petrorhagia grandiflora
Polycarpaea smithii
Saponaria chlorifolia
Silene diclinis
Silene haussknechtii
Silene hifacensis
Silene holzmannii
Silene lagunensis
Silene linicola
Silene orphanidis
Silene rothmaleri
Silene velutina
Silene vulgaris
Spergularia azorica

CHENOPODIACEAE
Bassia hirsuta
Corispermum canescens +
Corispermum marschallii
Halimione pedunculata
Halopeplis amplexicaulis
Kochia saxicola
Microcnemum coralloides
Salicornia veneta

CISTACEAE
Cistus heterophyllus
Cistus osbeckiafolius
Helianthemum alypoides
Helianthemum bystropogophyllum
Helianthemum stipulatum
Helianthemum teneriffae
Helianthemum tholiforme
Tuberaria major

COLLEMATACEAE
Collema dichotomum +

COMPOSITAE
Achillea barbeyana
Achillea horanszkyi +
Achillea ochroleuca +
Achillea umbellata
Anacyclus alboranensis
Andryala crithmifolia
Andryala levitomentosa +
Anthemis gerardiana
Anthemis glaberrima
Argyranthemum callichrysum
Argyranthemum coronopifolium
Argyranthemum haematomma
Argyranthemum hierrense
Argyranthemum lidii
Argyranthemum maderense
Argyranthemum pinnatifidum ssp. *succulentum*
Argyranthemum sventenii
Argyranthemum winterii
Artemisia argentata
Artemisia granatensis
Aster pyrenaeus
Asteriscus schultzii
Atractylis arbuscula
Atractylis preauxiana
Buphthalmum inuloides
Calendula maderensis
Calendula suffruticosa ssp. *maritima*
Carduus baeocephalus
Carduus bourgeaui
Carduus myriacanthus
Carduus squarrosus
Carlina diae
Centaurea aegialophila
Centaurea alba ssp. *princeps*
Centaurea baldaccii
Centaurea balearica
Centaurea corymbosa
Centaurea heldreichii
Centaurea horrida
Centaurea jankae +
Centaurea kalambakensis
Centaurea kartschiana

Centaurea lactiflora
Centaurea leucophaea ssp. *pseudocoerulescens*
Centaurea linaresii
Centaurea megarensis
Centaurea niederi
Centaurea parlatoris
Centaurea peucedanifolia
Centaurea poculatoris
Centaurea pontica +
Centaurea procumbens
Centaurea pumilio
Cheirolophus arboreus
Cheirolophus arbutifolius
Cheirolophus duranii
Cheirolophus ghomerythus
Cheirolophus junonianus
Cheirolophus massonianus
Cheirolophus sataratаensis ssp. *sataratаensis*
Cheirolophus sventenii ssp. *sventenii*
Cheirolophus webbianus
Cirsium latifolium
Crepis canariensis
Crepis crocifolia
Erigeron nanus +
Evacidium discolor
Evax rotundata
Gonospermum gomerae
Helichrysum gossypinum
Helichrysum monogynum
Helichrysum sibthorpii
Hieracium chaunotrichum +
Hypochoeris oligocephala
Inula helvetica
Jurinea cyanoides
Jurinea taygetea
Lactuca palmensis
Lamyropsis microcephala
Leontodon boryi
Leontodon microcephalus
Leontodon siculus
Leuzea cynaroides
Ligularia sibirica
Logfia neglecta
Lugoa revoluta
Nananthea perpusilla
Nolletia chrysocomoides
Onopordum nogalesii
Pulicaria burchardii
Pulicaria canariensis
Reichardia famarae
Santolina elegans
Santolina oblongifolia
Senecio alboranicus
Senecio appendiculatus
Senecio auricula
Senecio bollei
Senecio congestus
Senecio hadrosomus
Senecio hermosae
Senecio lopezii
Senecio multiflorus
Serratula lycopifolia
Sonchus bornmuelleri
Sonchus bourgeaui
Sonchus canariensis
Sonchus gandogeri
Sonchus gummifer
Sonchus imbricatus
Sonchus radicatus ssp. *gummifer*
Sonchus ustulatus ssp. *maderensis*
Sventenia bupleuroides
Taeckholmia microcarpa
Tanacetum ptarmiciflorum
Tolpis crassiuscula
Wagenitzia lancifolia

CONVOLVULACEAE
Convolvulus argyrothamnos
Convolvulus canariensis
Convolvulus diversifolius
Convolvulus lopez-socasi
Convolvulus massonii
Convolvulus perraudieri
Ipomoea stolonifera

CRASSULACEAE
Aeonium balsamiferum
Aeonium cuneatum
Aeonium gomeraense
Aeonium nobile
Aeonium saundersii
Aeonium sedifolium
Aeonium smithii
Aichryson brevipetalum
Aichryson dumosum
Crassula aquatica
Greenovia aizoon
Greenovia dodrentalis
Monanthes adenoscepes
Monanthes anagensis
Monanthes niphophila
Sedum aetnense
Sedum hierapetrae
Sempervivum montanum ssp.

carpaticum +

CRUCIFERAE
Aethionema cordatum
Alyssum borzaeanum +
Alyssum fastigiatum
Alyssum leucadeum
Alyssum montanum ssp. *brymii* +
Alyssum robertianum
Barbarea sicula
Biscutella divionensis
Biscutella neustriaca
Biscutella rotgesii
Biscutella vincentina
Boleum asperum
Brassica bourgeaui
Brassica glabrescens
Brassica insularis var. *ayliesii*
Brassica macrocarpa
Brassica souliei
Capsella thracica +
Coronopus navasii
Crambe arborea
Crambe gigantea
Crambe scoparia
Crambe sventenii
Descurainia gonzalezii
Diplotaxis ibicensis
Diplotaxis siettia
Diplotaxis vicentina
Erucastrum palustre
Erysimum arbuscula
Erysimum pieninicum +
Guiraoa arvensis
Hesperis inodora
Hesperis oblongifolia +
Hesperis vrabelyiana +
Hormathophylla pyrenaica
Hutera leptocarpa
Hutera rupestris
Hymenolobus procumbens
Iberis arbuscula
Iberis sampaiana
Ionopsidium acaule
Ionopsidium albiflorum
Ionopsidium savianum
Isatis lusitanica
Isatis platyloba
Lepidium cardamines
Parolinia intermedia
Rhynchosinapis johnstonii
Schivereckia podolica +
Sinapidendron angustifolium
Sinapidendron rupestre
Sisymbrium matritense
Sisymbrium supinum
Thlaspi caerulescens ssp. *tatrense* +
Thlaspi schudichii +
Vella pseudocytisus

CUPRESSACEAE
Juniperus cedrus
Juniperus drupacea
Tetraclinis articulata

CYPERACEAE
Carex baldensis
Carex calderae
Carex camposii
Carex canariensis
Carex durieui
Carex grioletii
Carex malato-belizii
Carex perraudieriana
Carex pirinensis +
Carex trinervis
Eleocharis carniolica
Eriophorum gracile

DATISCACEAE
Datisca cannabina

DIPSACACEAE
Knautia velutina
Pterocephalus brevis
Pterocephalus porphyranthus
Pterocephalus virens

DROSERACEAE
Drosera rotundifolia var. *corsica*

DRYOPTERIDACEAE
Dryopteris aemula

ELASTRACEAE
Maytenus dryandri

ELATINACEAE
Elatine alsinastrum
Elatine hexandra +
Elatine hungarica +

ERICACEAE
Arbutus canariensis
Erica scoparia ssp. *azorica*

EUPHORBIACEAE
Euphorbia azorica
Euphorbia bourgeauana
Euphorbia bravoana
Euphorbia corsica
Euphorbia handiensis
Euphorbia hierosolymitana
Euphorbia lambii
Euphorbia mellifera
Euphorbia ruscinonensis

FRANKENIACEAE
Frankenia pulverulenta +

GENTIANACEAE
Centaurium rigualii
Centaurium scilloides
Gentiana ligustica
Gentianella austriaca ssp. *fatrae* +
Gentianella lutescens ssp. *carpatica* +
Gentianella uliginosa
Ixanthus viscosus
Lomatogonium carinthiacum

GERANIACEAE
Erodium chrysanthum
Geranium humbertii
Geranium maderense

GESNERIACEAE
Jankaea heldreichii
Ramonda nathaliae
Ramonda serbica

GRAMINEAE
Aira provincialis
Antinoria insularis
Bromus grossus
Bromus moesiacus +
Calamagrostis scotica
Coleanthus subtilis
Cornucopiae cucullatum
Deschampsia argentea
Deschampsia maderensis
Deschampsia setacea
Festuca domax
Festuca jubata
Lolium lowei
Phalaris maderensis
Poa riphaea +
Saccharum spontaneum
Sesleria heuflerana ssp. *hungarica* +
Stipa austroitalica
Stipa bavarica
Stipa danubialis +
Stipa dasyphylla +

GROSSULARIACEAE
Ribes sardoum

GUTTIFERAE
Hypericum aciferum
Hypericum hircinum ssp. *cambessedesii*
Hypericum jovis

HYMENOPHYLLACEAE
Trichomanes speciosum

ILLECEBRACEAE
Herniaria algarvica
Herniaria canariensis
Herniaria maritima

IRIDACEAE
Crocus robertianus

ISOETACEAE
Isoetes boryana
Isoetes brochonii
Isoetes malinverniana
Isoetes tenuissima

JUNCACEAE
Ebingeria elegans
Luzula canariensis

LABIATAE
Ballota frutescens
Bystropogon canariensis
Bystropogon origanifolius
Dracocephalum austriacum
Lavandula rotundifolia
Micromeria pineolens
Micromeria rivas-martinezii
Micromeria taygetea
Moluccella spinosa
Nepeta dirphya
Nepeta sphaciotica
Origanum dictamnus
Origanum scabrum
Pycnanthemum incanum
var.*incanum* +
Salvia broussonetii
Sideritis cabrerae
Sideritis cystosiphon

Sideritis discolor
Sideritis infernalis
Sideritis kuegleriana
Sideritis macrostachya
Sideritis marmorea
Sideritis nervosa
Sideritis nutans
Sideritis penzigii
Sideritis pumila
Stachys brachyclada
Stachys spreitzenhoferi
Teucrium abutiloides
Teucrium francisci-werneri
Teucrium heterophyllum
Thymus camphoratus
Thymus carnosus
Thymus cephalotos
Thymus plasonii
Thymus richardii ssp. *ebusitanus*

LAURACEAE
Apollonias ceballosi
Ocotea foetens
Persea indica

LEGUMINOSAE
Anagyris latifolia
Anthyllis lemanniana
Astragalus algarbiensis
Astragalus aquilanus
Astragalus arenarius
Astragalus centralpinus
Astragalus dasyanthus +
Astragalus maritimus
Astragalus physocalyx +
Astragalus verrucosus
Chamaecytisus nejceffii +
Cytisus aeolicus
Dorycnium spectabile
Genista holopetala
Lathyrus pancicii +
Lotus berthelotii
Lotus callis-viridis
Lotus kunkelii
Lotus leptophyllus
Lotus maculatus
Lotus mascaensis
Lygos raetum
Medicago heyniana
Medicago strasseri
Ononis christii
Ononis cossoniana
Ononis masquillierii
Ononis maweana
Oxytropis campestris ssp. *tatrae* +
Teline benehoavensis
Teline linifolia
Trifolium saxatile
Vicia capreolata
Vicia portosanctana
Vicia scandens
Vicia sicula
Vicia sparsiflora

LENTIBULARIACEAE
Pinguicula bohemica +

LILIACEAE
Allium grosii
Allium longanum
Allium obtusiflorum
Allium suaveolens
Androcymbium psammophilum
Androcymbium rechingeri
Asparagus fallax
Asparagus nesiotes
Asphodelus bento-rainhae
Bellevalia hackelii
Colchicum arenarium +
Colchicum borisii +
Colchicum cousturieri
Colchicum davidovii +
Colchicum fominii +
Dracaena draco
Fritillaria involucrata
Lilium pomponium
Muscari gussonei
Narthecium scardicum
Ornithogalum orthophyllum ssp. *psammophilum* +
Ruscus streptophyllus
Scilla dasyantha
Scilla haemorrhoidalis
Scilla maderensis
Semele androgyna
Semele gayae
Tulipa goulimyi
Tulipa rhodopea +
Tulipa undulatifolia

LINACEAE
Linum leonii

LORANTHACEAE

Viscum cruciatum

LYCOPODIACEAE
Diphasiastrum complanatum ssp. *issleri*

LYTHRACEAE
Lythrum flexuosum
Lythrum thesioides

MALVACEAE
Hibiscus palustris
Lavatera mauritanica
Lavatera phoenicea

MARSILEACEAE
Marsilea quadrifolia
Marsilea strigosa
Pilularia globulifera

MYRSINACEAE
Heberdenia excelsa
Pleiomeris canariensis

NAJADACEAE
Najas flexilis
Najas marina +

OLEACEAE
Jasminum azoricum
Picconia excelsa

OPHIOGLOSSACEAE
Botrychium lanceolatum
Botrychium matricariifolium
Botrychium multifidum
Botrychium simplex
Botrychium virginianum

ORCHIDACEAE
Barlia metlesicsiana
Cephalanthera cucullata
Cephalanthera epipactoides
Coeloglossum viride
Comperia comperiana
Cypripedium calceolus var. *calceolus*
Cypripedium planipetalum
Dactylorhiza baumanniana
Dactylorhiza cambrensis
Dactylorhiza coccinea
Dactylorhiza foliosa
Dactylorhiza fuchsii ssp. *soóana* +
Dactylorhiza graeca
Dactylorhiza kalopissii
Dactylorhiza sphagnicola
Dactylorhiza traunsteineri
Dactylorhiza traunsteineri ssp. lapponica
Epipactis albensis +
Epipactis condensata
Epipactis cretica
Epipactis greuteri
Epipactis leptochila var. *dunensis*
Epipactis phyllanthes
Goodyera macrophylla
Hammarbya paludosa
Herminium monorchis
Himantoglossum adriaticum
Liparis loeselii
Malaxis monophyllos
Ophrys biancae
Ophrys biscutella
Ophrys carbonifera
Ophrys catalaunica
Ophrys fuciflora ssp. *candica*
Ophrys fuciflora ssp. *oxyrrhynchos*
Ophrys lunata
Ophrys pallida
Ophrys splendida
Orchis boryi
Orchis laxiflora ssp. *palustris*
Orchis punctulata
Orchis sancta
Orchis scopulorum
Orchis spitzelii ssp. *nitidifolia*
Pseudorchis frivaldii
Serapias nurrica
Serapias olbia
Spiranthes aestivalis

PAEONIACEAE
Paeonia cambessedesii
Paeonia clusii ssp. *rhodia*
Paeonia parnassica

PALMAE
Phoenix theophrasti

PAPAVERACEAE
Fumaria occidentalis
Fumaria reuteri
Papaver rupifragum ssp. *rupifragum*
Papaver tatricum +
Rupicapnos africana

PINACEAE
Abies cephalonica +
Abies nebrodensis
Abies pinsapo var. *pinsapo*
Larix decidua var. *polonica* +

PITTOSPORACEAE
Pittosporum coriaceum

PLANTAGINACEAE
Plantago atrata ssp. *carpatica* +
Plantago famarae
Plantago leiopetala
Plantago maderensis
Plantago malato-belizii

PLUMBAGINACEAE
Armeria pseudarmeria
Armeria rouyana
Armeria soleirolii
Armeria welwitschii
Limonium albidum
Limonium aragonense
Limonium arborescens
Limonium asterotrichum +
Limonium bourgeaui
Limonium brassicifolium
Limonium calcarae
Limonium companyonis
Limonium cordatum
Limonium dendroides
Limonium fruticans
Limonium imbricatum
Limonium inarimense ssp. *inarimense*
Limonium japygicum
Limonium johannis
Limonium laetum
Limonium macrophyllum
Limonium macropterum
Limonium panormitanum
Limonium papillatum
Limonium paradoxum
Limonium parvifolium
Limonium perezii
Limonium preauxii
Limonium puberulum
Limonium recurvum
Limonium redivivum
Limonium remotispiculum
Limonium sibthorpianum
Limonium spectabile
Limonium tenoreanum

POLYGALACEAE
Polygala helenae

POLYGONACEAE
Polygonum praelongum
Rumex rupestris

POLYPORACEAE
Fomitopsis rosea +

POTAMOGETONACEAE
Potamogeton rutilus

PRIMULACEAE
Androsace mathildae
Androsace obtusifolia +
Coris hispanica
Cyclamen fatrense +
Primula allionii
Primula apennina
Primula vulgaris ssp. *balearica*
Primula wulfeniana ssp. *baumgarteniana*+
Soldanella villosa

PSILOTACEAE
Psilotum nudum

PTERIDACEAE
Pteris cretica
Pteris dentata
Pteris serrulata

PYROLACEAE
Pyrola rotundifolia ssp. *maritima*

RANUNCULACEAE
Aconitum firmum ssp. *firmum* +
Aconitum firmum ssp. *moravicum* +
Aconitum lasiocarpum +
Aconitum napellus ssp. *corsicum*
Adonis cyllenea
Adonis distorta
Aquilegia alpina
Aquilegia bernardii
Aquilegia bertolonii
Aquilegia cazorlensis
Aquilegia kitaibelii
Aquilegia ottonis
Callianthemum kerneranum
Clematis elisabethae-carolae

Consolida samia
Delphinium oxysepalum +
Garidella nigellastrum
Garidella unguicularis
Helleborus lividus ssp. *lividus*
Pulsatilla hungarica +
Pulsatilla patens
Pulsatilla subslavica +
Ranunculus cacuminis
Ranunculus fontanus
Ranunculus revelieri
Ranunculus weyleri

RESEDACEAE
Reseda decursiva
Reseda scoparia

RHAMNACEAE
Rhamnus glandulosa

ROSACEAE
Bencomia brachystachya
Bencomia caudata
Bencomia exstipulata
Bencomia sphaerocarpa
Chamaemeles coriacea
Cotoneaster nummularia
Geum heterocarpum
Marcetella maderensis
Potentilla arcadiensis
Potentilla delphinensis
Potentilla goulandrii
Rosa mandonii
Sorbus hazslinszkyana +
Sorbus maderensis
Sorbus sudetica +
Spiraea crenata

RUBIACEAE
Asperula saxicola
Galium litorale
Galium stojanovii +
Galium sudeticum +
Galium viridiflorum

RUTACEAE
Ruta microcarpa
Ruta oreojasme
Ruta pinnata

SAMBUCACEAE
Sambucus palmensis

SANTALACEAE
Kunkeliella canariensis
Kunkeliella psilotoclada
Kunkeliella subsucculenta
Thesium ebracteatum

SAPOTACEAE
Sideroxylon marmulano

SAXIFRAGACEAE
Saxifraga berica
Saxifraga florulenta
Saxigraga moschata ssp. *dominii* +
Saxifraga moschata ssp. *kotulae* +
Saxifraga tombeanensis
Saxifraga valdensis
Saxifraga wahlenbergii +

SCROPHULARIACEAE
Euphrasia marchesettii
Euphrasia slovaca +
Isoplexis chalcantha
Isoplexis isabelliana
Kickxia urbanii
Linaria algarviana
Linaria ficalhoana
Linaria flava
Linaria hellenica
Linaria lamarckii
Linaria ricardoi
Linaria thymifolia
Linaria tonzigii
Melampyrum bohemicum +
Melampyrum ciliatum
Odontites holliana
Pedicularis sudetica ssp. *sudetica* +
Scrophularia anagae
Scrophularia calliantha
Scrophularia smithii ssp. *smithii*
Sibthorpia peregrina
Verbascum anisophyllum +
Verbascum cylleneum
Verbascum davidoffii +
Verbascum jankaeanum +
Verbascum litigiosum
Verbascum purpureum +
Verbascum reiseri
Verbascum syriacum
Veronica oetaea
Veronica stamatiadae

SELAGINACEAE
Globularia ascanii

Globularia sarcophylla
Globularia stygia

SOLANACEAE
Atropa baetica
Mandragora officinarum
Solanum lidii
Solanum trisectum
Solanum vespertilio

TAMARICACEAE
Tamarix boveana

THEACEAE
Visnea mocanera

THYMELAEACEAE
Daphne petraea
Daphne rodriguezii
Thymelaea thomasii

TRAPACEAE
Trapa natans

TYPHACEAE
Typha minima
Typha shuttleworthii

ULMACEAE
Zelkova cretica

UMBELLIFERAE
Ammi procerum
Angelica heterocarpa
Apium repens
Athamanta cortiana
Berula erecta +
Bunium brevifolium
Bupleurum bourgaei
Bupleurum capillare
Bupleurum dianthifolium
Bupleurum elatum
Bupleurum falcatum ssp. *dilatatum* +
Bupleurum handiense
Bupleurum kakiskalae
Eryngium alpinum
Eryngium barrelieri
Eryngium spinalba
Eryngium viviparum
Ferulago asparagifolia
Heracleum minimum
Imperatoria lowei
Laserpitium archangelica +
Laserpitium longiradium
Monizia edulis
Naufraga balearica
Oenanthe conioides
Oenanthe divaricata
Oenanthe pteridifolia
Petagnia saniculifolia
Petroselinum segetum
Peucedanum coriaceum
Pimpinella anagodendron
Pimpinella bicknellii
Rouya polygama
Seseli leucospermum
Thorella verticillatinundata

URTICACEAE
Gesnouinia arborea

VALERIANACEAE
Centranthus trinervis

VIOLACEAE
Viola athois
Viola biflora ssp. *biflora* +
Viola cheiranthifolia
Viola delphinantha
Viola hispida
Viola jaubertiana
Viola palmensis
Viola paradoxa
Viola sfikasiana

WOODSIACEAE
Cystopteris sudetica

ANNEX 5: Lists of habitat classes in key European classifications

ANNEX 5: Lists of habitat classes in key European classifications

a) Habitat units identified in the CORINE Biotopes habitat check-list for the EU and the proposed CORINE Biotopes Habitats of the Palearctic (Devilliers, 1994)

Coastal and Halophytic Communities

Oceans and Seas
Sea Inlets
Tidal Rivers and Estuaries
Mud Flats and Sand Flats
Salt marshes, Salt Steppes and Gypsum Scrubs
Coastal Sand Dunes and Sand Beaches
Shingle Beaches
Cliffs and rocky Shores
Islets and Rocky Stacks
Machair

Non-Marine Waters

Coastal Lagoons
Standing Fresh Water
Standing Brackish and Salt Water
Running Water

Scrub and Grassland

Heath and Scrub
Sclerophyllous Scrub
Phrygana
Dry Calcareous Grasslands and Steppes
Dry Siliceous Grasslands
Alpine and Subalpine Grasslands
Humid Grasslands and Tall Herb Communities
Mesophile Grasslands

Forests

Broad-leaved Deciduous Forests
Coniferous Woodland
Mixed Woodland
Alluvial and very wet Forests and Brush
Broad-leaved Evergreen Woodlands

Bogs and Marshes

Raised Bogs
Blanket Bogs
Water-fringed Vegetation
Fens, Transition Mires and Springs

Inland Rocks, Screes and Sands

Screes
Inland Cliffs and Exposed Rocks
Eternal Snow and Ice
Inland Sand Dunes
Caves
Volcanic Features

Deserts

Polar Deserts
Continental Deserts and Semi-Deserts
Subtropical Deserts and Semi-Deserts
Cool Coastal Deserts

Agricultural Land and Artificial Landscapes

Improved Grasslands
Crops
Orchards, Groves and Tree Plantations
Tree Lines, Hedges, Rural Mosaics
Urban Parks and Large Gardens
Towns, Villages, Industrial Sites
Fallow Land, Waste Places
Mines and Underground Passages
Industrial Lagoons and Reservoirs, Canals

Wooded Grasslands and Scrub

Parklands
Bocages
Wooded Steppe
Wooded Tundra
Treeline Ecotones
Savannas
Wooded Deserts and Semi-Deserts

b) Habitat Classes in the Habitats Directive

Coastal and Halophytic habitats

Open sea and tidal areas
Sea cliffs and shingle or stony beaches
Atlantic and continental salt marshes and salt meadows
Mediterranean and thermo-Atlantic salt marshes and salt meadows
Salt and gypsum continental steppes

Coastal sand dunes and continental dunes

Sea dunes of the Atlantic, North Sea and Baltic coasts
Sea dunes of the Mediterranean coast
Continental dunes, old and decalcified

Freshwater habitats

Standing water
Running water

Temperate Heath and Scrub

Sclerophyllous scrub (Matorral)
Sub-Mediterranean and temperate
Mediterranean arborescent matorral
Thermo-Mediterranean and pre-steppe brush
Phrygana

Natural and semi-natural grassland formations

Natural grasslands
Semi-natural dry grasslands and scrubland facies
Sclerophyllous grazed forests (dehesas)
Semi-natural tall-herb humid meadows
Mesophile grasslands

Raised Bogs and Mires and Fens

Sphagnum acid bogs
Calcareous fens

Rocky Habitats and Caves

Scree
Chasmophytic vegetation on rocky slopes
Other rocky habitats

Forest

Forests of Temperate Europe
Mediterranean deciduous forests
Mediterranean sclerophyllous forests
Alpine and subalpine coniferous forests
Mediterranean mountainous coniferous forests

c) Habitat Classes in the Council of Europe/CEC *Map of the Natural Vegetation of the member countries of the European Community and the Council of Europe* (1987)

Geobotanical divisions

Boreal domain
Atlantic domain
Alpine domain
Mediterranean region
Anatolian domain

Vegetation

Edaphic Azonal vegetation

Coastal halophytic vegetation
Coastal dunes
Maritime polders
Fresh-water marshes
Fluvial plains
Minerotrophic fens
Raised bogs with sphagnum moss
Blanket bogs
Boreal peatlands

Zonal Vegetation: Boreal Europe

Arctic heathlands and Oro-Caledonian zone
Subarctic heathlands and forests
Boreal spruce forests
Boreal mixed forests
Montane Boreo-Atlantic heathlands

Temperate Europe vegetation

Acidophilous oakwoods and oligotrophic heathlands
Mesotrophic mixed oakwoods
Thermophilous mixed oakwoods
Hill and submontane beechwoods
Montane beech and beech-fir forests

Montane and subalpine conifer forests
Alpine zone

Pontic domain vegetation

Pontic vegetation
Subpontic vegetation
Pontic alpine zone

Mediterranean vegetation

Thermo-Mediterranean zone
Meso-Mediterranean zone
Supra-Mediterranean zone
Oro-Mediterranean conifer zone
Alti-Mediterranean zone

Pre-steppe and steppe vegetation of Anatolia

Steppe woodland
Treeless steppes

ANNEX 6: Countries covered by each of the Conventions

ANNEX 6: Countries covered by each of the Conventions

CORINE = Coordination of Information on the Environment

covers the 12 European Union Countries -

Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, United Kingdom

PHARE = initially Poland and Hungary Assistance for Restructuring Economy, now encompasses -

Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovak Republic

BERN CONVENTION = so far there are 29 contracting parties -

Austria, Belgium, Bulgaria, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom -, and three non-member states - Burkino Faso, Romania and Senegal

BONN CONVENTION = the 12 EU countries plus: Argentina, Australia, Benin, Burkino Faso, Cameroon, Chile, Egypt, Finland, Ghana, Guinea, Hungary, India, Israel, Mali, Monaco, Morocco, Niger, Nigeria, Norway, Pakistan, Panama, Philippines, Saudi Arabia, Senegal, Somalia, South Africa, Sri Lanka, Sweden, Tunisia, Uruguay and Zaire.

There are also nine Signatories to the Convention:

Central African Republic, Chad, Côte d'Ivoire, Greece, Jamaica, Madagascar, Paraguay, Togo and Uganda.

24 member states of the Council of Europe:

Austria, Belgium, Bulgaria, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom and three non-member states - Burkino Faso, Romania and Senegal.

3. CITES parties relevent to this project

Austria, Belgium, Bulgaria, Commonwealth of Independent States, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, United Kingdom

4 UN-ECE

The European Red List of Globally Threatened Animals and Plants includes species occurring in the European member countries of the EU, including the whole territory of Turkey and the European part of "Russia". The eastern boundary runs along the eastern Ural Mountains, the Ural River, the Caspian Sea and the Kuma and Manych rivers.

ANNEX 7: Checklist of species for the CITES Convention

APPENDIX I

Interpretation:

1. Species included in this Appendix are referred to:

(*a*) by the name of the species; or

(*b*) as being all of the species included in a higher taxon or designated part thereof.

2. The abbreviation "spp." is used to denote all species of a higher taxon.

3. Other references to taxa higher than species are for the purposes of information or classification only.

4. An asterisk (*) placed against the name of a species or higher taxon indicates that one or more geographically separate populations, sub-species or species of that taxon are included in Appendix II and that these populations, sub-species or species are excluded from Appendix I.

5. The symbol (−) followed by a number placed against the name of a species or higher taxon indicates the exclusion from that species or taxon of designated geographically separate populations, sub-species or species as follows:

−101 *Lemur catta*
−102 Australian population

6. The symbol (+) followed by a number placed against the name of a species denotes that only a designated geographically separate population or sub-species of that species is included in this Appendix, as follows:

+201 Italian population only

7. The symbol (†) placed against the name of a species or higher taxon indicates that the species concerned are protected in accordance with the International Whaling Commission's schedule of 1972.

FAUNA

MAMMALIA

Marsupialia	
Macropodidae	*Macropus parma*
	Onychogalea frenata
	O. lunata
	Lagorchestes hirsutus
	Lagostrophus fasciatus
	Caloprymnus campestris
	Bettongia penicillata
	B. lesueur
	B. tropica
Phalangeridae	*Wyulda squamicaudata*
Burramyidae	*Burramys parvus*
Vombatidae	*Lasiorhinus gillespiei*
Peramelidae	*Perameles bougainville*
	Chaeropus ecaudatus
	Macrotis lagotis
	M. leucura

Dasyuridae	*Planigale tenuirostris*
	P. subtilissima
	Sminthopsis psammophila
	S. longicaudata
	Antechinomys laniger
	Myrmecobius fasciatus rufus
Thylacinidae	*Thylacinus cynocephalus*
Primates	
Lemuridae	*Lemur* spp.* −101
	Lepilemur spp.
	Hapalemur spp.
	Allocebus spp.
	Cheirogaleus spp.
	Mirocebus spp.
	Phaner spp.
Indriidae	*Indri* spp.
	Propithecus spp.
	Avahi spp.
Daubentoniidae	*Daubentonia madagascariensis*
Callithricidae	*Leontopithecus* (*Leontideus*) spp.
	Callimico goeldii
Cebidae	*Saimiri oerstedii*
	Chiropotes albinasus
	Cacajao spp.
	Alouatta palliata (*villosa*)
	Ateles geoffroyi frontatus
	A. g. panamensis
	Brachyteles arachnoides
Cercopithecidae	*Cercocebus galeritus galeritus*
	Macaca silenus
	Colobus badius rufomitratus
	C. b. kirkii
	Presbytis geei
	P. pileatus
	P. entellus
	Nasalis larvatus
	Simias concolor
	Pygathrix nemaeus
Hylobatidae	*Hylobates* spp.
	Symphalangus syndactylus
Pongidae	*Pongo pygmaeus pygmaeus*
	P. p. abelii
	Gorilla gorilla
Edentata	
Dasypodidae	*Priodontes giganteus* (=*maximus*)

Pholidota

Manidae	*Manis temmincki*

Lagomorpha

Leporidae	*Romerolagus diazi* *Caprolagus hispidus*

Rodentia

Sciuridae	*Cynomys mexicanus*
Castoridae	*Castor fiber birulaia* *Castor canadensis mexicanus*
Muridae	*Zyzomys pedunculatus* *Leporillus conditor* *Pseudomys novaehollandiae* *P. praeconis* *P. shortridgei* *P. fumeus* *P. occidentalis* *P. fieldi* *Notomys aquilo* *Xeromys myoides*
Chinchillidae	*Chinchilla brevicaudata boliviana*

Cetacea

Platanistidae	*Platanista gangetica*
Eschrichtidae	*Eschrichtius robustus (glaucus)*†
Balaenopteridae	*Balaenoptera musculus*† *Megaptera novaeangliae*†
Balaenidae	*Balaena mysticetus*† *Eubalaena* spp.

Carnivora

Canidae	*Canis lupus monstrabilis* *Vulpes velox hebes*
Viverridae	*Prionodon pardicolor*
Ursidae	*Ursus americanus emmonsii* *U. arctos pruinosus* *U. arctos** +201 *U. a. nelsoni*
Mustelidae	*Mustela nigripes* *Lutra longicaudis (platensis/annectens)* *L. felina* *L. provocax* *Pteronura brasiliensis* *Aonyx microdon* *Enhydra lutris nereis*

Hyaenidae	*Hyaena brunnea*
Felidae	*Felis planiceps* *F. nigripes* *F. concolor coryi* *F. c. costaricensis* *F. c. cougar* *F. temmincki* *Felis bengalensis bengalensis* *F. yagouaroundi cacomitli* *F. y. fossata* *F. y. panamensis* *F. y. tolteca* *F. pardalis mearnsi* *F. p. mitis* *F. wiedii nicaraguae* *F. w. salvinia* *F. tigrina oncilla* *F. marmorata* *F. jacobita* *F. (Lynx) rufa escuinapae* *Neofelis nebulosa* *Panthera tigris** *P. pardus* *P. uncia* *P. onca* *Acinonyx jubatus*

Pinnipedia

Phocidae	*Monachus* spp. *Mirounga angustirostris*

Proboscidea

Elephantidae	*Elephas maximus*

Sirenia

Dugongidae	*Dugong dugon** −102
Trichechidae	*Trichechus manatus* *T. inunguis*

Perissodactylia

Equidae	*Equus przewalskii* *E. hemionus hemionus* *E. h. khur* *E. zebra zebra*
Tapiridae	*Tapirus pinchaque* *T. bairdii* *T. indicus*
Rhinocerotidae	*Rhinoceros unicornis* *R. sondaicus* *Didermocerus sumatrensis* *Ceratotherium simum cottoni*

Artiodactyla	
Suidae	*Sus salvanius*
	Babyrousa babyrussa
Camelidae	*Vicugna vicugna*
	Camelus bactrianus
Cervidae	*Moschus moschiferus moschiferus*
	Axis (Hyelaphus) porcinus annamiticus
	A. (Hyelaphus) calamianensis
	A. (Hyelaphus) kuhlii
	Cervus duvauceli
	C. eldi
	C. elaphus hanglu
	Hippocamelus bisulcus
	H. antisiensis
	Blastoceros dichotomus
	Ozotoceros bezoarticus
	Pudu pudu
Antilocapridae	*Antilocapra americana sonoriensis*
	A. a. peninsularis
Bovidae	*Bubalus (Anoa) mindorensis*
	B. (Anoa) depressicornis
	B. (Anoa) quarlesi
	Bos gaurus
	B. (grunniens) mutus
	Novibos (Bos) sauveli
	Bison bison athabascae
	Kobus leche
	Hippotragus niger variani
	Oryx leucoryx
	Damaliscus dorcas dorcas
	Saiga tatarica mongolica
	Nemorhaedus goral
	Capricornis sumatraensis
	Rupicapra rupicapra ornata
	Capra falconeri jerdoni
	C. f. megaceros
	C. f. chiltanensis
	Ovis orientalis ophion
	O. ammon hodgsoni
	O. vignei

AVES

Tinamiformes	
Tinamidae	*Tinamus solitarius*
Podicipediformes	
Podicipedidae	*Podilymbus gigas*

Procellariiformes	
Diomedeidae	*Diomedea albatrus*
Pelecaniformes	
Sulidae	*Sula abbotti*
Fregatidae	*Fregata andrewsi*
Ciconiiformes	
Ciconiidae	*Ciconia ciconia boyciana*
Threskiornithidae	*Nipponia nippon*
Anseriformes	
Anatidae	*Anas aucklandica nesiotis*
	Anas oustaleti
	Anas laysanensis
	Anas diazi
	Cairina scutulata
	Rhodonessa caryophyllacea
	Branta canadensis leucopareia
	Branta sandvicensis
Falconiformes	
Cathartidae	*Vultur gryphus*
	Gymnogyps californianus
Accipitridae	*Pithecophaga jefferyi*
	Harpia harpyja
	Haliaetus l. leucocephalus
	Haliaetus heliaca adalberti
	Haliaetus albicilla groenlandicus
Falconidae	*Falco peregrinus anatum*
	Falco peregrinus tundrius
	Falco peregrinus peregrinus
	Falco peregrinus babylonicus
Galliformes	
Megapodiidae	*Macrocephalon maleo*
Cracidae	*Crax blumenbachii*
	Pipile p. pipile
	Pipile jacutinga
	Mitu mitu mitu
	Oreophasis derbianus
Tetraonidae	*Tympanuchus cupido attwateri*
Phasianidae	*Colinus virginianus ridgwayi*
	Tragopan blythii
	Tragopan caboti

Phasianidae *continued*	
	Tragopan melanocephalus
	Lophophorus sclateri
	Lophophorus lhuysii
	Lophophorus impejanus
	Crossoptilon mantchuricum
	Crossoptilon crossoptilon
	Lophura swinhoii
	Lophura imperialis
	Lophura edwardsii
	Syrmaticus ellioti
	Syrmaticus humiae
	Syrmaticus mikado
	Polyplectron emphanum
	Tetraogallus tibetanus
	Tetraogallus caspius
	Cyrtonyx montezumae merriami
Gruiformes	
Gruidae	*Grus japonensis*
	Grus leucogeranus
	Grus americana
	Grus canadensis pulla
	Grus canadensis nesiotes
	Grus nigricollis
	Grus vipio
	Grus monacha
Rallidae	*Tricholimnas sylvestris*
Rhynochetidae	*Rhynochetos jubatus*
Otididae	*Eupodotis bengalensis*
Charadriiformes	
Scolopacidae	*Numenius borealis*
	Tringa guttifer
Laridae	*Larus relictus*
Columbiformes	
Columbidae	*Ducula mindorensis*
Psittaciformes	
Psittacidae	*Strigops habroptilus*
	Rhynchopsitta pachyrhyncha
	Amazona leucocephala
	Amazona vittata
	Amazona guildingii
	Amazona versicolor
	Amazona imperialis
	Amazona rhodocorytha
	Amazona petrei petrei
	Amazona vinacea

Psittacidae *continued*	
	Pyrrhura cruentata
	Anodorhynchus glaucus
	Anodorhynchus leari
	Cyanopsitta spixii
	Pionopsitta pileata
	Aratinga guaruba
	Psittacula krameri echo
	Psephotus pulcherrimus
	Psephotus chrysopterygius
	Neophema chrysogaster
	Neophema splendida
	Cyanoramphus novaezelandiae
	Cyanoramphus auriceps forbesi
	Geopsittacus occidentalis
	Psittacus erithacus princeps
Apodiformes	
Trochilidae	*Ramphodon dohrnii*
Trogoniformes	
Trogonidae	*Pharomachrus mocinno mocinno*
	Pharomachrus mocinno costaricensis
Strigiformes	
Strigidae	*Otus gurneyi*
Coraciiformes	
Bucerotidae	*Rhinoplax vigil*
Piciformes	
Picidae	*Dryocopus javensis richardsii*
	Campephilus imperialis
Passeriformes	
Cotingidae	*Cotinga maculata*
	Xipholena atro-purpurea
Pittidae	*Pitta kochi*
Atrichornithidae	*Atrichornis clamosa*
Muscicapidae	*Picathartes gymnocephalus*
	Picathartes oreas
	Psophodes nigrogularis
	Amytornis goyderi
	Dasyornis brachypterus longirostris
	Dasyornis broadbenti littoralis
Sturnidae	*Leucopsar rothschildi*
Meliphagidae	*Meliphaga cassidix*
Zosteropidae	*Zosterops albogularis*
Fringillidae	*Spinus cucullatus*

AMPHIBIA

Urodela

Cryptobranchidae
- *Andrias* (=*Megalobatrachus*) *davidianus japonicus*
- *Andrias* (=*Megalobatrachus*) *davidianus davidianus*

Salientia

Bufonidae
- *Bufo superciliaris*
- *Bufo periglenes*
- *Nectophrynoides* spp.

Atelopodidae
- *Atelopus varius zeteki*

REPTILIA

Crocodylia

Alligatoridae
- *Alligator mississippiensis*
- *Alligator sinensis*
- *Melanosuchus niger*
- *Caiman crocodilus apaporiensis*
- *Caiman latirostris*

Crocodylidae
- *Tomistoma schlegelii*
- *Osteolaemus tetraspis tetraspis*
- *Osteolaemus tetraspis osborni*
- *Crocodylus cataphractus*
- *Crocodylus siamensis*
- *Crocodylus palustris palustris*
- *Crocodylus palustris kimbula*
- *Crocodylus novaeguineae mindorensis*
- *Crocodylus intermedius*
- *Crocodylus rhombifer*
- *Crocodylus moreletii*
- *Crocodylus niloticus*

Gavialidae
- *Gavialis gangeticus*

Testudinata

Emydidae
- *Batagur baska*
- *Geoclemmys* (=*Damonia*) *hamiltonii*
- *Geoemyda* (=*Nicoria*) *tricarinata*
- *Kachuga tecta tecta*
- *Morenia ocellata*
- *Terrapene coahuila*

Testudinidae
- *Geochelone* (=*Testudo*) *elephantopus*
- *Geochelone* (=*Testudo*) *geometrica*
- *Geochelone* (=*Testudo*) *radiata*
- *Geochelone* (=*Testudo*) *yniphora*

Cheloniidae
- *Eretmochelys imbricata imbricata*
- *Lepidochelys kempii*

Trionychidae
- *Lissemys punctata punctata*
- *Trionyx ater*
- *Trionyx nigricans*
- *Trionyx gangeticus*
- *Trionyx hurum*

Chelidae
- *Pseudemydura umbrina*

Lacertilia

Varanidae
- *Varanus komodoensis*
- *Varanus flavescens*
- *Varanus bengalensis*
- *Varanus griseus*

Serpentes

Boidae
- *Epicrates inornatus inornatus*
- *Epicrates subflavus*
- *Python molurus molurus*

Rhynchocephalia

Sphenodontidae
- *Sphenodon punctatus*

PISCES

Acipenseriformes

Acipenseridae
- *Acipenser brevirostrum*
- *Acipenser oxyrhynchus*

Osteoglossiformes

Osteoglossidae
- *Scleropages formosus*

Salmoniformes

Salmonidae
- *Coregonus alpenae*

Cypriniformes

Catostomidae
- *Chasmistes cujus*

Cyprinidae
- *Probarbus jullieni*

Siluriformes

Schilbeidae
- *Pangasianodon gigas*

Perciformes

Percidae
- *Stizostedion vitreum glaucum*

MOLLUSCA

Naiadoida

Unionidae
- *Conradilla caelata*
- *Dromus dromas*
- *Epioblasma* (=*Dysnomia*) *florentina curtisi*
- *Epioblasma* (=*Dysnomia*) *florentina florentina*
- *Epioblasma* (=*Dysnomia*) *sampsoni*
- *Epioblasma* (=*Dysnomia*) *sulcata perobliqua*

Unionidae *continued*	*Epioblasma* (=*Dysnomia*) *torulosa gubernaculum*
	Epioblasma (=*Dysnomia*) *torulosa torulosa*
	Epioblasma (=*Dysnomia*) *turgidula*
	Epioblasma (=*Dysnomia*) *walkeri*
	Fusconaia cuneolus
	Fusconaia edgariana
	Lampsilis higginsi
	Lampsilis orbiculata orbiculata
	Lampsilis satura
	Lampsilis virescens
	Plethobasis cicatricosus
	Plethobasis cooperianus
	Pleurobema plenum
	Potamilus (=*Proptera*) *capax*
	Quadrula intermedia
	Quadrula sparsa
	Toxolasma (=*Carunculina*) *cylindrella*
	Unio (*Megalonaias*/*?*/) *nickliniana*
	Unio (*Lampsilis*/*?*/) *tampicoensis tecomatensis*
	Villosa (=*Micromya*) *trabalis*

FLORA

Araceae	*Alocasia sanderiana*
	Alocasia zebrina
Caryocaraceae	*Caryocar costaricense*
Caryophyllaceae	*Gymnocarpos przewalskii*
	Melandrium mongolicum
	Silene mongolica
	Stellaria pulvinata
Cupressaceae	*Pilgerodendron uviferum*
Cycadaceae	*Encephalartos* spp.
	Microcycas calocoma
	Stangeria eriopus
Gentianaceae	*Prepusa hookeriana*
Humiriaceae	*Vantanea barbourii*
Juglandaceae	*Engelhardtia pterocarpa*
Leguminosae	*Amnopiptanthus mongolicum*
	Cynometra hemitomophylla
	Platymiscium pleiostachyum
Liliaceae	*Aloe albida*
	Aloe pillansii
	Aloe polyphylla
	Aloe thorncroftii
	Aloe vossii

Melastomataceae	*Lavoisiera itambana*
Meliaceae	*Guarea longipetiola*
	Tachigalia versicolor
Moraceae	*Batocarpus costaricense*
Orchidaceae	*Cattleya jongheana*
	Cattleya skinneri
	Cattleya trianae
	Didiciea cunninghamii
	Laelia lobata
	Lycaste virginalis var. *alba*
	Peristeria elata
Pinaceae	*Abies guatamalensis*
	Abies nebrodensis
Podocarpaceae	*Podocarpus costalis*
	Podocarpus parlatorei
Proteaceae	*Orothamnus zeyheri*
	Protea odorata
Rubiaceae	*Balmea stormae*
Saxifragaceae (Grossulariaceae)	*Ribes sardoum*
Taxaceae	*Fitzroya cupressoides*
Ulmaceae	*Celtis aetnensis*
Welwitschiaceae	*Welwitschia bainesii*
Zingiberaceae	*Hedychium philippinense*

APPENDIX II

Interpretation:

1. Species included in this Appendix are referred to:

(*a*) by the name of the species; or

(*b*) as being all of the species included in a higher taxon or designated part thereof.

2. The abbreviation "spp." is used to denote all the species of a higher taxon.

3. Other references to taxa higher than species are for the purposes of information or classification only.

4. An asterisk (*) placed against the name of a species or higher taxon indicates that one or more geographically separate populations, sub-species or species of that taxon are included in Appendix I and that these populations, sub-species or species are excluded from Appendix II.

5. The symbol (‡) followed by a number placed against the name of a species or higher taxon designates parts or derivatives which are specified in relation thereto for the purposes of the present Convention as follows:

‡1 designates root
‡2 designates timber
‡3 designates trunks

6. The symbol (−) followed by a number placed against the name of a species or higher taxon indicates the exclusion from that species or taxon of designated geographically separate populations, sub-species, species or groups of species as follows:

−101 Species which are not succulents

7. The symbol (+) followed by a number placed against the name of a species or higher taxon denotes that only designated geographically separate populations, sub-species or species of that species or taxon are included in this Appendix as follows:

+201 All North American sub-species
+202 New Zealand species
+203 All species of the family in the Americas
+204 Australian population

FAUNA

MAMMALIA

Marsupialia	
Macropodidae	*Dendrolagus inustus*
	Dendrolagus ursinus
Insectivora	
Erinaceidae	*Erinaceus frontalis*
Primates	
Lemuridae	*Lemur catta*
Lorisidae	*Nycticebus coucang*
	Loris tardigradus
Cebidae	*Cebus capucinus*

Cercopithecidae	*Macaca sylvanus*
	Colobus badius gordonorum
	Colobus verus
	Rhinopithecus roxellanae
	Presbytis johnii
Pongidae	*Pan paniscus*
	Pan troglodytes
Edentata	
Myrmecophagidae	*Myrmecophaga tridactyla*
	Tamandua tetradactyla chapadensis
Bradypodidae	*Bradypus boliviensis*
Pholidota	
Manidae	*Manis crassicaudata*
	Manis pentadactyla
	Manis javanica
Lagomorpha	
Leporidae	*Nesolagus netscheri*
Rodentia	
Heteromyidae	*Dipodomys phillipsii phillipsii*
Sciuridae	*Ratufa* spp.
	Lariscus hosei
Castoridae	*Castor canadensis frondator*
	Castor canadensis repentinus
Cricetidae	*Ondatra zibethicus bernardi*
Canidae	*Canis lupus pallipes*
	Canis lupus irremotus
	Canis lupus crassodon
	Chrysocyon brachyurus
	Cuon alpinus
Ursidae	*Ursus (Thalarctos) maritimus*
	*Ursus arctos** +201
	Helarctos malayanus
Procyonidae	*Ailurus fulgens*
Mustelidae	*Martes americana atrata*
Viveridae	*Prionodon linsang*
	Cynogale bennetti
	Helogale derbianus
Felidae	*Felis yagouaroundi**
	Felis colocolo pajeros
	Felis colocolo crespoi

Felidae *continued*

Felis colocolo budini
Felis concolor missoulensis
Felis concolor mayensis
Felis concolor azteca
Felis serval
Felis lynx isabellina
*Felis wiedii**
*Felis pardalis**
*Felis tigrina**
Felis (=Caracal) caracal
Panthera leo persica
Panthera tigris altaica (=amurensis)

Pinnipedia

Otariidae
Arctocephalus australis
Arctocephalus galapagoensis
Arctocephalus philippii
Arctocephalus townsendi

Phocidae
Mirounga australis
Mirounga leonina

Tubulidentata

Orycteropidae
Orycteropus afer

Sirenia

Dugongidae
*Dugong dugon** + 204

Trichechidae
Trichechus senegalensis

Perissodactyla

Equidae
*Equus hemionus**

Tapiridae
Tapirus terrestris

Rhinocerotidae
Dicros bicornis

Artiodactyla

Hippopotamidae
Choeropus liberiensis

Cervidae
Cervus elaphus bactrianus
Pudu mephistophiles

Antilocapridae
Antilocapra americana mexicana

Bovidae
Cephalophus monticola
Oryx (tao) dammah
Addax nasomaculatus
Pantholops hodgsoni
*Capra falconeri**
*Ovis ammon**
Ovis canadensis

Sphenisciformes

Spheniscidae
Spheniscus demersus

Rheiformes

Rheidae
Rhea americana albescens
Pterocnemia pennata pennata
Pterocnemia pennata garleppi

Tinamiformes

Tinamidae
Rhynchotus rufescens rufescens
Rhynchotus rufescens pallescens
Rhynchotus rufescens maculicollis

Ciconiiformes

Ciconiidae
Ciconis nigra

Threskiornithidae
Geronticus calvus
Platalea leucorodia

Phoenicopteridae
Phoenicopterus ruber chilensis
Phoenicoparrus andinus
Phoenicoparrus jamesi

Pelecaniformes

Pelecanidae
Pelecanus crispus

Anseriformes

Anatidae
Anas aucklandica aucklandica
Anas aucklandica chlorotis
Anas hernieri
Dendrocygna arborea
Sarkidiornis melanotos
Anser albifrons gambelli
Cygnus bewickii jankowskii
Cygnus melancoryphus
Coscoroba coscoroba
Branta ruficollis

Falconiformes

Accipitridae
Gypaetus barbatus meridionalis
Aquila chrysaetos

Falconidae
Spp.*

Galliformes

Megapodiidae
Megapodius freycinet nicobariensis
Megapodius freycinet abbottii

Tetraonidae
Tympanuchus cupido pinnatus

Phasianidae
Francolinus ochropectus
Francolinus swierstrai
Catreus wallichii

Phasianidae *continued*	
	Polyplectron malacense
	Polyplectron germaini
	Polyplectron bicalcaratum
	Gallus sonneratii
	Argusianus argus
	Ithaginus cruentus
	Cyrtonyx montezumae montezumae
	Cyrtonyx montezumae mearnsi
Gruiformes	
Gruidae	*Balearica regulorum*
	Grus canadensis pratensis
Rallidae	*Gallirallus australis hectori*
Otididae	*Chlamydotis undulata*
	Choriotis nigriceps
	Otis tarda
Charadriiformes	
Scolopacidae	*Numenius tenuirostris*
	Numenius minutus
Laridae	*Larus brunneicephalus*
Columbiformes	
Columbidae	*Gallicolumba luzonica*
	Goura cristata
	Goura scheepmakeri
	Goura victoria
	Caloenas nicobarica pelewensis
Psittaciformes	
Psittacidae	*Coracopsis nigra barklyi*
	Prosopeia personata
	Eunymphicus cornutus
	Cyanoramphus unicolor
	Cyanoramphus novaezelandiae
	Cyanoramphus malherbi
	Poicephalus robustus
	Tanygnathus luzoniensis
	Probosciger aterrimus
Cuculiformes	
Musophagidae	*Turaco corythaix*
	Gallirex porphyreolophus
Strigiformes	
Strigidae	*Otus nudipes newtoni*
Coraciiformes	
Bucerotidae	*Buceros rhinoceros rhinoceros*
	Buceros bicornis
	Buceros hydrocorax hydrocorax
	Aceros narcondami

Piciformes	
Picidae	*Picus squamatus flavirostris*
Passeriformes	
Cotingidae	*Rupicola rupicola*
	Rupicola peruviana
Pittidae	*Pitta brachyura nympha*
Hirundinidae	*Pseudochelidon sirintarae*
Paradisaeidae	Spp.
Muscicapidae	*Muscicapa ruecki*
Fringillidae	*Spinus yarrellii*

AMPHIBIA

Urodela	
Ambystomidae	*Ambystoma mexicanum*
	Ambystoma dumerillii
	Ambystoma lermaensis
Salientia	
Bufonidae	*Bufo retiformis*

REPTILIA

Crocodylia	
Alligatoridae	*Caiman crocodilus crocodilus*
	Caiman crocodilus yacare
	Caiman crocodilus fuscus (*chiapasius*)
	Paleosuchus palpebrosus
	Paleosuchus trigonatus
Crocodylidae	*Crocodylus johnsoni*
	Crocodylus novaeguineae novaeguineae
	Crocodylus porosus
	Crocodylus acutus
Testudinata	
Emydidae	*Clemmys muhlenbergi*
Testudinidae	*Chersine* spp.
	Geochelone spp.•
	Gopherus spp.
	Homopus spp.
	Kinixys spp.
	Malacochersus spp.
	Pyxis spp.
	Testudo spp.•

Cheloniidae	*Caretta caretta*
	Chelonia mydas
	Chelonia depressa
	Eretmochelys imbricata bissa
	Lepidochelys olivacea
Dermochelidae	*Dermochelys coriacea*
Pelomedusidae	*Podocnemis* spp.
Lacertilia	
Teiidae	*Cnemidophorus hyperythrus*
Iguanidae	*Conolophus pallidus*
	Cololophus subcristatus
	Amblyrhynchus cristatus
	Phrynosoma coronatum blainvillei
Helodermatidae	*Heloderma suspectum*
	Heloderma horridum
Varanidae	*Varanus* spp.*
Serpentes	
Boidae	*Epicrates cenchris cenchris*
	Eunectes notaeus
	Constrictor constrictor
	Python spp.*
Colubridae	*Cyclagras gigas*
	Pseudoboa cloelia
	Elachistodon westermanni
	Thamnophis elegans hammondi

PISCES

Acipenseriformes	
Acipenseridae	*Acipenser fulvescens*
	Acipenser sturio
Osteoglossiformes	
Osteoglossidae	*Arapaima gigas*
Salmoniformes	
Salmonidae	*Stenodus leucichthys leucichthys*
	Salmo chrysogaster
Cypriniformes	
Cyprinidae	*Plagopterus argentissimus*
	Ptychocheilus lucius

Atheriniformes	
Cyprinodontidae	*Cynolebias constanciae*
	Cynolebias marmoratus
	Cynolebias minimus
	Cynolebias opalescens
	Cynolebias splendens
Poeciliidae	*Xiphophorus couchianus*
Coelacanthiformes	
Coelacanthidae	*Latimeria chalumnae*
Ceratodiformes	
Ceratodidae	*Neoceratodus forsteri*

MOLLUSCA

Naiadoida	
Unionidae	*Cyprogenia aberti*
	Epioblasma (=*Dysnomia*) *torulosa rangiana*
	Fusconaia subrotunda
	Lampsilis brevicula
	Lexingtonia dolabelloides
	Pleurobema clava
Stylommatophora	
Camaenidae	*Papustyla* (=*Papuina*) *pulcherrima*
Paraphantidae	*Paraphanta* spp. †202
Prosobranchia	
Hydrobiidae	*Coahuilix hubbsi*
	Cochliopina milleri
	Durangonella coahuilae
	Mexipyrgus carranzae
	Mexipyrgus churinceanus
	Mexipyrgus escobedae
	Mexipyrgus lugoi
	Mexipyrgus mojarralis
	Mexipyrgus multilineatus
	Mexithauma quadripaludium
	Nymphophilus minckleyi
	Paludiscala caramba

INSECTA

Lepidoptera	
Papilionidae	*Parnassius apollo apollo*

FLORA

Apocynaceae	*Pachypodium* spp.
Araliaceae	*Panax quinquefolium* ‡1
Araucariaceae	*Araucaria araucana* ‡2

Cactaceae	Cactaceae spp. +203 *Rhipsalis* spp.
Compositae	*Saussurea lappa* ‡1
Cyatheaceae	*Cyathea* (*Hemitelea*) *capensis* ‡3 *Cyathea dredgei* ‡3 *Cyathea mexicana* ‡3 *Cyathea* (*Alsophila*) *salvinii* ‡3
Dioscoreaceae	*Dioscorea deltoidea* ‡1
Euphorbiaceae	*Euphorbia* spp. −101
Fagaceae	*Quercus copeyensis* ‡2
Leguminosae	*Thermopsis mongolica*
Liliaceae	*Aloe* spp.*
Meliaceae	*Swietenia humilis* ‡2
Orchidaceae	Spp.*
Palmae	*Arenga ipot* *Phoenix hanceana* var. *philippinensis* *Zalacca clemensiana*
Portulacaceae	*Anacampseros* spp.
Primulaceae	*Cyclamen* spp.
Solanaceae	*Solanum sylvestris*
Sterculiaceae	*Basiloxylon excelsum* ‡2
Verbenaceae	*Caryopteris mongolica*
Zygophyllaceae	*Guaiacum sanctum* ‡2

[Appendix III: see Article II, paragraph 3. and Article XVI.]

ANNEX 8: Checklist of species for the Bonn Convention

APPENDIX I AND APPENDIX II OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS (CMS)

(as amended by the Conference of the Parties in 1985, 1988 and 1991)

APPENDIX I

Interpretation

1. Migratory species included in this Appendix are referred to:

   a) by the name of the species or subspecies; or
   b) as being all of the migratory species included in a higher taxon or designated part thereof.

2. Other references to taxa higher than species are for the purposes of information or classification only.

3. The abbreviation "(s.l.)" is used to denote that the scientific name is used in its extended meaning.

4. An asterisk (*) placed against the name of a species indicates that the species, or a separate population of that species, or a higher taxon which includes that species is included in Appendix II.

MAMMALIA

CHIROPTERA	
Molossidae	*Tadarida brasiliensis*
PRIMATES	
Pongidae	*Gorilla gorilla beringei*
CETACEA	
Balaenopteridae	*Balaenoptera musculus*
	Megaptera novaeangliae
Balaenidae	*Balaena mysticetus*
	Eubalaena glacialis \ 1/
	Eubalaena australis /
CARNIVORA	
Felidae	*Panthera uncia*
PINNIPEDIA	
Phocidae	*Monachus monachus* *
PERISSODACTYLA	
Equidae	*Equus grevyi*
ARTIODACTYLA	
Camelidae	*Vicugna vicugna* * (except Peruvian populations) 2/
Cervidae	*Cervus elaphus barbarus*
Bovidae	*Bos sauveli*
	Bos grunniens
	Addax nasomaculatus
	Gazella cuvieri
	Gazella dama
	Gazella dorcas (only Northwest African populations)
	Gazella leptoceros

1/ Formerly listed as *Eubalaena glacialis* (s.l.)
2/ Formerly listed as *Lama vicugna* * (except Peruvian populations)

AVES

PROCELLARIIFORMES	
Diomedeidae	*Diomedea albatrus*
Procellariidae	*Pterodroma cahow*
	Pterodroma phaeopygia
PELECANIFORMES	
Pelecanidae	*Pelecanus crispus* *
	Pelecanus onocrotalus (only Palearctic populations)
CICONIIFORMES	
Ardeidae	*Egretta eulophotes*
Ciconiidae	*Ciconia boyciana*
Threskiornithidae	*Geronticus eremita*
ANSERIFORMES	
Anatidae	*Chloephaga rubidiceps* *
FALCONIFORMES	
Accipitridae	*Haliaeetus albicilla* *
	Haliaeetus pelagicus *
GRUIFORMES	
Gruidae	*Grus japonensis* *
	Grus leucogeranus *
	Grus nigricollis *
Otididae	*Chlamydotis undulata* * (only Northwest African populations)
CHARADRIIFORMES	
Scolopacidae	*Numenius borealis* *
	Numenius tenuirostris *
Laridae	*Larus audouinii*
	Larus leucophthalmus
	Larus relictus
	Larus saundersi
Alcidae	*Synthliboramphus wumizusume*
PASSERIFORMES	
Parulidae	*Dendroica kirtlandii*
Fringillidae	*Serinus syriacus*

REPTILIA

TESTUDINATA	
Cheloniidae	*Chelonia mydas* *
	Caretta caretta *
	Eretmochelys imbricata *
	Lepidochelys kempii *
	Lepidochelys olivacea *
Dermochelyidae	*Dermochelys coriacea* *
Pelomedusidae	*Podocnemis expansa* * (only Upper Amazon populations)
CROCODYLIA	
Gavialidae	*Gavialis gangeticus*

PISCES

SILURIFORMES	
Schilbeidae	*Pangasianodon gigas*

APPENDIX II

Interpretation

1. Migratory species included in this Appendix are referred to:

   a) by the mame of the species or subspecies; or
   b) as being all of the migratory species included in a higher taxon or designated part thereof.

   Unless otherwise indicated, where reference is made to a taxon higher than species, it is understood that all the migratory species within that taxon could significantly benefit from the conclusion of AGREEMENTS.

2. The abbreviation "spp." following the name of a Family or Genus is used to denote all migratory species within that Family or Genus.

3. Other references to taxa higher than species are for the purposes of information or classification only.

4. The abbreviation "(s.l.)" is used to indicate that the scientific name is used in its extended meaning.

5. An asterisk (*) placed against the name of a species or higher taxon indicates that the species, or a separate population of that species, or one or more species included in that higher taxon is included in Appendix I.

MAMMALIA

CHIROPTERA	
Rhinolophidae	R. spp. (only European populations)
Vespertilionidae	V. spp. (only European populations)
CETACEA	
Platanistidae	*Platanista gangetica*
Pontoporiidae	*Pontoporia blainvillei*
Iniidae	*Inia geoffrensis*
Monodontidae	*Delphinapterus leucas*
	Monodon monoceros
Phocoenidae	*Phocoena phocoena* (North and Baltic Sea, western North Atlantic, and Black Sea populations)
	Neophocaena phocaenoides
	Phocoenoides dalli
Delphinidae	*Sousa chinensis*
	Sousa teuszii
	Sotalia fluviatilis
	Lagenorhynchus albirostris (only North and Baltic Sea populations)
	Lagenorhynchus acutus (only North and Baltic Sea populations)
	Lagenorhynchus australis
	Grampus griseus (only North and Baltic Sea populations)
	Tursiops truncatus (North and Baltic Sea, western Mediterranean, and Black Sea populations)
	Stenella attenuata (eastern tropical Pacific population)
	Stenella longirostris (eastern tropical Pacific populations)
	Stenella coeruleoalba (eastern tropical Pacific and western Mediterranean populations)
	Delphinus delphis (North and Baltic Sea, western Mediterranean, Black Sea and eastern tropical Pacific populations)
	Orcaella brevirostris
	Cephalorhynchus commersonii (South American population)
	Cephalorhynchus heavisidii

Delphinidae	*Orcinus orca* (eastern North Atlantic and eastern North Pacific populations)
	Globicephala melas (only North and Baltic Sea populations) 3/
Ziphiidae	*Berardius bairdii*
	Hyperoodon ampullatus
PINNIPEDIA	
Phocidae	*Phoca vitulina* (only Baltic and Wadden Sea populations)
	Halichoerus grypus (only Baltic Sea populations)
	Monachus monachus *
PROBOSCIDEA	
Elephantidae	*Loxodonta africana*
SIRENIA	
Dugongidae	*Dugong dugon*
ARTIODACTYLA	
Camelidae	*Vicugna vicugna* * 4/
Bovidae	*Oryx dammah*
	Gazella gazella (only Asian populations)

AVES

PELECANIFORMES	
Pelecanidae	*Pelecanus crispus* *
CICONIIFORMES	
Ciconiidae	*Ciconia ciconia*
	Ciconia nigra
Threskiornithidae	*Platalea leucorodia*
	Plegadis falcinellus
Phoenicopteridae	Ph. spp.
ANSERIFORMES	
Anatidae	A. spp. *
FALCONIFORMES	
Cathartidae	C. spp.
Pandionidae	*Pandion haliaetus*
Accipitridae	A. spp. *
Falconidae	F. spp.
GALLIFORMES	
Phasianidae	*Coturnix coturnix coturnix*
GRUIFORMES	
Gruidae	*Grus* spp. *
	Anthropoides virgo
Otididae	*Chlamydotis undulata* * (only Asian populations)
	Otis tarda

3/ Formerly listed as *Globicephala melaena* (only North and Baltic Sea populations)
4/ Formerly listed as *Lama vicugna* *

CHARADRIIFORMES	
Recurvirostridae	R. spp.
Phalaropodidae	P. spp.
Burhinidae	*Burhinus oedicnemus*
Glareolidae	*Glareola pratincola*
	Glareola nordmanni
Charadriidae	C. spp.
Scolopacidae	S. spp. *
Laridae	*Sterna dougallii* (Atlantic population)
CORACIIFORMES	
Meropidae	*Merops apiaster*
Coraciidae	*Coracias garrulus*
PASSERIFORMES	
Muscicapidae	M. (s.l.) spp.

REPTILIA

TESTUDINATA	
Cheloniidae	C. spp. *
Dermochelyidae	D. spp. *
Pelomedusidae	*Podocnemis expansa* *
CROCODYLIA	
Crocodylidae	*Crocodylus porosus*

PISCES

ACIPENSERIFORMES	
Acipenseridae	*Acipenser fulvescens*

INSECTA

LEPIDOPTERA	
Danaidae	*Danaus plexippus*

ANNEX 9: Checklist of species for the Bern Convention

Council of Europe
Conseil de l'Europe

Strasbourg, 2 July 1993
[S:\TPVS93\TPVS16A.93]

T-PVS (93) 16

CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE AND NATURAL HABITATS

CONVENTION RELATIVE A LA CONSERVATION DE LA VIE SAUVAGE ET DU MILIEU NATUREL DE L'EUROPE

APPENDICES TO THE CONVENTION

ANNEXES A LA CONVENTION

Secretariat Memorandum
prepared by the
Directorate of Environment
and Local Authorities

Note du Secrétariat Général
établie par la
Direction de l'Environnement
et des Pouvoirs Locaux

A/N6887

APPENDIX I/ANNEXE I

STRICTLY PROTECTED FLORA SPECIES
ESPECES DE FLORE STRICTEMENT PROTEGEES

PTERIDOPHYTA

ASPLENIACEAE
Asplenium hemionitis L.
Asplenium jahandiezii (Litard.)Rouy

BLECHNACEAE
Woodwardia radicans (L.) Sm.

DICKSONIACEAE
Culcita macrocarpa C.Presl

DRYOPTERIDACEAE
Dryopteris corleyi Fraser-Jenk.
Polystichum drepanum (Swartz) C.Presl

HYMENOPHYLLACEAE
Hymenophyllum maderensis
Trichomanes speciosum Willd.

ISOETACEAE
Isoetes azorica Durieu ex Milde
Isoetes boryana Durieu
Isoetes malinverniana Ces. & De Not.

MARSILEACEAE
Marsilea azorica Launert
Marsilea batardae Launert
Marsilea quadrifolia L.
Marsilea strigosa Willd.
Pilularia minuta Durieu ex.Braun

OPHIOGLOSSACEAE
Botrychium simplex Hitchc.
Ophioglossum polyphyllum A.Braun

SALVINIACEAE
Salvinia natans (L.) All.

GYMNOSPINACEAE
Abies nebrodensis (Lojac.) Mattei

ANGIOSPERMAE

AGAVACEAE
Dracaena draco (L.) L.

ALISMATACEAE
Alisma wahlenbergii (O.R.Holmb.) Juz.
Caldesia parnassifolia (L.) Parl.
Luronium natans (L.) Raf.

AMARYLLIDACEAE
Leucojum nicaeense Ard.
Narcissus longispathus Pugsley
Narcissus nevadensis Pugsley
Narcissus scaberulus Henriq.
Narcissus triandrus L.
Narcissus viridiflorus Schousboe
Sternbergia candida B.Mathew & Baytop

APOCYNACEAE
Rhazya orientalis (Decaisne) A.DC.

ARACEAE
Arum purpureospathum Boyce

ARISTOLOCHIACEAE
Aristolochia samsunensis Davis

ASCLEPIADACEAE
Caralluma burchardii N.E.Brown
Ceropegia chrysantha Svent.

BERBERIDACEAE
Berberis maderensis Lowe

BORAGINACEAE
Alkanna pinardii Boiss.
Anchusa crispa Viv. (inclu. A. litoreae)
Echium gentianoides Webb ex Coincy
Lithodora nitida (H.Ern) R.Fernandes
Myosotis azorica H.C.Watson
Myosotis rehsteineri Wartm.
Omphalodes kuzinskyana Willk.
Omphalodes littoralis Lehm.
Onosma halophilum Boiss. & Heldr.
Onosma proponticum Aznav.
Onosma troodi Kotschy
Solenanthus albanicus (Degen et al.) Degen & Baldacci
Symphytum cycladense Pawl.

CAMPANULACEAE
Asyneuma giganteum (Boiss.) Bornm.
Azorina vidalii (H.C.Watson) Feer
Campanula damboldtiana Davis
Campanula lycica Sorger & Kit Tan
Campanula morettiana Reichenb.
Campanula sabatia De Not.
Jasione lusitanica A.DC.
Musschia aurea (L.f.) DC.
Musschia wollastonii Lowe
Physoplexis comosa (L.) Schur
Trachelium asperuloides Boiss. & Orph.

CAPRIFOLIACEAE
Sambucus palmensis Link

CARYOPHYLLACEAE
Arenaria nevadensis Boiss. & Reuter
Arenaria provincialis Chater & Halliday

Dianthus rupicola Biv.
Gypsophila papillosa P.Porta
Herniaria algarvica Chaudri
Herniaria maritima Link
Moehringia fontqueri Pau
Moehringia tommasinii Marches.
Petrocoptis grandiflora Rothm.
Petrocoptis montsicciana O.Bolos Rivas Mart.
Petrocoptis pseudoviscosa Fernandez Casas
Saponaria halophila Hedge & Hub.-Mor.
Silene furcata Raf. subsp. angustiflora (Rupr.) Walters
Silene haussknechtii Heldr. ex Hausskn.
Silene hifacensis Rouy ex Willk.
Silene holzmannii Heldr. ex Boiss.
Silene mariana Pau
Silene orphanidis Boiss.
Silene pompeiopolitana Gay ex Boiss.
Silene rothmaleri Pinto da Silva
Silene salsuginea Hub.-Mor.
Silene sangaria Coode & Cullen
Silene velutina Pourret ex Loisel.

CHENOPODIACEAE
Beta adanensis Pamuk. apud Aellen
Beta trojana Pamuk. apud Aellen
Kalidiopsis wagenitzii Aellen
Kochia saxicola Guss.
Microcnemum coralloides (Loscos & Pardo) subsp. anatolicum Wagenitz
Salicornia veneta Pignatti & Lausi
Salsola anatolica Aellen
Suaeda cucullata Aellen

CISTACEAE
Helianthemum alypoides Losa & Rivas Goday
Helianthemum bystropogophyllum Svent.
Helianthemum caput-felis Boiss.
Tuberaria major (Willk.) Pinto da Silva & Roseira

COMPOSITAE
Anacyclus latealatus Hub.-Mor.
Anthemis glaberrima (Rech.f.) Greuter
Anthemis halophila Boiss. & Bal.
Argyranthemum lidii Humphries
Argyranthemum pinnatifidum (L.F.) Lowe subsp. succulentum (Lowe) Humphries
Argyranthemum winterii (Svent.) Humphries
Artemisia granatensis Boiss.
Artemisia insipida Vill.
Artemisia laciniata Willd.
Artemisia pancicii (Janka) Ronn.
Aster pyrenaeus Desf. ex DC.France,
Aster sibiricus L.
Atractylis arbuscula Svent. & Michaelis
Atractylis preauxiana Schultz Bip.
Carduus myriacanthus Salzm. ex DC.
Carlina diae (Rech.f.) Meusel & Kastener
Centaurea alba L. subsp. heldreichii (Halacsy) Dostal (Centaurea heldreichii Halacsy)
Centaurea alba L. subsp. princeps (Boiss. & Heldr.) Gugler (Centaurea princeps Boiss. & Heldr.)
Centaurea attica Nyman subsp. megarensis (Halacsy & Hayek) Dostal (Centaurea megarensis Halacsy & Hayek)
Centaurea balearica J.D.Rodriguez
Centaurea borjae Valdes-Berm. & Rivas Goday
Centaurea citricolor Font Quer
Centaurea corymbosa Pourret
Centaurea hermannii F.Hermann
Centaurea horrida Badaro
Centaurea kalambakensis Freyn & Sint.
Centaurea kartschiana Scop.
Centaurea lactiflora Halacsy
Centaurea niederi Heldr.
Centaurea peucedanifolia Boiss. & Orph.
Centaurea pinnata Pau
Centaurea pulvinata (G.Blanca) G.Blanca
Centaurea tchihatcheffii Fich. & Mey.
Crepis crocifolia Boiss. & Heldr.
Crepis granatensis (Willk.) G.Blanca & M.Cueto
Crepis purpurea Willd. Bieb.
Erigeron frigidus Boiss. ex DC.
Helichrysum gossypinum Webb
Helichrysum sibthorpii Rouy
Hymenostemma pseudanthemis (Kunze) Willd.
Hypochoeris oligocephala (Svent. & D.Bramwell) Lack
Jurinea cyanoides (L.) Reichenb.
Jurinea fontqueri Cuatrec.
Lactuca watsoniana Trelease
Lamyropsis microcephala (Moris) Dittrich & Greuter
Leontodon boryi Boiss. ex DC.
Leontodon microcephalus (Boiss. ex DC.) Boiss.
Leontodon siculus (Guss.) Finch & Sell
Ligularia sibirica (L.) Cass.
Onopordum carduelinum Bolle
Onopordum nogalesii Svent.
Pericallis hadrosomus Svent.
Picris willkommii (Schultz Bip.) Nyman
Santolina elegans Boiss. ex DC.
Senecio elodes Boiss. ex DC.
Senecio nevadensis Boiss. & Reuter
Sonchus erzincanicus Matthews
Stemmacantha cynaroides
Sventenia bupleuroides Font Quer
Tanacetum ptarmiciflorum (Webb) Schultz Bip.
Wagenitzia lancifolia (Sieber ex Sprengel) Dostal

CONVOLVULACEAE
Convolvulus argyrothamnos Greuter
Convolvulus caput-medusae Lowe
Convolvulus lopez-socasi Svent.
Convolvulus massonii A.Dietr.
Convolvulus pulvinatus Sa'ad
Pharbitis preauxii Webb

CRASSULACEAE
Aeonium gomeraense Praeger
Aeonium saundersii Bolle

CRUCIFERAE
Alyssum akamasicum B.L.Burtt
Alyssum pyrenaicum Lapeyr. (Ptilotrichum pyrenaicum (Lapeyr.) Boiss.)
Arabis kennedyae Meikle
Biscutella neustriaca Bonnet
Boleum asperum (Pers.) Desvaux
Brassica glabrescens Poldini
Brassica hilarionis Post

Brassica insularis Moris
Brassica macrocarpa Guss.
Braya purpurasceus (R.Br.) Bunge
Coincya rupestris Rouy (Hutera rupestris P. Porta)
Coronopus navasii Pau
Crambe arborea Webb ex Christ
Crambe laevigata DC. ex Christ
Crambe sventenii B.Petters. ex Bramw. & Sunding
Diplotaxis ibicensis (Pau) Gomez-Campo
Diplotaxis siettiana Maire
Erucastrum palustre (Pirona) Vis.
Iberis arbuscula Runemark
Ionopsidium acaule (Desf.) Reichemb.
Ionopsidium savianum (Caruel) Ball ex Arcang.
Murbeckiella sousae Rothm.
Parolinia schizogynoides Svent.
Sisymbrium cavanillesianum Valdes & Castroviejo
(S. matritense P.W.Ball & Heywood)
Sisymbrium confertum Stev.
Sisymbrium supinum L.
Thlaspi cariense A.Carlström

CYPERACEAE
Eleocharis carniolica Koch

DIOSCOREACEAE
Borderea chouardii (Gaussen) Heslot

DIPSACACEAE
Dipsacus cephalarioides Mathews & Kupicha

DROSERACEAE
Aldrovanda vesiculosa L.

ERICACEAE
Erica scoparia L. subsp. azorica (Hochst.) D.A.Webb

EUPHORBIACEAE
Euphorbia handiensis Burchard
Euphorbia lambii Svent.
Euphorbia margalidiana Kuhbier & Lewejohann
Euphorbia nevadensis Boiss. & Reuter
Euphorbia stygiana H.C.Watson

GENTIANACEAE
Centaurium rigualii Esteve Chueca
Centaurium somedanum Lainz
Gentiana ligustica R. de Vilm. Chopinet
Gentianella anglica (Pugsley) E.F.Warburg

GERANIACEAE
Erodium astragaloides Boiss. & Reuter
Erodium chrysanthum L'Herit. ex DC.
Erodium paularense Fernandez-Gonzalez & Izco
Erodium rupicola Boiss.
Geranium maderense Yeo

GESNERIACEAE
Jankaea heldreichii (Boiss.) Boiss.
Ramonda serbica Pancic

GRAMINEAE
Avenula hackelii (Henriq.) Holub
Bromus bromoideus (Lej.) Crepin
Bromus grossus Desf. ex DC.
Bromus interruptus (Hackel) Druce
Bromus psammophilus P.M.Smith
Coleanthus subtilis (Tratt.) Seidl
Eremopoa mardinensis R.Mill
Gaudinia hispanica Stace & Tutin
Micropyropsis tuberosa Romero-Zarco Cabezudo
Puccinellia pungens (Pau) Paunero
Stipa austroitalica Martinovsky
Stipa bavarica Martinovsky & H.Scholz
Stipa styriaca Martinovsky
Trisetum subalpestre (Hartm.) Neuman

GROSSULARIACEAE
Ribes sardoum Martelli

HYPERICACEAE
Hypericum aciferum (Greuter) N.K.B.Robson
Hypericum salsugineum Robson & Hub.-Mor.

IRIDACEAE
Crocus abantensis T.Baytop & Mathew
Crocus cyprius Boiss. & Kotschy
Crocus etruscus Parl.
Crocus hartmannianus Holmboe
Crocus robertianus C.D. Brickell
Iris marsica Ricci & Colasante

LABIATAE
Dracocephalum austriacum L.
Micromeria taygetea P.H.Davis
Nepeta dirphya (Boiss.) Heldr. ex Halacsy
Nepeta sphaciotica P.H.Davis
Origanum cordifolium (Auch. & Montbr.)
Vogel (Amaracus cordifolium Montr. & Auch.)
Origanum dictamnus L.
Origanum scabrum Boiss. & Heldr
Phlomis brevibracteata Turrill
Phlomis cypria Post
Rosmarinus tomentosus Huber-Morath & Maire
Salvia crassifolia Sibth. & Smith
Sideritis cypria Post
Sideritis cystosiphon Svent.
Sideritis discolor (Webb ex de Noe) Bolle
Sideritis incana L. ssp. glauca (Cav.) Malagarriga
Sideritis infernalis Bolle
Sideritis javalambrensis Pau
Sideritis marmorea Bolle.
Sideritis serrata Cav. ex Lag.
Teucrium charidemi Sandwith
Teucrium lepicephalum Pau
Teucrium turredanum Losa & Rivas Goday
Thymus aznavourii Velen.
Thymus camphoratus Hoffmanns. & Link
Thymus carnosus Boiss.
Thymus cephalotos L.

LEGUMINOSAE
Anagyris latifolia Brouss. ex Willd.
Anthyllis hystrix Cardona, Contandr. & E.Sierra
Astragalus algarbiensis Coss. ex Bunge
Astragalus aquilanus Anzalone
Astragalus centralpinus Braun-Blanquet

Astragalus macrocarpus DC. subsp. lefkarensis Agerer-Kirchoff & Meikle
Astragalus maritimus Moris
Astragalus tremolsianus Pau
Astragalus verrucosus Moris
Cytisus aeolicus Guss. ex Lindl.
Dorycnium spectabile Webb & Berthel.
Genista dorycnifolia Font Quer
Genista holopetala (Fleischm. ex Koch) Baldacci
Glycyrrhiza iconica Hub.-Mor.
Lotus azoricus P.W.Ball
Lotus callis-viridis D.Bramwell & D.H.Davis
Lotus kunkelii (E.Chueca) D.Bramwell et al.
Ononis maweana Ball
Oxytropis deflexa (Pallas) DC. ssp. norvegica Nordh.
Sphaerophysa kotschyana Boiss.
Teline rosmarinifolia Webb & Berthel.
Teline salsoloides Arco & Acebes.
Thermopsis turcica Kit Tan, Vural & Küçüködü
Trifolium pachycalyx Zoh.
Trifolium saxatile All.
Trigonella arenicola Hub.-Mor.
Trigonella halophila Boiss.
Trigonella polycarpa Boiss. & Heldr.
Vicia bifoliolata J.D.Rodriguez
Vicia dennesiana H.C.Watson

LENTIBULARIACEAE
Pinguicula crystallina Sibth. & Sm.
Pinguicula nevadensis (Lindb.) Casper

LILIACEAE
Allium grosii Font Quer
Allium vuralii Kit Tan
Androcymbium europaeum (Lange) K.Richter
Androcymbium psammophilum Svent.
Androcymbium rechingeri Greuter
Asparagus lycaonicus Davis
Asphodelus bento-rainhae Pinto da Silva
Chionodoxa lochiae Meikle
Chionodoxa luciliae Boiss.
Colchicum arenarium Waldst. & Kit.
Colchicum corsicum Baker
Colchicum cousturieri Greuter
Colchicum micranthum Boiss.
Fritillaria conica Boiss.
Fritillaria drenovskii Degen & Stoy.
Fritillaria epirotica Turrill ex Rix
Fritillaria euboeica (Rix Doerfler) Rix
Fritillaria gussichiae (Degen & Doerfler) Rix
Fritillaria obliqua Ker-Gawl.
Fritillaria rhodocanakis Orph. ex Baker
Fritillaria tuntasia Heldr. ex Halacsy
Muscari gussonei (Parl.) Tod.
Ornithogalum reverchonii Lange
Scilla morrisii Meikle
Scilla odorata Link
Tulipa cypria Stapf
Tulipa goulimya Sealy & Turrill
Tulipa praecox Ten.
Tulipa sprengeri Baker

LYTHRACEAE
Lythrum flexuosum Lag.
Lythrum thesioides M.Bieb.

MALVACEAE
Kosteletzkya pentacarpos (L.) Ledeb.

MYRICACEAE
Myrica rivas-martinezii Santos.

NAJADACEAE
Najas flexilis (Willd.) Rostk. & W.L.Schmidt
Najas tenuissima (A.Braun) Magnus

ORCHIDACEAE
Cephalanthera cucullata Boiss. & Heldr.
Comperia comperiana (Steven) Aschers. & Graebner
Cypripedium calceolus L.
Dactylorhiza chuhensis Renz & Taub.
Goodyera macrophylla Lowe
Liparis loeselii (L.) Rich.
Ophrys argolica Fleischm.
Ophrys isaura Renz & Taub.
Ophrys kotschyi Fleischm. & Soo
Ophrys lunulata Parl.
Ophrys lycia Renz & Taub.
Orchis scopulorum Summerh.
Platanthera obtusata (Pursh) Lindl. subsp. oligantha (Turcz.) Hulten
Spiranthes aestivalis (Poiret) L.C.M. Richard

PAEONIACEAE
Paeonia cambessedesii (Willk.) Willk.
Paeonia clusii F.C.Stern subsp. rhodia (Stearn) Tzanoudakis
Paeonia parnassica Tzanoudakis

PALMAE
Phoenix theophrasti Greuter

PAPAVERACEAE
Papaver lapponicum (Tolm.) Nordh.
Rupicapnos africana (Lam.) Pomel

PITTOSPORACEAE
Pittosporum coriaceum Dryander ex Aiton

PLUMBAGINACEAE
Armeria pseudarmeria (Murray) Mansfeld
Armeria rouyana Daveau
Armeria soleirolii (Duby) Godron
Armeria velutina Welv. ex Boiss. & Reuter
Limonium anatolicum Hedge
Limonium arborescens (Brouss.) Kuntze
Limonium dendroides Svent.
Limonium spectabile (Svent.) Kunkel & Sunding
Limonium sventenii Santos & Fernandez Galvan
Limonium tamaricoides Bokhari

POLEMONIACEAE
Polemonium boreale Adams

POLYGONACEAE
Polygonum praelongum Coode & Cullen
Rumex rupestris Le Gall

PRIMULACEAE
Androsace cylindrica DC.
Androsace mathildae Levier
Androsace pyrenaica Lam.
Cyclamen mirabile Hildebr.
Lysimachia minoricensis J.D.Rodriguez
Primula apennina Widmer
Primula egaliksensis Wormsk.
Primula glaucescens Moretti
Primula palinuri Petagna
Primula spectabilis Tratt.
Soldanella villosa Darracq

RANUNCULACEAE
Aconitum corsicum Gayer
Adonis cyllenea Boiss., Heldr. & Orph.
Adonis distorta Ten.
Aquilegia bertolonii Schott
Aquilegia kitaibelii Schott
Aquilegia ottonis subsp. taygetea (Orph.) Strid
Aquilegia pyrenaica DC. subsp. cazorlensis (Heywood) Galiano & Rivas Martinez (Aquilegia cazorlensis Heywood)
Consolida samia P.H.Davis
Delphinium caseyi B.L.Burtt
Pulsatilla patens (L.) Miller
Ranunculus fontanus C. Presl
Ranunculus kykkoensis Meikle
Ranunculus weyleri Mares

RESEDACEAE
Reseda decursiva Forssk.Gibraltar

ROSACEAE
Bencomia brachystachya Svent.
Bencomia sphaerocarpa Svent.
Chamaemeles coriacea Lindl.
Crataegus dikmensis Pojark
Dendriopoterium pulidoi Svent.
Potentilla delphinensis Gren. & Godron
Pyrus anatolica Browicz

RUBIACEAE
Galium globuliferum Hub.-Mor. & Reese
Galium litorale Guss.
Galium viridiflorum Boiss. & Reuter

RUTACEAE
Ruta microcarpa Svent.

SANTALACEAE
Kunkeliella subsucculenta Kammer
Thesium ebracteatum Hayne

SAPOTACEAE
Sideroxylon marmulano Banks ex Lowe

SAXIFRAGACEAE
Saxifraga berica (Beguinot) D.A.Webb
Saxifraga cintrana Kuzinsky ex Willk.
Saxifraga florulenta Moretti
Saxifraga hirculus L.
Saxifraga portosanctana Boiss.
Saxifraga presolanensis Engl.
Saxifraga tombeanensis Boiss. ex Engl.
Saxifraga valdensis DC.
Saxifraga vayredana Luizet

SCROPHULARIACEAE
Antirrhinum charidemi Lange
Euphrasia azorica H.C.Watson
Euphrasia grandiflora Hochst.
Euphrasia marchesettii Wettst. ex Marches.
Isoplexis chalcantha Svent. & O'Shanahan
Isoplexis isabelliana (Webb & Berthel.) Masferrer
Linaria algarviana Chav.
Linaria ficalhoana Rouy
Linaria flava (Poiret) Desf.
Linaria hellenica Turril
Linaria ricardoi Cout.
Linaria tursica B.Valdes & Cabezudo
Lindernia procumbens (Krocker) Philcox
Odontites granatensis Boiss.
Verbascum afyonense Hub.-Mor.
Verbascum basivelatum Hub.-Mor.
Verbascum cylleneum (Boiss. & Heldr.) Kuntze
Verbascum degenii Hal.
Verbascum stepporum Hub.-Mor.
Veronica oetaea L.-A.Gustavsson

SELAGINACEAE
Globularia ascanii D.Bramwell & Kunkel
Globularia sarcophylla Svent.
Globularia stygia Orph. ex Boiss.

SOLANACEAE
Atropa baetica Willk.
Mandragora officinarum L.
Solanum lidii Sunding

THYMELAEACEAE
Daphne petraea Leybold
Daphne rodriguezii Texidor
Thymelea broterana Coutinho

TRAPACEAE
Trapa natans L.

TYPHACEAE
Typha minima Funk
Typha shuttleworthii Koch & Sonder

ULMACEAE
Zelkova abelicea (Lam.) Boiss.

UMBELLIFERAE
Angelica heterocarpa Lloyd
Angelica palustris (Besser) Hoffman
Apium bermejoi Llorens
Apium repens (Jacq.) Lag.
Athamanta cortiana Ferrarini
Bunium brevifolium Lowe
Bupleurum capillare Boiss. & Heldr.
Bupleurum dianthifolium Guss.
Bupleurum handiense (Bolle) Kunkel
Bupleurum kakiskalae Greuter
Eryngium alpinum L.
Eryngium viviparum Gay

Ferula halophila H.Pesmen
Ferula latipinna Santos
Laserpitium longiradium Boiss.
Naufraga balearica Constance & Cannon
Oenanthe conioides Lange
Petagnia saniculifolia Guss.
Rouya polygama (Desf.) Coincy
Seseli intricatum Boiss.
Thorella verticillatinundata (Thore) Briq.

VALERIANACEAE
Centranthus trinervis (Viv.) Beguinot

VIOLACEAE
Viola athois W.Becker
Viola cazorlensis Gandoger
Viola cryana Gillot
Viola delphinantha Boiss.
Viola hispida Lam.
Viola jaubertiana Mares & Vigineix

BRYOPHYTA

BRYOPSIDA: ANTHOCEROTAE

ANTHOCEROTACEAE
Notothylas orbicularis (Schwein.) Sull.

BRYOPSIDA: HEPATICAE

AYTONIACEAE
Mannia triandra (Scop.) Grolle

CEPHALOZIACEAE
Cephalozia macounii (Aust.) Aust.

CODONIACEAE
Petalophyllum ralfsii (Wils.) Nees et Gott. ex Lehm.

FRULLANIACEAE
Frullania parvistipula Steph.

GYMNOMITRIACEAE
Marsupella profunda Lindb.

JUNGERMANNIACEAE
Jungermannia handelii (Schiffn.) Amak.

RICCIACEAE
Riccia breidleri Jur. ex Steph.

RIELLACEAE
Riella helicophylla (Mont.) Hook.

SCAPANIACEAE
Scapania massalongi (K.Muell.) K.Muell.

BRYOPSIDA: MUSCI

AMBLYSTEGIACEAE
Drepanocladus vernicosus (Mitt.) Warnst.

BRUCHIACEAE
Bruchia vogesiaca Schwaegr.

BUXBAUMIACEAE
Buxbaumia viridis (Moug. ex Lam. & DC.)
Brid. ex Moug. & Nestl.

DICRANACEAE
Atractylocarpus alpinus (Schimp. ex Milde) Lindb.
Cynodontium suecicum (H.Arn. & C.Jens.) I.Hag.
Dicranum viride (Sull. & Lesq.) Lindb.

ECHINODIACEAE
Echinodium spinosum (Mitt.) Jur.

FONTINALACEAE
Dichelyma capillaceum (With.) Myr.

FUNARIACEAE
Pyramidula tetragona (Brid.) Brid.

HOOKERIACEAE
Distichophyllum carinatum Dix. & Nich.

MEESIACEAE
Meesia longiseta Hedw.

ORTHOTRICHACEAE
Orthotrichum rogeri Brid.

POTTIACEAE
Bryoerythrophyllum machadoanum (Sergio) M.Hill

SPHAGNACEAE
Sphagnum pylaisii Brid.

SPLACHNACEAE
Tayloria rudolphiana (Garov.) B.S.G.

THAMNIACEAE
Thamnobryum fernandesii Sergio

APPENDIX II/ANNEXE II

STRICTLY PROTECTED FAUNA SPECIES
ESPECES DE FAUNE STRICTEMENT PROTEGEES

VERTEBRATES/VERTEBRES

Mammals/Mammifères

INSECTIVORA
Erinaceidae
Erinaceus (Aethechinus) algirus
Soricidae
Crocidura ariadne
Crocidura cypria
Crocidura canariensis
Talpidae
Desmana pyrenaica (Galemys pyrenaicus)

MICROCHIROPTERA
all species except
Pipistrellus pipistrellus
toutes les espèces à l'exception de
Pipistrellus pipistrellus

RODENTIA
Sciuridae
Sciurus anomalus
Citellus citellus
Pteromys volans (Sciuropterus russicus)
Cricetidae
Cricetus cricetus
Microtidae
Pitymys bavaricus (Microtus bavaricus)
Zapodidae
Sicista betulina
Sicista subtilis
Hystricidae
Hystrix cristata

CARNIVORA
Canidae
Canis lupus
Alopex lagopus
Ursidae
all species/toutes les espèces
Mustelidae
Lutreola (Mustela) lutreola
Lutra lutra
Gulo gulo
Felidae
Felis silvestris (catus)
Lynx pardina (pardellus)
Pantera pardus
Pantera tigris
Odobenidae
Odobenus rosmarus
Phocidae
Monachus monachus

ARTIODACTYLA
Cervidae
Cervus elaphus corsicanus
Bovidae
Capra aegagrus
Capra pyrenaica pyrenaica
Rupicapra rupicapra ornata
Ovibos moschatus

CETACEA
Delphinidae
Orcinus orca
Pseudoroa crassidens
Grampus griseus
Globicephala melaena
Delphinus delphis
Tursiops truncatus (tursio)
Lagenorhynchus acutus
Lagenorhynchus albirostris
Steno bredanensis
Stenella coeruleoalba
Phocaenidae
Phocaena phocaena
Ziphiidae
Hyperoodon rostratus
Mesoplodon mirus
Mesoplodon bidens
Ziphius cavirostris
Balaenopteridae
Sibbaldus (Balaenoptera) musculus
Megaptera novaengliae (longimana, nodosa)
Balaenidae
Eubalaena glacialis
Balaena mysticetus

Birds/Oiseaux

GAVIIFORMES
Gaviidae
all species/toutes les espèces

PODICIPEDIFORMES
Podicipedidae
Podiceps griseigena
Podiceps auritus
Podiceps nigricollis (caspicus)
Podiceps ruficollis

PROCELLARIIFORMES
Hydrobatidae
all species/toutes les espèces

Procellariidae
Bulweria bulwèrii
Procellaria diomedea
Puffinus puffinus
Puffinus assimilis baroli
Pterodroma madeira
Pterodroma feae

PELECANIFORMES
Phalacrocoracidae
Phalocrocorax pygmaeus
Pelecanidae
all species/toutes les espèces

CICONIIFORMES
Ardeidae
Ardea purpurea
Casmerodius albus (Egretta alba)
Egretta garzetta
Ardeola ralloides
Bulbucus (Ardeola) ibis
Nycticorax nycticorax
Ixobrychus minutus
Botaurus stellaris
Ciconiidae
all species/toutes les espèces
Threskiornithidae
all species/toutes les espèces
Phoenicopteridae
Phoenicopterus ruber

ANSERIFORMES
Anatidae
Cygnus cygnus
Cygnus bewickii (columbianus)
Anser erythropus
Branta leucopsis
Branta ruficollis
Tadorna tadorna
Tadorna ferruginea
Marmaronetta (Anas) angustirostris
Somateria spectabilis
Polysticta stelleri
Histrionicus histrionicus
Bucephala islandica
Mergus albellus
Oxyura leucocephala

FALCONIFORMES
all species/toutes les espèces

GALLIFORMES
Tetraonidae
Tetrao urogallus cantabricus

GRUIFORMES
Turnicidae
Turnix sylvatica
Gruidae
all species/toutes les espèces
Rallidae
Porzana porzana
Porzana pusilla
Porzana parva
Crex crex
Porphyrio porphyrio
Fulica cristata
Otitidae
all species/toutes les espèces

CHARADRIIFORMES
Charadriidae
Hoplopterus spinosus
Charadrius hiaticula
Charadrius dubius
Charadrius alexandrinus
Charadrius leschenaulti
Eudromias morinellus
Arenaria interpres
Scolopacidae
Gallinago media
Numenius tenuirostris
Tringa stagnatilis
Tringa ochropus
Tringa glareola
Tringa hypoleucos
Tringa cinerea
Calidris minuta
Calidris temminckii
Calidris maritima
Calidris alpina
Calidris ferruginea
Calidris alba
Limicola falcinellus
Recurvirostridae
all species/toutes les espèces
Phalaropodidae
all species/toutes les espèces
Burhinidae
Burhinus oedicnemus
Glareolidae
all species/toutes les espèces
Laridae
Pagophila eburnea
Larus audouinii
Larus melanocephalus
Larus genei
Larus minutus
Larus (Xenia) sabini
Chlidonias niger
Chlidonias leucopterus
Chlidonias hybrida
Gelochelidon nilotica
Hydroprogne caspia
Sterna hirundo
Sterna paradisaea (macrura)
Sterna dougallii
Sterna albifrons
Sterna sandvicensis

COLUMBIFORMES
Pteroclididae
all species/toutes les espèces
Columbidae
Columba bollii
Columba junoniae

CUCULIFORMES
Cuculidae
Clamator glandarius

STRIGIFORMES
all species/toutes les espèces

CAPRIMULGIFORMES
Caprimulgidae
all species/toutes les espèces

APODIFORMES
Apodidae
Apus pallidus
Apus melba
Apus caffer
Apus unicolor

CORACIIFORMES
Alcedinidae
Alcedo atthis
Ceryle rudis
Halcyon smyrnensis
Meropidae
Merops apiaster
Coraciidae
Coracias garrulus
Upopidae
Upopa epops

PICIFORMES
all species/toutes les espèces

PASSERIFORMES
Alaudidae
Calandrella brachydactyla
Calendrella rufescens
Melanocorypha bimaculata
Melanocorypha calandra
Melanocorypha leucoptera
Melanocorypha yeltoniensis
Galerida theklae
Chersophilus duponti
Eremophila alpestris
Hirundinidae
all species/toutes les espèces
Motacillidae
all species/toutes les espèces
Pycnonotidae
Pycnonotus barbatus
Laniidae
all species/toutes les espèces
Bombycillidae
Bombycilla garrulus
Cinclidae
Cinclus cinclus
Troglodytidae
Troglodytes troglodytes
Prunellidae
all species/toutes les espèces
Muscicapidae
Turdinae
Saxicola rubetra
Saxicola torquata
Saxicola dacotiae
Oenanthe oenanthe
Oenanthe pleschanka (leucomela)
Oenanthe hispanica
Oenanthe isabellina
Oenanthe leucura
Oenanthe finischii
Cercotrichas galactotes
Monticola saxatilis
Monticola solitarius
Turdus torquatus
Phoenicurus ochruros
Phoenicurus phoenicurus
Erithacus rubecula
Luscinia megarhynchos
Luscinia luscinia
Luscinia (Cyanosylvia) svecica
Tarsiger cyanurus
Irania gutturalis
Sylviinae
all species/toutes les espèces
Regulinae
all species/toutes les espèces
Muscicapinae
all species/toutes les espèces
Timaliinae
Panurus biarmicus
Paridae
all species/toutes les espèces
Sittidae
all species/toutes les espèces
Certhiidae
all species/toutes les espèces
Emberizidae
Emberiza citrinella
Emberiza leucocephala
Emberiza cirlus
Emberiza cineracea
Emberiza caesia
Emberiza cia
Emberiza schoeniclus
Emberiza melanocephala
Emberiza aureola
Emberiza pusilla
Emberiza rustica
Plectrophenax nivalis
Calcarius lapponicus
Fringillidae
Carduelis chloris
Carduelis carduelis
Carduelis spinus
Carduelis flavirostris
Carduelis cannabina
Carduelis flammea
Carduelis hornemanni
Serinus citrinella
Serinus serinus
Serinus pusillus
Loxia curvirostra
Loxia pityopsittacus
Loxia leucoptera
Loxia scotica
Pinicola enucleator
Carpodacus erythrinus
Rhodopechys githaginea
Coccothraustes coccothraustes
Fringilla teydea
Ploceidae
Petronia petronia
Montrifringilla nivalis

Sturnidae
Sturnus unicolor
Sturnus roseus
Oriolidae
Oriolus oriolus
Corvidae
Perisoreus infaustus
Cyanopica cyanus
Nucifraga caryocatactes
Pyrrhocorax pyrrhocorax
Pyrrhocorax graculus

Reptiles

TESTUDINES
Testudinidae
Testudo hermanni
Testudo graeca
Testudo marginata
Emydidae
Emys orbicularis
Mauremys caspica
Dermochelyidae
Dermochelys coriacea
Cheloniidae
Caretta caretta
Lepidochelys kempii
Chelonia mydas
Eretmochelys imbricata

SAURIA
Gekkonidae
Tarentola delalandii
Tarentola boettgeri
Tarentola angustimentalis
Tarentola gomerensis
Phyllodactylus europaeus
Cyrtodactylus kotschyi
Agamidae
Agama stellio
Chamaeleontidae
Chamaeleo chamaeleon
Lacertidae
Algyroides nigropunctatus
Algyroides moreoticus
Algyroides fitzingeri
Algyroides marchi
Ophisops elegans
Lacerta lepida
Lacerta parva
Lacerta princeps
Lacerta viridis
Lacerta schreiberi
Lacerta trilineata
Lacerta agilis
Lacerta monticola
Lacerta bedriagae
Lacerta horvathi
Lacerta graeca
Lacerta dugesi
Gallotia (Lacerta) simonyi
Gallotia galloti
Gallotia stehlini
Podarcis muralis
Podarcis lilfordi
Podarcis sicula
Podarcis filfolensis
Podarcis pityusensis
Podarcis tiliguerta
Podarcis wagleriana
Podarcis melisellensis
Podarcis taurica
Podarcis erhardii
Podarcis peloponnesiaca
Podarcis milensis
Anguidae
Ophisaurus apodus
Scincidae
Ablepharus kitaibelii
Chalcides ocellatus
Chalcides bedriagai
Chalcides viridianus
Chalcides sexlineatus
Chalcides occidentalis
Ophiomorus punctatissimus

OPHIDIA
Colubridae
Coluber hippocrepis
Coluber najadum
Coluber viridiflavus
Coluber gemonensis
Coluber jugularis
Elaphe situla
Elaphe quatuorlineata
Elaphe longissima
Natrix tessellata
Coronella austriaca
Telescopus fallax
Viperidae
Vipera ursinii
Vipera latasti
Vipera ammodytes
Vipera xanthina
Vipera lebetina
Vipera kaznakovi

Amphibians/Amphibiens

CAUDATA
Salamandridae
Salamandra atra
Salamandra (Mertensiella) luschani
Salamandrina terdigitata
Chioglossa lusitanica
Euproctus asper
Euproctus montanus
Euproctus platycephalus
Triturus cristatus
Triturus montandoni
Triturus italicus
Triturus carnifex
Triturus dobrogicus
Triturus karelinii

Plethodontidae
Hydromantes genei
Hydromantes flavus
Hydromantes supramontes
Hydromantes imperialis
Hydromantes italicus
Proteidae
Proteus anguinus

ANURA
Discoglossidae
Bombina variegata
Bombina bombina
Discoglossus pictus
Discoglossus galganoi
Discoglossus sardus
Discoglossus jeanneae
Alytes obstetricans
Alytes cisternasii
Alytes muletensis
Pelobatidae
Pelobates cultripes
Pelobates fuscus
Pelobates syriacus
Pelodytes caucasicus
Bufonidae
Bufo calamita
Bufo viridis
Hylidae
Hyla arborea
Hyla meridionalis
Hyla sarda
Ranidae
Rana arvalis
Rana dalmatina
Rana latestei
Rana iberica
Rana italica

Fish/Poissons

ACIPENSERIFORMES
Acipenseridae
Acipenser naccarii

SALMONIFORMES
Umbridae
Umbra krameri

ATHERINIFORMES
Cyprinodontidae
Valencia hispanica

PERCIFORMES
Percidae
Zingel asper

INVERTEBRATES/INVERTEBRES

Arthropods/Arthropodes

INSECTA
Mantodea
Apteromantis aptera
Odonata
Calopteryx syriaca
Sympecma braueri
Coenagrion freyi
Coenagrion mercuriale
Aeshna viridis
Stylurus (= Gomphus) flavipes
Gomphus graslinii
Ophiogomphus cecilia
Lindenia tetraphylla
Cordulegaster trinacriae
Oxygastra curtisii
Macromia splendens
Brachythemis fuscopalliata
Leucorrhinia albifrons
Leucorrhinia caudalis
Leucorrhinia pectoralis
Orthoptera
Baetica ustulata
Saga pedo
Coleoptera
Carabus olympiae
Dytiscus latissimus
Graphoderus bilineatus
Osmoderma eremita
Buprestis splendens
Cucujus cinnaberinus
Cerambyx cerdo
Rosalia alpina
Lepidoptera
Papilio hospiton
Papilio alexanor
Zerynthia polyxena
Parnassius apollo
Parnassius mnemosyne
Apatura metis
Fabriciana elisa
Euphydryas (Eurodryas) aurinia
Melanargia arge
Erebia christi
Erebia sudetica
Erebia calcaria
Coenonympha hero
Coenonympha oedippus
Lopinga achine
Lycaena dispar
Maculinea arion
Maculinea teleius
Maculinea nausithous
Plebicula golgus
Hypodryas maturna
Eriogaster catax
Hyles hippophaes
Proserpinus prosperpina

ARACHNIDA
Araneae
Macrothele calpeiana

Molluscs/Mollusques

GASTROPODA
Stylommatophora
Leiostyla abbreviata
Leiostyla cassida
Leiostyla corneocostata
Leiostyla gibba
Leiostyla lamellosa
Geomalacus maculosus
Caseolus calculus
Caseolus commixta
Caseolus sphaerula
Discula leacockiana
Discula tabellata
Discula testudinalis
Discula turricula
Geomitra moniziana
Helix subplicata
Discus guerinianus
Discus defloratus
Elona quimperiana

BIVALVIA
Unionoida
Margaritifera auricularia

APPENDIX III/ANNEXE III

PROTECTED FAUNA SPECIES
ESPECES DE FAUNE PROTEGEES

VERTEBRATES/VERTEBRES

Mammals/Mammifères

INSECTIVORA
Erinaceidae
Erinaceus europaeus
Soricidae
all species/toutes les espèces

MICROCHIROPTERA
Vespertilionidae
Pipistrellus pipistrellus

DUPLICIDENTATA
Leporidae
Lepus timidus
Lepus capensis (europaeus)

RODENTIA
Sciuridae
Sciurus vulgaris
Marmota marmota
Castoridai
Castor fiber
Gliridae
all species/toutes les espèces
Microtidae
Microtus ratticeps (oeconomus)
Microtus nivalis (librunii)
Microtus cabrerae

CETACEA
All species not mentioned in Appendix II/
Toutes les espèces non mentionnées à l'annexe II

CARNIVORA
Mustelidae
Meles meles
Mustela erminea
Mustela nivalis
Putorius (Mustela) putorius
Martes martes
Martes foina
Vormela peregusna
Viverridae
all species/toutes les espèces
Felidae
Lynx lynx
Phocidae
Phoca vitulina
Pusa (Phoca) hispida
Pagophilus groenlandicus (Phoca groenlandica)
Erignathus barbatus
Halichoerus grypus
Cystophora cristata

ARTIODACTYLA
Suidae
Sus scrofa meridionalis
Cervidae
all species/toutes les espèces
Bovidae
Ovis aries (musimon, ammon)
Capra ibex
Capra pyrenaica
Rupicapra rupicapra

Birds/Oiseaux
All species not included in Appendix II with the exception of :
Toutes les espèces non incluses dans l'annexe II à l'exception de :
Larus marinus
Larus fuscus
Larus argentatus
Columba palumbus
Passer domesticus
Sturnus vulgaris
Garrulus glandarius
Pica pica
Corvus monedula
Corvus frugilegus
Corvus corone (corone and/et cornix)

Reptiles
All species non included in Appendix II
Toutes les espèces non incluses dans l'annexe II

Amphibians/Amphibiens
All species not included in Appendix II
Toutes les espèces non incluses dans l'annexe II

Fish/Poissons

PETROMYZONIFORMES
Petromyzonidae
Eudontomyzon hellenicum
Eudontomyzon mariae
Eudontomyzon vladykovi
Lampetra fluviatilis
Lampetra planeri
Lampetra zanandreai
Petromyzon marinus

ACIPENSERIFORMES
Acipenseridae
Acipenser ruthenus
Acipenser stellatus
Acipenser sturio
Huso huso

CLUPEIFORMES
Clupeidae
Alosa alosa
Alosa fallox
Alosa pontica

SALMONIFORMES
Coregonidae
Coregonus
all species/toutes les espèces
Thymallidae
Thymallus thymallus
Salmonidae
Hucho hucho
Salmo salar (*)

CYPRINIFORMES
Cyprinidae
Abramis ballerus
Abramis sapa
Abramis vimba
Alburnoides bipunctatus
Alburnus albidus
Aspius aspius
Barbus bocagei
Barbus comiza
Barbus meridionalis
Barbus microcephalus
Barbus peloponesis
Barbus plebejus
Barbus sclateri
Barbus steindachneri
Chalcalburnus chalcoides
Chondrostoma genei
Chondrostoma kneri
Chondrostoma lemingi
Chondrostoma lusitanicum
Chondrostoma nasus
Chondrostoma phoxinus
Chondrostoma polylepis
Chondrostoma soetta
Chondrostoma toxostoma
Chondrostoma willkommi
Gobio albipinnatus
Gobio kessleri
Gobio uranoscopus
Leucaspius delineatus
Leucaspius stymphalicus
Leuciscus illyricus
Leuciscus lucumotis
Leuciscus microlepis
Leuciscus polylepis
Leuciscus pyrenaicus
Leuciscus soufia
Leuciscus svallize
Leuciscus turskyi
Leuciscus ukliva
Pachychilon pictum
Pelecus cultratus
Phoxinellus adspersus
Phoxinellus hispanicus
Pseudophoxinus marathonicus
Pseudophoxinus stymphalicus
Rhodeus sericeus
Rutilus alburnoides
Rutilus arcasii
Rutilus frisii
Rutilus graecus
Rutilus lemmingii
Rutilus macedonicus
Rutilus macrolepidotus
Rutilus pigus
Rutilus racovitzai
Rutilus rubilio
Cobitidae
Cobitis elongata
Cobitis hassi
Cobitis larvata
Cobitis paludicola
Cobitis taenia
Cobitis trichonica
Misgurnis fossilis
Sabanejewia aurata
Sabanejewi calderoni

SILURIFORMES
Siluridae
Siluris aristotelis
Siluris glanis

ATHERINIFORMES
Cyprinodontidae
Aphanius fasciatus
Aphanius iberus

GASTEROSTEIFORMES
Syngnathidae
Syngnathus abaster
Syngnathus nigrolineatus
Gasterosteidae
Pungitius hellenicus
Tuntitius platygaster

SCORPAENIFORMES
Cottidae
Cottus poecilopus
Myoxocephalus quadricornis

PERCIFORMES
Percidae
Gymnocephalus baloni
Gymnocephalus schraetzer
Stizostedion volgense
Zingel zingel
Zingel streber
Blenniidae
Blennius fluviatilis

(*) The provisions for this appendix shall not apply to salmon in sea waters.
Les dispositions pour cette annexe ne s'appliquent pas aux saumons dans les eaux marines.

Gobiidae
- Gobius fluviatilis
- Gobius kessleri
- Gobius nigricans
- Gobius ophiocephalus
- Gobius syrman
- Gobius thressalus
- Padogobius panizzai
- Padogobius martensi
- Pomatoschistus canestrini
- Pomatoschistus microps
- Pomatoschistus minutus
- Proterorhinus marmoratus

INVERTEBRATES/INVERTEBRES

ARTHROPODS/ARTHROPODES

INSECTA
Coleoptera
- Lucanus cervus

Lepidoptera
- Graellsia isabellae

CRUSTACEA
Decapoda
- Astacus astacus
- Austropotamobius pallipes
- Austropotamobius torrentium

MOLLUSCS/MOLLUSQUES
GASTROPODA
Stylommatophora
- Helix pomatia

BIVALVIA
Unionida
- Margaritifera margaritifera
- Unio elongatulus
- Microcondymaea compressa

ANNELIDS/ANNELIDES

HIRUDINEA
Arhynchobdellae
- Hirudo medicinalis

ANNEX 10: Checklist of species for the Habitats Directive

ANNEX II

ANIMAL AND PLANT SPECIES OF COMMUNITY INTEREST WHOSE CONSERVATION REQUIRES THE DESIGNATION OF SPECIAL AREAS OF CONSERVATION

Interpretation

(a) Annex II follows on from Annex I for the establishment of a consistent network of special areas of conservation.

(b) The species listed in this Annex are indicated:

— by the name of the species or subspecies, or

— by the body of species belonging to a higher taxon or to a designated part of that taxon.

The abbreviation 'spp.' after the name of a family or genus designates all the species belonging to that family or genus.

(c) *Symbols*

An asterisk (*) before the name of a species indicates that the species is a priority species.

Most species listed in this Annex are also listed in Annex IV.

Where a species appears i this Annex but does not appear in either Annex IV or Annex V, the species name is followed by the symbol (o); where a species which appears in this Annex also appears in Annex V but does not appear in Annex IV, its name is followed by the symbol (V).

(a) *ANIMALS*

VERTEBRATES

MAMMALS

INSECTIVORA

Talpidae

Galemys pyrenaicus

CHIROPTERA

Rhinolophidae

Rhinolophus blasii
Rhinolophus euryale
Rhinolophus ferrumequinum
Rhinolophus hipposideros
Rhinolophus mehelyi

Vespertilionidae

Barbastella barbastellus
Miniopterus schreibersi
Myotis bechsteini
Myotis blythi
Myotis capaccinii
Myotis dasycneme
Myotis emarginatus
Myotis myotis

RODENTIA

Sciuridae

Spermophilus citellus

Castoridae

Castor fiber

Microtidae

Microtus cabrerae
*Microtus oeconomus arenicola

CARNIVORA

Canidae

*Canis lupus (Spanish populations: only those south of the Duero; Greek populations: only those south of the 39th parallel)

Ursidae

*Ursus arctos

Mustelidae

Lutra lutra
Mustela lutreola

Felidae

Lynx lynx
*Lynx pardina

Phocidae

Halichoerus grypus (V)
*Monachus monachus
Phoca vitulina (V)

ARTIODACTYLA

Cervidae

*Cervus elaphus corsicanus

Bovidae

Capra aegagrus (natural populations)
*Capra pyrenaica pyrenaica
Ovis ammon musimon (natural populations — Corsica and Sardinia)
Rupicapra rupicapra balcanica
*Rupicapra ornata

CETACEA

Tursiops truncatus
Phocoena phocoena

REPTILES

TESTUDINATA

Testudinidae

Testudo hermanni
Testudo graeca
Testudo marginata

Chelonidae

*Caretta caretta

Emydidae

Emys orbicularis
Mauremys caspica
Mauremys leprosa

SAURIA

Lacertidae

Lacerta monticola
Lacerta schreiberi
Gallotia galloti insulanagae
*Gallotia simonyi
Podarcis lilfordi
Podarcis pityusensis

Scincidae

Chalcides occidentalis

Gekkonidae

Phyllodactylus europaeus

OPHIDIA

Colubridae

Elaphe quatuorlineata
Elaphe situla

Coregonidae

*Coregonus oxyrhynchus (anadromous populations in certain sectors of the North Sea)

CYPRINIFORMES

Cyprinidae

Alburnus vulturius (o)
Alburnus albidus (o)
Anaecypris hispanica
Aspius aspius (o)
Barbus plebejus (V)
Barbus meridionalis (V)
Barbus capito (V)
Barbus comiza (V)
Chalcalburnus chalcoides (o)
Chondrostoma soetta (o)
Chondrostoma polylepis (o)
Chondrostoma genei (o)
Chondrostoma lusitanicum (o)
Chondrostoma toxostoma (o)
Gobio albipinnatus (o)
Gobio uranoscopus (o)
Iberocypris palaciosi (o)
*Ladigesocypris ghigii (o)
Leuciscus lucomonis (o)
Leuciscus souffia (o)
Phoxinellus spp. (o)
Rutilus pigus (o)
Rutilus rubilio (o)
Rutilus arcasii (o)
Rutilus macrolepidotus (o)
Rutilus lemmingii (o)
Rutilus friesii meidingeri (o)
Rutilus alburnoides (o)
Rhodeus sericeus amarus (o)
Scardinius graecus (o)

Cobitidae

Cobitis conspersa (o)
Cobitis larvata (o)
Cobitis trichonica (o)
Cobitis taenia (o)
Misgurnis fossilis (o)
Sabanejewia aurata (o)

PERCIFORMES

Percidae

Gymnocephalus schraetzer (V)
Zingel spp. [(o) except Zingel asper and Zingel zingel (V)]

Gobiidae

Pomatoschistus canestrini (o)
Padogobius panizzai (o)
Padogobius nigricans (o)

CLUPEIFORMES

Clupeidae

Alosa spp. (V)

SCORPAENIFORMES

Cottidae

Cottus ferruginosus (o)
Cottus petiti (o)
Cottus gobio (o)

SILURIFORMES

Siluridae

Silurus aristotelis (V)

Leiostyla abbreviata
Leiostyla cassida
Leiostyla corneocostata
Leiostyla gibba
Leiostyla lamellosa
Vertigo angustior (o)
Vertigo genesii (o)
Vertigo geyeri (o)
Vertigo moulinsiana (o)

BIVALVIA

Unionoida

Margaritifera margaritifera (V)
Unio crassus

(b) ***PLANTS***

PTERIDOPHYTA

ASPLENIACEAE

Asplenium jahandiezii (Litard.) Rouy

BLECHNACEAE

Woodwardia radicans (L.) Sm.

DICKSONIACEAE

Culcita macrocarpa C. Presl

DRYOPTERIDACEAE

*Dryopteris corleyi Fraser-Jenk.

HYMENOPHYLLACEAE

Trichomanes speciosum Willd.

ISOETACEAE

Isoetes borvana Durieu
Isoetes malinverniana Ces. & De Not.

MARSILEACEAE

Marsilea batardae Launert
Marsilea quadrifolia L.
Marsilea strigosa Willd.

OPHIOGLOSSACEAE

Botrychium simplex Hitchc.
Ophioglossum polyphyllum A. Braun

GYMNOSPERMAE

PINACEAE

*Abies nebrodensis (Lojac.) Mattei

ANGIOSPERMAE

ALISMATACEAE

Caldesia parnassifolia (L.) Parl.
Luronium natans (L.) Raf.

AMARYLLIDACEAE

Leucojum nicaeense Ard.
Narcissus asturiensis (Jordan) Pugsley
Narcissus calcicola Mendonça
Narcissus cyclamineus DC.
Narcissus fernandesii G. Pedro
Narcissus humilis (Cav.) Traub

*Centaurea alba L.
subsp. heldreichii (Halacsy) Dostal
*Centaurea alba L.
subsp. princeps (Boiss. & Heldr.) Gugler
*Centaurea attica Nyman
subsp. megarensis (Halacsy & Hayek) Dostal
*Centaurea balearica J. D. Rodriguez
*Centaurea borjae Valdes-Berm. & Rivas Goday
*Centaurea citricolor Font Quer
Centaurea corymbosa Pourret
Centaurea gadorensis G. Bianca
*Centaurea horrida Badaro
*Centaurea kalambakensis Freyn & Sint.
Centaurea kartschiana Scop.
*Centaurea lactiflora Halacsy
Centaurea micrantha Hoffmanns. & Link
subsp. herminii (Rouy) Dostál
*Centaurea niederi Heldr.
*Centaurea peucedanifolia Boiss. & Orph.
*Centaurea pinnata Pau
Centaurea pulvinata (G. Bianca) G. Bianca
Centaurea rothmalerana (Arènes) Dostál
Centaurea vicentina Mariz
*Crepis crocifolia Boiss. & Heldr.
Crepis granatensis (Willk.) B. Bianca & M. Cueto
Erigeron frigidus Boiss. ex DC.
Hymenostemma pseudanthemis (Kunze) Willd.
*Jurinea cyanoides (L.) Reichenb.
*Jurinea fontqueri Cuatrec.
*Lamyropsis microcephala (Moris) Dittrich & Greuter
Leontodon microcephalus (Boiss. ex DC.) Boiss.
Leontodon boryi Boiss.
*Leontodon siculus (Guss.) Finch & Sell
Leuzea longifolia Hoffmanns. & Link
Ligularia sibirica (L.) Cass.
Santolina impressa Hoffmanns. & Link
Santolina semidentata Hoffmanns. & Link
*Senecio elodes Boiss. ex DC.
Senecio nevadensis Boiss. & Reuter

CONVOLVULACEAE

*Convolvulus argyrothamnus Greuter
*Convolvulus Fernandes Pinto da Silva & Teles

CRUCIFERAE

Alyssum pyrenaicum Lapeyr.
Arabis sadina (Samp.) P. Cout.
*Biscutella neustriaca Bonnet
Biscutella vincentina (Samp.) Rothm.
Boleum asperum (Pers.) Desvaux
Brassica glabrescens Poldini
Brassica insularis Moris
*Brassica macrocarpa Guss.
Coincya cintrana (P. Cout.) Pinto da Silva
*Coincya rupestris Rouy
*Coronopus navasii Pau
Diplotaxis ibicensis (Pau) Gomez-Campo
*Diplotaxis siettiana Maire
Diplotaxis vicentina (P. Cout.) Rothm.
Erucastrum palustre (Pirona) Vis.
*Iberis arbuscula Runemark
Iberis procumbens Lange
subsp. microcarpa Franco & Pinto da Silva
*Ionopsidium acaule (Desf.) Reichenb.
Ionopsidium savianum (Caruel) Ball ex Arcang.
Sisymbrium cavanillesianum Valdes & Castroviejo
Sisymbrium supinum L.

CYPERACEAE

*Carex panormitana Guss.
Eleocharis carniolica Koch

*Astragalus maritimus Moris
Astragalus tremolsianus Pau
*Astragalus verrucosus Moris
*Cytisus aeolicus Guss. ex Lindl.
Genista dorycnifolia Font Quer
Genista holopetala (Fleischm. ex Koch) Baldacci
Melilotus segetalis (Brot.) Ser.
subsp. fallax Franco
*Ononis hackelii Lange
Trifolium saxatile All.
*Vicia bifoliolata J. D. Rodriguez

LENTIBULARIACEAE

Pinguicula nevadensis (Lindb.) Casper

LILIACEAE

Allium grosii Font Quer
*Androcymbium rechingeri Greuter
*Asphodelus bento-rainhae P. Silva
Hyacinthoides vicentina (Hoffmanns. & Link) Rothm.
*Muscari gussonei (Parl.) Tod.

LINACEAE

*Linum muelleri Moris

LYTHRACEAE

*Lythrum flexuosum Lag.

MALVACEAE

Kosteletzkya pentacarpos (L.) Ledeb.

NAJADACEAE

Najas flexilis (Willd.) Rostk. & W. L. Schmidt

ORCHIDACEAE

*Cephalanthera cucullata Boiss. & Heldr.
Cypripedium calceolus L.
Liparis loeselii (L.) Rich.
*Ophrys lunulata Parl.

PAEONIACEAE

Paeonia cambessedesii (Willk.) Willk.
Paeonia parnassica Tzanoudakis
Paeonia clusii F. C. Stern
subsp. rhodia (Stearn) Tzanoudakis

PALMAE

Phoenix theophrasti Greuter

PLANTAGINACEAE

Plantago algarbiensis Samp.
Plantago almogravensis Franco

PLUMBAGINACEAE

Armeria berlengensis Daveau
*Armeria helodes Martini & Pold
Armeria neglecta Girard
Armeria pseudarmeria (Murray) Mansfeld
*Armeria rouyana Daveau
Armeria soleirolii (Duby) Godron
Armeria velutina Welw. ex Boiss. & Reuter
Limonium dodartii (Girard) O. Kuntze
subsp. lusitanicum (Daveau) Franco
*Limonium insulare (Beg. & Landi) Arrig. & Diana
Limonium lanceolatum (Hoffmanns. & Link) Franco
Limonium multiflorum Erben
*Limonium pseudolaetum Arrig. & Diana
*Limonium strictissimum (Salzmann) Arrig.

POLYGONACEAE

Polygonum praelongum Coode & Cullen
Rumex rupestris Le Gall

ULMACEAE

Zelkova abelicea (Lam.) Boiss.

UMBELLIFERAE

*Angelica heterocarpa Lloyd
Angelica palustris (Besser) Hoffm.
*Apium bermejoi Llorens
Apium repens (Jacq.) Lag.
Athamanta cortiana Ferrarini
*Bupleurum capillare Boiss. & Heldr.
*Bupleurum kakiskalae Greuter
Eryngium alpinum L.
*Eryngium viviparum Gay
*Laserpitium longiradium Boiss.
*Naufraga balearica Constans & Cannon
*Oenanthe conioides Lange
Petagnia saniculifolia Guss.
Rouya polygama (Desf.) Coincy
*Seseli intricatum Boiss.
Thorella verticillatinundata (Thore) Brig.

VALERIANACEAE

Centranthus trinervis (Viv.) Beguinot

VIOLACEAE

*Viola hispida Lam.
Viola jaubertiana Mares & Vigineix

Lower plants

BRYOPHYTA

Bruchia vogesiaca Schwaegr. (o)
*Bryoerythrophyllum machadoanum (Sergio) M. Hill (o)
Buxbaumia viridis (Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl. (o)
Dichelyma capillaceum (With.) Myr. (o)
Dicranum viride (Sull. & Lesq.) Lindb. (o)
Distichophyllum carinatum Dix. & Nich. (o)
Drepanocladus vernicosus (Mitt.) Warnst. (o)
Jungermannia handelii (Schiffn.) Amak. (o)
Mannia triandra (Scop.) Grolle (o)
*Marsupella profunda Lindb. (o)
Meesia longiseta Hedw. (o)
Nothothylas orbicularis (Schwein.) Sull. (o)
Orthotrichum rogeri Brid. (o)
Petalophyllum ralfsii Nees & Goot. ex Lehm. (o)
Riccia breidleri Jur. ex Steph. (o)
Riella helicophylla (Mont.) Hook. (o)
Scapania massolongi (K. Muell.) K. Muell. (o)
Sphagnum pylaisii Brid. (o)
Tayloria rudolphiana (Garov) B. & G. (o)

SPECIES FOR MACARONESIA

PTERIDOPHYTA

HYMENOPHYLLACEAE

Hymenophyllum maderensis Gibby & Lovis

DRYOPTERIDACEAE

*Polystichum drepanum (Sw.) C. Presl.

ISOETACEAE

Isoetes azorica Durieu & Paiva

CRUCIFERAE

*Crambe arborea Webb ex Christ
Crambe laevigata DC. ex Christ
*Crambe sventenii R. Petters ex Bramwell & Sund.
*Parolinia schizogynoides Svent.
Sinapidendron rupestre (Ait.) Lowe

CYPERACEAE

Carex malato-belizii Raymond

DIPSACACEAE

Scabiosa nitens Roemer & J. A. Schultes

ERICACEAE

Erica scoparia L.
subsp. azorica (Hochst.) D. A. Webb

EUPHORBIACEAE

*Euphorbia handiensis Burchard
Euphorbia lambii Svent.
Euphorbia stygiana H. C. Watson

GERANIACEAE

*Geranium maderense P. F. Yeo

GRAMINEAE

Deschampsia maderensis (Haeck. & Born.)
Phalaris maderensis (Menezes) Menezes

LABIATAE

*Sideritis cystosiphon Svent.
*Sideritis discolor (Webb ex de Noe) Bolle
Sideritis infernalis Bolle
Sideritis marmorea Bolle
Teucrium abutiloides L'Hér
Teucrium betonicum L'Hér

LEGUMINOSAE

*Anagyris latifolia Brouss. ex Willd.
Anthyllis lemanniana Lowe
*Dorycnium spectabile Webb & Berthel
*Lotus azoricus P. W. Ball
Lotus callis-viridis D. Bramwell & D. H. Davis
*Lotus kunkelii (E. Chueca) D. Bramwell & al.
*Teline rosmarinifolia Webb & Berthel.
*Teline salsoloides Arco & Acebes.
Vicia dennesiana H. C. Watson

LILIACEAE

*Androcymbium psammophilum Svent.
Scilla maderensis Menezes
Semele maderensis Costa

LORANTHACEAE

Arceuthobium azoricum Wiens & Hawksw

MYRICACEAE

*Myrica rivas-martinezii Santos.

OLEACEAE

Jasminum azoricum L.
Picconia azorica (Tutin) Knobl.

ORCHIDACEAE

Goodyera macrophylla Lowe

PITTOSPORACEAE

*Pittosporum coriaceum Dryand. ex Ait.

ANNEX III

CRITERIA FOR SELECTING SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE AND DESIGNATION AS SPECIAL AREAS OF CONSERVATION

STAGE 1: **Assessment at national level of the relative importance of sites for each natural habitat type in Annex I and each species in Annex II (including priority natural habitat types and priority species)**

A. *Site assessment criteria for a given natural habitat type in Annex I*

(a) Degree of ~~of~~ representativity of the natural habitat type on the site.

(b) Area of the site covered by the natural habitat type in relation to the total area covered by that natural habitat type within national territory.

(c) Degree of conservation of the structure and functions of the natural habitat type concerned and restoration possibilities.

(d) Global assessment of the value of the site for conservation of the natural habitat type concerned.

B. *Site assessment criteria for a given species in Annex II*

(a) Size and density of the population of the species present on the site in relation to the populations present within national territory.

(b) Degree of conservation of the features of the habitat which are important for the species concerned and restoration possibilities.

(c) Degree of isolation of the population present on the site in relation to the natural range of the species.

(d) Global assessment of the value of the site for conservation of the species concerned.

C. On the basis of these criteria, Member States will classify the sites which they propose on the national list as sites eligible for identification as sites of Community importance according to their relative value for the conservation of each natural habitat type in Annex I or each species in Annex II.

D. That list will show the sites containing the priority natural habitat types and priority species selected by the Member States on the basis of the criteria in A and B above.

STAGE 2: **Assessment of the Community importance of the sites included on the national lists**

1. All the sites identified by the Member States in Stage 1 which contain priority natural habitat types and/or species will be considered as sites of Community importance.

2. The assessment of the Community importance of other sites on Member States' lists, i.e. their contribution to maintaining or re-establishing, at a favourable conservation status, a natural habitat in Annex I or a species in Annex II and/or to the coherence of Natura 2000 will take account of the following criteria:

(a) relative value of the site at national level;

(b) geographical situation of the site in relation to migration routes of species in Annex II and whether it belongs to a continuous ecosystem situated on both sides of one or more internal Community frontiers;

(c) total area of the site;

(d) number of natural habitat types in Annex I and species in Annex II present on the site;

(e) global ecological value of the site for the biogeographical regions concerned and/or for the whole of the territory referred to in Article 2, as regards both the characteristic or unique aspect of its features and the way they are combined.

Felidae

Felis silvestris
Lynx lynx
Lynx pardina

Phocidae

Monachus monachus

ARTIODACTYLA

Cervidae

Cervus elaphus corsicanus

Bovidae

Capra aegagrus (natural populations)
Capra pyrenaica pyrenaica
Ovis ammon musimon (natural populations — Corsica and Sardinia)
Rupicapra rupicapra balcanica
Rupicapra ornata

CETACEA

All species

REPTILES

TESTUDINATA

Testudinidae

Testudo hermanni
Testudo graeca
Testudo marginata

Cheloniidae

Caretta caretta
Chelonia mydas
Lepidochelys kempii
Eretmochelys imbricata

Dermochelyidae

Dermochelys coriacea

Emydidae

Emys orbicularis
Mauremys caspica
Mauremys leprosa

SAURIA

Lacertidae

Algyroides fitzingeri
Algyroides marchi
Algyroides moreoticus
Algyroides nigropunctatus
Lacerta agilis
Lacerta bedriagae
Lacerta dandfordi
Lacerta dugesi
Lacerta graeca
Lacerta horvathi
Lacerta monticola
Lacerta schreiberi
Lacerta trilineata
Lacerta viridis
Gallotia atlantica
Gallotia galloti
Gallotia galloti insulanagae
Gallotia simonyi
Gallotia stehlini
Ophisops elegans
Podarcis erhardii
Podarcis filfolensis
Podarcis hispanica atrata

Euproctus platycephalus
Salamandra atra
Salamandra aurorae
Salamandra lanzai
Salamandra luschani
Salamandrina terdigitata
Triturus carnifex
Triturus cristatus
Triturus italicus
Triturus karelinii
Triturus marmoratus

Proteidae

Proteus anguinus

Plethodontidae

Speleomantes ambrosii
Speleomantes flavus
Speleomantes genei
Speleomantes imperialis
Speleomantes italicus
Speleomantes supramontes

ANURA

Discoglossidae

Bombina bombina
Bombina variegata
Discoglossus galganoi
Discoglossus jeanneae
Discoglossus montalentii
Discoglossus pictus
Discoglossus sardus
Alytes cisternasii
Alytes muletensis
Alytes obstetricans

Ranidae

Rana arvalis
Rana dalmatina
Rana graeca
Rana iberica
Rana italica
Rana latastei
Rana lessonae

Pelobatidae

Pelobates cultripes
Pelobates fuscus
Pelobates syriacus

Bufonidae

Bufo calamita
Bufo viridis

Hylidae

Hyla arborea
Hyla meridionalis
Hyla sarda

FISH

ACIPENSERIFORMES

Acipenseridae

Acipenser naccarii
Acipenser sturio

ATHERINIFORMES

Cyprinodontidae

Valencia hispanica

Orthoptera

Baetica ustulata
Saga pedo

ARACHNIDA

Araneae

Macrothele calpeiana

MOLLUSCS

GASTROPODA

Prosobranchia

Patella ferruginea

Stylommatophora

Caseolus calculus
Caseolus commixta
Caseolus sphaerula
Discula leacockiana
Discula tabellata
Discula testudinalis
Discula turricula
Discus defloratus
Discus guerinianus
Elona quimperiana
Geomalacus maculosus
Geomitra moniziana
Helix subplicata
Leiostyla abbreviata
Leiostyla cassida
Leiostyla corneocostata
Leiostyla gibba
Leiostyla lamellosa

BIVALVIA

Anisomyaria

Lithophaga lithophaga
Pinna nobilis

Unionoida

Margaritifera auricularia
Unio crassus

ECHINODERMATA

Echinoidea

Centrostephanus longispinus

(b) *PLANTS*

Annex IV (b) contains all the plant species listed in Annex II (b) (1) plus those mentioned below

PTERIDOPHYTA

ASPLENIACEAE

Asplenium hemionitis L

ANGIOSPERMAE

AGAVACEAE

Dracaena draco (L.) L

AMARYLLIDACEAE

Narcissus longispathus Pugsley
Narcissus triandrus L.

(1) Except bryophytes in Annex II (b).

SAPOTACEAE

Sideroxylon marmulano Banks ex Lowe

SAXIFRAGACEAE

Saxifraga cintrana Kuzinsky ex Willk.
Saxifraga portosanctana Boiss.
Saxifraga presolanensis Engl.
Saxifraga valdensis DC.
Saxifraga vayredana Luizet

SCROPHULARIACEAE

Antirrhinum lopesianum Rothm.
Lindernia procumbens (Krocker) Philcox

SOLANACEAE

Mandragora officinarum L.

THYMELAEACEAE

Thymelaea broterana P. Cout.

UMBELLIFERAE

Bunium brevifolium Lowe

VIOLACEAE

Viola athois W. Becker
Viola cazorlensis Gandoger
Viola delphinantha Boiss.

ACIPENSERIFORMES

Acipenseridae

All species not mentioned in Annex IV

SALMONIFORMES

Salmonidae

Thymallus thymallus
Coregonus spp. (except Coregonus oxyrhynchus — anadromous populations in certain sectors of the North Sea)
Hucho hucho
Salmo salar (only in fresh water)

Cyprinidae

Barbus spp.

PERCIFORMES

Percidae

Gymnocephalus schraetzer
Zingel zingel

CLUPEIFORMES

Clupeidae

Alosa spp.

SILURIFORMES

Siluridae

Silurus aristotelis

INVERTEBRATES

COELENTERATA

CNIDARIA

Corallium rubrum

MOLLUSCA

GASTROPODA — STYLOMMATOPHORA

Helicidae

Helix pomatia

BIVALVIA — UNIONOIDA

Margaritiferidae

Margaritifera margaritifera

Unionidae

Microcondylaea compressa
Unio elongatulus

ANNELIDA

HIRUDINOIDEA — ARHYNCHOBDELLAE

Hirudinidae

Hirudo medicinalis

ARTHROPODA

CRUSTACEA — DECAPODA

Astacidae

Astacus astacus
Austropotamobius pallipes
Austropotamobius torrentium

Scyllaridae

Scyllarides latus

INSECTA — LEPIDOPTERA

Saturnidae

Graellsia isabellae

ROSACEAE

Rubus genevieri Boreau
subsp. herminii (Samp.) P. Cout.

SCROPHULARIACEAE

Anarrhinum longipedicelatum R. Fernandes
Euphrasia mendonçae Samp.
Scrophularia grandiflora DC.
subsp. grandiflora DC.
Scrophularia herminii Hoffmanns & Link
Scrophularia sublyrata Brot.

COMPOSITAE

Leuzea rhaponticoides Graells

ANNEX II

ANIMAL AND PLANT SPECIES OF COMMUNITY INTEREST WHOSE CONSERVATION REQUIRES THE DESIGNATION OF SPECIAL AREAS OF CONSERVATION

Interpretation

(a) Annex II follows on from Annex I for the establishment of a consistent network of special areas of conservation.

(b) The species listed in this Annex are indicated:

— by the name of the species or subspecies, or

— by the body of species belonging to a higher taxon or to a designated part of that taxon.

The abbreviation 'spp.' after the name of a family or genus designates all the species belonging to that family or genus.

(c) *Symbols*

An asterisk (*) before the name of a species indicates that the species is a priority species.

Most species listed in this Annex are also listed in Annex IV.

Where a species appears i this Annex but does not appear in either Annex IV or Annex V, the species name is followed by the symbol (o); where a species which appears in this Annex also appears in Annex V but does not appear in Annex IV, its name is followed by the symbol (V).

(a) *ANIMALS*

VERTEBRATES

MAMMALS

INSECTIVORA

Talpidae

Galemys pyrenaicus

CHIROPTERA

Rhinolophidae

Rhinolophus blasii
Rhinolophus euryale
Rhinolophus ferrumequinum
Rhinolophus hipposideros
Rhinolophus mehelyi

Vespertilionidae

Barbastella barbastellus
Miniopterus schreibersi
Myotis bechsteini
Myotis blythi
Myotis capaccinii
Myotis dasycneme
Myotis emarginatus
Myotis myotis

RODENTIA

Sciuridae

Spermophilus citellus

Castoridae

Castor fiber

Microtidae

Microtus cabrerae
*Microtus oeconomus arenicola

CARNIVORA

Canidae

*Canis lupus (Spanish populations: only those south of the Duero; Greek populations: only those south of the 39th parallel)

Ursidae

*Ursus arctos

Mustelidae

Lutra lutra
Mustela lutreola

Felidae

Lynx lynx
*Lynx pardina

Phocidae

Halichoerus grypus (V)
*Monachus monachus
Phoca vitulina (V)

ARTIODACTYLA

Cervidae

*Cervus elaphus corsicanus

Bovidae

Capra aegagrus (natural populations)
*Capra pyrenaica pyrenaica
Ovis ammon musimon (natural populations — Corsica and Sardinia)
Rupicapra rupicapra balcanica
*Rupicapra ornata

CETACEA

Tursiops truncatus
Phocoena phocoena

REPTILES

TESTUDINATA

Testudinidae

Testudo hermanni
Testudo graeca
Testudo marginata

Chelonidae

*Caretta caretta

Emydidae

Emys orbicularis
Mauremys caspica
Mauremys leprosa

SAURIA

Lacertidae

Lacerta monticola
Lacerta schreiberi
Gallotia galloti insulanagae
*Gallotia simonyi
Podarcis lilfordi
Podarcis pityusensis

Scincidae

Chalcides occidentalis

Gekkonidae

Phyllodactylus europaeus

OPHIDIA

Colubridae

Elaphe quatuorlineata
Elaphe situla

Coregonidae

*Coregonus oxyrhynchus (anadromous populations in certain sectors of the North Sea)

CYPRINIFORMES

Cyprinidae

Alburnus vulturius (o)
Alburnus albidus (o)
Anaecypris hispanica
Aspius aspius (o)
Barbus plebejus (V)
Barbus meridionalis (V)
Barbus capito (V)
Barbus comiza (V)
Chalcalburnus chalcoides (o)
Chondrostoma soetta (o)
Chondrostoma polylepis (o)
Chondrostoma genei (o)
Chondrostoma lusitanicum (o)
Chondrostoma toxostoma (o)
Gobio albipinnatus (o)
Gobio uranoscopus (o)
Iberocypris palaciosi (o)
*Ladigesocypris ghigii (o)
Leuciscus lucomonis (o)
Leuciscus souffia (o)
Phoxinellus spp. (o)
Rutilus pigus (o)
Rutilus rubilio (o)
Rutilus arcasii (o)
Rutilus macrolepidotus (o)
Rutilus lemmingii (o)
Rutilus friesii meidingeri (o)
Rutilus alburnoides (o)
Rhodeus sericeus amarus (o)
Scardinius graecus (o)

Cobitidae

Cobitis conspersa (o)
Cobitis larvata (o)
Cobitis trichonica (o)
Cobitis taenia (o)
Misgurnis fossilis (o)
Sabanejewia aurata (o)

PERCIFORMES

Percidae

Gymnocephalus schraetzer (V)
Zingel spp. [(o) except Zingel asper and Zingel zingel (V)]

Gobiidae

Pomatoschistus canestrini (o)
Padogobius panizzai (o)
Padogobius nigricans (o)

CLUPEIFORMES

Clupeidae

Alosa spp. (V)

SCORPAENIFORMES

Cottidae

Cottus ferruginosus (o)
Cottus petiti (o)
Cottus gobio (o)

SILURIFORMES

Siluridae

Silurus aristotelis (V)

Leiostyla abbreviata
Leiostyla cassida
Leiostyla corneocostata
Leiostyla gibba
Leiostyla lamellosa
Vertigo angustior (o)
Vertigo genesii (o)
Vertigo geyeri (o)
Vertigo moulinsiana (o)

BIVALVIA

Unionoida

Margaritifera margaritifera (V)
Unio crassus

(b) ***PLANTS***

PTERIDOPHYTA

ASPLENIACEAE

Asplenium jahandiezii (Litard.) Rouy

BLECHNACEAE

Woodwardia radicans (L.) Sm.

DICKSONIACEAE

Culcita macrocarpa C. Presl

DRYOPTERIDACEAE

*Dryopteris corleyi Fraser-Jenk.

HYMENOPHYLLACEAE

Trichomanes speciosum Willd.

ISOETACEAE

Isoetes borvana Durieu
Isoetes malinverniana Ces. & De Not.

MARSILEACEAE

Marsilea batardae Launert
Marsilea quadrifolia L.
Marsilea strigosa Willd.

OPHIOGLOSSACEAE

Botrychium simplex Hitchc.
Ophioglossum polyphyllum A. Braun

GYMNOSPERMAE

PINACEAE

*Abies nebrodensis (Lojac.) Mattei

ANGIOSPERMAE

ALISMATACEAE

Caldesia parnassifolia (L.) Parl.
Luronium natans (L.) Raf.

AMARYLLIDACEAE

Leucojum nicaeense Ard.
Narcissus asturiensis (Jordan) Pugsley
Narcissus calcicola Mendonça
Narcissus cyclamineus DC.
Narcissus fernandesii G. Pedro
Narcissus humilis (Cav.) Traub

*Centaurea alba L.
subsp. heldreichii (Halacsy) Dostal
*Centaurea alba L.
subsp. princeps (Boiss. & Heldr.) Gugler
*Centaurea attica Nyman
subsp. megarensis (Halacsy & Hayek) Dostal
*Centaurea balearica J. D. Rodriguez
*Centaurea borjae Valdes-Berm. & Rivas Goday
*Centaurea citricolor Font Quer
Centaurea corymbosa Pourret
Centaurea gadorensis G. Bianca
*Centaurea horrida Badaro
*Centaurea kalambakensis Freyn & Sint.
Centaurea kartschiana Scop.
*Centaurea lactiflora Halacsy
Centaurea micrantha Hoffmanns. & Link
subsp. herminii (Rouy) Dostál
*Centaurea niederi Heldr.
*Centaurea peucedanifolia Boiss. & Orph.
*Centaurea pinnata Pau
Centaurea pulvinata (G. Bianca) G. Bianca
Centaurea rothmalerana (Arènes) Dostál
Centaurea vicentina Mariz
*Crepis crocifolia Boiss. & Heldr.
Crepis granatensis (Willk.) B. Bianca & M. Cueto
Erigeron frigidus Boiss. ex DC.
Hymenostemma pseudanthemis (Kunze) Willd.
*Jurinea cyanoides (L.) Reichenb.
*Jurinea fontqueri Cuatrec.
*Lamyropsis microcephala (Moris) Dittrich & Greuter
Leontodon microcephalus (Boiss. ex DC.) Boiss.
Leontodon boryi Boiss.
*Leontodon siculus (Guss.) Finch & Sell
Leuzea longifolia Hoffmanns. & Link
Ligularia sibirica (L.) Cass.
Santolina impressa Hoffmanns. & Link
Santolina semidentata Hoffmanns. & Link
*Senecio elodes Boiss. ex DC.
Senecio nevadensis Boiss. & Reuter

CONVOLVULACEAE

*Convolvulus argyrothamnus Greuter
*Convolvulus Fernandes Pinto da Silva & Teles

CRUCIFERAE

Alyssum pyrenaicum Lapeyr.
Arabis sadina (Samp.) P. Cout.
*Biscutella neustriaca Bonnet
Biscutella vincentina (Samp.) Rothm.
Boleum asperum (Pers.) Desvaux
Brassica glabrescens Poldini
Brassica insularis Moris
*Brassica macrocarpa Guss.
Coincya cintrana (P. Cout.) Pinto da Silva
*Coincya rupestris Rouy
*Coronopus navasii Pau
Diplotaxis ibicensis (Pau) Gomez-Campo
*Diplotaxis siettiana Maire
Diplotaxis vicentina (P. Cout.) Rothm.
Erucastrum palustre (Pirona) Vis.
*Iberis arbuscula Runemark
Iberis procumbens Lange
subsp. microcarpa Franco & Pinto da Silva
*Ionopsidium acaule (Desf.) Reichenb.
Ionopsidium savianum (Caruel) Ball ex Arcang.
Sisymbrium cavanillesianum Valdes & Castroviejo
Sisymbrium supinum L.

CYPERACEAE

*Carex panormitana Guss.
Eleocharis carniolica Koch

*Astragalus maritimus Moris
Astragalus tremolsianus Pau
*Astragalus verrucosus Moris
*Cytisus aeolicus Guss. ex Lindl.
Genista dorycnifolia Font Quer
Genista holopetala (Fleischm. ex Koch) Baldacci
Melilotus segetalis (Brot.) Ser.
subsp. fallax Franco
*Ononis hackelii Lange
Trifolium saxatile All.
*Vicia bifoliolata J. D. Rodriguez

LENTIBULARIACEAE

Pinguicula nevadensis (Lindb.) Casper

LILIACEAE

Allium grosii Font Quer
*Androcymbium rechingeri Greuter
*Asphodelus bento-rainhae P. Silva
Hyacinthoides vicentina (Hoffmanns. & Link) Rothm.
*Muscari gussonei (Parl.) Tod.

LINACEAE

*Linum muelleri Moris

LYTHRACEAE

*Lythrum flexuosum Lag.

MALVACEAE

Kosteletzkya pentacarpos (L.) Ledeb.

NAJADACEAE

Najas flexilis (Willd.) Rostk. & W. L. Schmidt

ORCHIDACEAE

*Cephalanthera cucullata Boiss. & Heldr.
Cypripedium calceolus L.
Liparis loeselii (L.) Rich.
*Ophrys lunulata Parl.

PAEONIACEAE

Paeonia cambessedesii (Willk.) Willk.
Paeonia parnassica Tzanoudakis
Paeonia clusii F. C. Stern
subsp. rhodia (Stearn) Tzanoudakis

PALMAE

Phoenix theophrasti Greuter

PLANTAGINACEAE

Plantago algarbiensis Samp.
Plantago almogravensis Franco

PLUMBAGINACEAE

Armeria berlengensis Daveau
*Armeria helodes Martini & Pold
Armeria neglecta Girard
Armeria pseudarmeria (Murray) Mansfeld
*Armeria rouyana Daveau
Armeria soleirolii (Duby) Godron
Armeria velutina Welw. ex Boiss. & Reuter
Limonium dodartii (Girard) O. Kuntze
subsp. lusitanicum (Daveau) Franco
*Limonium insulare (Beg. & Landi) Arrig. & Diana
Limonium lanceolatum (Hoffmanns. & Link) Franco
Limonium multiflorum Erben
*Limonium pseudolaetum Arrig. & Diana
*Limonium strictissimum (Salzmann) Arrig.

POLYGONACEAE

Polygonum praelongum Coode & Cullen
Rumex rupestris Le Gall

ULMACEAE

Zelkova abelicea (Lam.) Boiss.

UMBELLIFERAE

*Angelica heterocarpa Lloyd
Angelica palustris (Besser) Hoffm.
*Apium bermejoi Llorens
Apium repens (Jacq.) Lag.
Athamanta cortiana Ferrarini
*Bupleurum capillare Boiss. & Heldr.
*Bupleurum kakiskalae Greuter
Eryngium alpinum L.
*Eryngium viviparum Gay
*Laserpitium longiradium Boiss.
*Naufraga balearica Constans & Cannon
*Oenanthe conioides Lange
Petagnia saniculifolia Guss.
Rouya polygama (Desf.) Coincy
*Seseli intricatum Boiss.
Thorella verticillatinundata (Thore) Brig.

VALERIANACEAE

Centranthus trinervis (Viv.) Beguinot

VIOLACEAE

*Viola hispida Lam.
Viola jaubertiana Mares & Vigineix

Lower plants

BRYOPHYTA

Bruchia vogesiaca Schwaegr. (o)
*Bryoerythrophyllum machadoanum (Sergio) M. Hill (o)
Buxbaumia viridis (Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl. (o)
Dichelyma capillaceum (With.) Myr. (o)
Dicranum viride (Sull. & Lesq.) Lindb. (o)
Distichophyllum carinatum Dix. & Nich. (o)
Drepanocladus vernicosus (Mitt.) Warnst. (o)
Jungermannia handelii (Schiffn.) Amak. (o)
Mannia triandra (Scop.) Grolle (o)
*Marsupella profunda Lindb. (o)
Meesia longiseta Hedw. (o)
Nothothylas orbicularis (Schwein.) Sull. (o)
Orthotrichum rogeri Brid. (o)
Petalophyllum ralfsii Nees & Goot. ex Lehm. (o)
Riccia breidleri Jur. ex Steph. (o)
Riella helicophylla (Mont.) Hook. (o)
Scapania massolongi (K. Muell.) K. Muell. (o)
Sphagnum pylaisii Brid. (o)
Tayloria rudolphiana (Garov) B. & G. (o)

SPECIES FOR MACARONESIA

PTERIDOPHYTA

HYMENOPHYLLACEAE

Hymenophyllum maderensis Gibby & Lovis

DRYOPTERIDACEAE

*Polystichum drepanum (Sw.) C. Presl.

ISOETACEAE

Isoetes azorica Durieu & Paiva

CRUCIFERAE

*Crambe arborea Webb ex Christ
Crambe laevigata DC. ex Christ
*Crambe sventenii R. Petters ex Bramwell & Sund.
*Parolinia schizogynoides Svent.
Sinapidendron rupestre (Ait.) Lowe

CYPERACEAE

Carex malato-belizii Raymond

DIPSACACEAE

Scabiosa nitens Roemer & J. A. Schultes

ERICACEAE

Erica scoparia L.
subsp. azorica (Hochst.) D. A. Webb

EUPHORBIACEAE

*Euphorbia handiensis Burchard
Euphorbia lambii Svent.
Euphorbia stygiana H. C. Watson

GERANIACEAE

*Geranium maderense P. F. Yeo

GRAMINEAE

Deschampsia maderensis (Haeck. & Born.)
Phalaris maderensis (Menezes) Menezes

LABIATAE

*Sideritis cystosiphon Svent.
*Sideritis discolor (Webb ex de Noe) Bolle
Sideritis infernalis Bolle
Sideritis marmorea Bolle
Teucrium abutiloides L'Her
Teucrium betonicum L'Her

LEGUMINOSAE

*Anagyris latifolia Brouss. ex Willd.
Anthyllis lemanniana Lowe
*Dorycnium spectabile Webb & Berthel
*Lotus azoricus P. W. Ball
Lotus callis-viridis D. Bramwell & D. H. Davis
*Lotus kunkelii (E. Chueca) D. Bramwell & al.
*Teline rosmarinifolia Webb & Berthel
*Teline salsoloides Arco & Acebes.
Vicia dennesiana H. C. Watson

LILIACEAE

*Androcymbium psammophilum Svent.
Scilla maderensis Menezes
Semele maderensis Costa

LORANTHACEAE

Arceuthobium azoricum Wiens & Hawksw

MYRICACEAE

*Myrica rivas-martinezii Santos.

OLEACEAE

Jasminum azoricum L.
Picconia azorica (Tutin) Knobl.

ORCHIDACEAE

Goodyera macrophylla Lowe

PITTOSPORACEAE

*Pittosporum coriaceum Dryand. ex Ait.

ANNEX III

CRITERIA FOR SELECTING SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE AND DESIGNATION AS SPECIAL AREAS OF CONSERVATION

STAGE 1: **Assessment at national level of the relative importance of sites for each natural habitat type in Annex I and each species in Annex II (including priority natural habitat types and priority species)**

A. *Site assessment criteria for a given natural habitat type in Annex I*

(a) Degree of representativity of the natural habitat type on the site.

(b) Area of the site covered by the natural habitat type in relation to the total area covered by that natural habitat type within national territory.

(c) Degree of conservation of the structure and functions of the natural habitat type concerned and restoration possibilities.

(d) Global assessment of the value of the site for conservation of the natural habitat type concerned.

B. *Site assessment criteria for a given species in Annex II*

(a) Size and density of the population of the species present on the site in relation to the populations present within national territory.

(b) Degree of conservation of the features of the habitat which are important for the species concerned and restoration possibilities.

(c) Degree of isolation of the population present on the site in relation to the natural range of the species.

(d) Global assessment of the value of the site for conservation of the species concerned.

C. On the basis of these criteria, Member States will classify the sites which they propose on the national list as sites eligible for identification as sites of Community importance according to their relative value for the conservation of each natural habitat type in Annex I or each species in Annex II.

D. That list will show the sites containing the priority natural habitat types and priority species selected by the Member States on the basis of the criteria in A and B above.

STAGE 2: **Assessment of the Community importance of the sites included on the national lists**

1. All the sites identified by the Member States in Stage 1 which contain priority natural habitat types and/or species will be considered as sites of Community importance.

2. The assessment of the Community importance of other sites on Member States' lists, i.e. their contribution to maintaining or re-establishing, at a favourable conservation status, a natural habitat in Annex I or a species in Annex II and/or to the coherence of Natura 2000 will take account of the following criteria:

(a) relative value of the site at national level,

(b) geographical situation of the site in relation to migration routes of species in Annex II and whether it belongs to a continuous ecosystem situated on both sides of one or more internal Community frontiers;

(c) total area of the site;

(d) number of natural habitat types in Annex I and species in Annex II present on the site;

(e) global ecological value of the site for the biogeographical regions concerned and/or for the whole of the territory referred to in Article 2, as regards both the characteristic or unique aspect of its features and the way they are combined.

Felidae

Felis silvestris
Lynx lynx
Lynx pardina

Phocidae

Monachus monachus

ARTIODACTYLA

Cervidae

Cervus elaphus corsicanus

Bovidae

Capra aegagrus (natural populations)
Capra pyrenaica pyrenaica
Ovis ammon musimon (natural populations — Corsica and Sardinia)
Rupicapra rupicapra balcanica
Rupicapra ornata

CETACEA

All species

REPTILES

TESTUDINATA

Testudinidae

Testudo hermanni
Testudo graeca
Testudo marginata

Cheloniidae

Caretta caretta
Chelonia mydas
Lepidochelys kempii
Eretmochelys imbricata

Dermochelyidae

Dermochelys coriacea

Emydidae

Emys orbicularis
Mauremys caspica
Mauremys leprosa

SAURIA

Lacertidae

Algyroides fitzingeri
Algyroides marchi
Algyroides moreoticus
Algyroides nigropunctatus
Lacerta agilis
Lacerta bedriagae
Lacerta danfordi
Lacerta dugesi
Lacerta graeca
Lacerta horvathi
Lacerta monticola
Lacerta schreiberi
Lacerta trilineata
Lacerta viridis
Gallotia atlantica
Gallotia galloti
Gallotia galloti insulanagae
Gallotia simonyi
Gallotia stehlini
Ophisops elegans
Podarcis erhardii
Podarcis filfolensis
Podarcis hispanica atrata

Euproctus platycephalus
Salamandra atra
Salamandra aurorae
Salamandra lanzai
Salamandra luschani
Salamandrina terdigitata
Triturus carnifex
Triturus cristatus
Triturus italicus
Triturus karelinii
Triturus marmoratus

Proteidae

Proteus anguinus

Plethodontidae

Speleomantes ambrosii
Speleomantes flavus
Speleomantes genei
Speleomantes imperialis
Speleomantes italicus
Speleomantes supramontes

ANURA

Discoglossidae

Bombina bombina
Bombina variegata
Discoglossus galganoi
Discoglossus jeanneae
Discoglossus montalentii
Discoglossus pictus
Discoglossus sardus
Alytes cisternasii
Alytes muletensis
Alytes obstetricans

Ranidae

Rana arvalis
Rana dalmatina
Rana graeca
Rana iberica
Rana italica
Rana latastei
Rana lessonae

Pelobatidae

Pelobates cultripes
Pelobates fuscus
Pelobates syriacus

Bufonidae

Bufo calamita
Bufo viridis

Hylidae

Hyla arborea
Hyla meridionalis
Hyla sarda

FISH

ACIPENSERIFORMES

Acipenseridae

Acipenser naccarii
Acipenser sturio

ATHERINIFORMES

Cyprinodontidae

Valencia hispanica

Orthoptera

Baetica ustulata
Saga pedo

ARACHNIDA

Araneae

Macrothele calpeiana

MOLLUSCS

GASTROPODA

Prosobranchia

Patella feruginea

Stylommatophora

Caseolus calculus
Caseolus commixta
Caseolus sphaerula
Discula leacockiana
Discula tabellata
Discula testudinalis
Discula turricula
Discus defloratus
Discus guerinianus
Elona quimperiana
Geomalacus maculosus
Geomitra moniziana
Helix subplicata
Leiostyla abbreviata
Leiostyla cassida
Leiostyla corneocostata
Leiostyla gibba
Leiostyla lamellosa

BIVALVIA

Anisomyaria

Lithophaga lithophaga
Pinna nobilis

Unionoida

Margaritifera auricularia
Unio crassus

ECHINODERMATA

Echinoidea

Centrostephanus longispinus

(b) *PLANTS*

Annex IV (b) contains all the plant species listed in Annex II (b) (*) plus those mentioned below

PTERIDOPHYTA

ASPLENIACEAE

Asplenium hemionitis L.

ANGIOSPERMAE

AGAVACEAE

Dracaena draco (L.) L.

AMARYLLIDACEAE

Narcissus longispathus Pugsley
Narcissus triandrus L.

(*) Except bryophytes in Annex II (b).

SAPOTACEAE

Sideroxylon marmulano Banks ex Lowe

SAXIFRAGACEAE

Saxifraga cintrana Kuzinsky ex Willk.
Saxifraga portosanctana Boiss.
Saxifraga presolanensis Engl.
Saxifraga valdensis DC.
Saxifraga vayredana Luizet

SCROPHULARIACEAE

Antirrhinum lopesianum Rothm.
Lindernia procumbens (Krocker) Philcox

SOLANACEAE

Mandragora officinarum L.

THYMELAEACEAE

Thymelaea broterana P. Cout.

UMBELLIFERAE

Bunium brevifolium Lowe

VIOLACEAE

Viola athois W. Becker
Viola cazorlensis Gandoger
Viola delphinantha Boiss.

ACIPENSERIFORMES

Acipenseridae

All species not mentioned in Annex IV

SALMONIFORMES

Salmonidae

Thymallus thymallus
Coregonus spp. (except Coregonus oxyrhynchus — anadromous populations in certain sectors of the North Sea)
Hucho hucho
Salmo salar (only in fresh water)

Cyprinidae

Barbus spp.

PERCIFORMES

Percidae

Gymnocephalus schraetzer
Zingel zingel

CLUPEIFORMES

Clupeidae

Alosa spp.

SILURIFORMES

Siluridae

Silurus aristotelis

INVERTEBRATES

COELENTERATA

CNIDARIA

Corallium rubrum

MOLLUSCA

GASTROPODA — STYLOMMATOPHORA

Helicidae

Helix pomatia

BIVALVIA — UNIONOIDA

Margaritiferidae

Margaritifera margaritifera

Unionidae

Microcondylaea compressa
Unio elongatulus

ANNELIDA

HIRUDINOIDEA — ARHYNCHOBDELLAE

Hirudinidae

Hirudo medicinalis

ARTHROPODA

CRUSTACEA — DECAPODA

Astacidae

Astacus astacus
Austropotamobius pallipes
Austropotamobius torrentium

Scyllaridae

Scyllarides latus

INSECTA — LEPIDOPTERA

Saturniidae

Graellsia isabellae

ROSACEAE

Rubus genevieri Boreau
subsp. herminii (Samp.) P. Cout.

SCROPHULARIACEAE

Anarrhinum longipedicelatum R. Fernandes
Euphrasia mendonçae Samp.
Scrophularia grandiflora DC.
subsp. grandiflora DC.
Scrophularia herminii Hoffmanns & Link
Scrophularia sublyrata Brot.

COMPOSITAE

Leuzea rhapontícoides Graells

ANNEX 11: **Checklist of habitats for the Habitats Directive**

ANNEX I

NATURAL HABITAT TYPES OF COMMUNITY INTEREST WHOSE CONSERVATION REQUIRES THE DESIGNATION OF SPECIAL AREAS OF CONSERVATION

Interpretation

Code: The hierarchical classification of habitats produced through the Corine programme (1) (Corine biotopes project) is the reference work for this Annex. Most types of natural habitat quoted are accompanied by the corresponding Corine code listed in the Technical Handbook, Volume 1, pp. 73—109, Conne/Biotope/89/2.2, 19 May 1988, partially updated 14 February 1989.

The sign 'x' combining codes indicates associated habitat types, e.g. 35.2 x 64.1 — Open grassland with *Corynephorus* and *Agrostis* (35.2), in combination with continental dunes (64.1).

The sign '*' indicates priority habitat types.

COSTAL AND HALOPHYTIC HABITATS

Open sea and tidal areas

11.25	Sandbanks which are slightly covered by sea water all the time
11.34	*Posidonia beds
13.2	Estuaries
14	Mudflats and sandflats not covered by seawater at low tide
21	*Lagoons
—	Large shallow inlets and bays
—	Reefs
—	Marine 'columns' in shallow water made by leaking gases

Sea cliffs and shingle or stony beaches

17.2	Annual vegetation of drift lines
17.3	Perennial vegetation of stony banks
18.21	Vegetated sea cliffs of the Atlantic and Baltic coasts
18.22	Vegetated sea cliffs of the Mediterranean coasts (with endemic *Limonium spp.*)
18.23	Vegetated sea cliffs of the Macaronesian coasts (flora endemic to these coasts)

Atlantic and continental salt marshes and salt meadows

15.11	*Salicornia* and other annuals colonizing mud and sand
15.12	Spartina swards (*Spartinion*)
15.13	Atlantic salt meadows (*Glauco-Puccinellietalia*)
15.14	*Continental salt meadows (*Puccinellietalia distantis*)

Mediterranean and thermo-Atlantic salt marshes and salt meadows

15.15	Mediterranean salt meadows (*Juncetalia maritimi*)
15.16	Mediterranean and thermo-Atlantic halophilous scrubs (Arthrocnemetalia fructicosae)
15.17	Iberia halo-nitrophilous scrubs (*Pegano-Salsoletea*)

Salt and gypsum continental steppes

15.18	*Salt steppes (Limonietalia)
15.19	*Gypsum steppes (Gypsophiletalia)

(1) Corine: Council Decision 85/338/EEC of 27 June 1985 (OJ No L 176, 6. 7. 1985, p. 14).

COASTAL SAND DUNES AND CONTINENTAL DUNES

Sea dunes of the Atlantic, North Sea and Baltic coasts

16.211	Embryonic shifting dunes
16.212	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)
16.221 to 16.227	*Fixed dunes with herbaceous vegetation (grey dunes): 16.221 *Galio-Koelerion albescentis* 16.222 *Euphorbio-Helichrysion* 16.223 *Crucianellion maritimae* 16.224 *Euphorbia terracina* 16.225 *Mesobromion* 16.226 *Trifolio-Gerantietea sanguinei, Galio maritimi-Geranion sanguinei* 16.227 *Thero-Airion, Botrychio-Polygalctum, Tuberarion guttatae*
16.23	*Decalcified fixed dunes with *Empetrum nigrum*
16.24	*Eu-atlantic decalcified fixed dunes *(Calluno-Ulicetea)*
16.25	Dunes with *Hyppophae rhamnoides*
16.26	Dunes with *Salix arenaria*
16.29	Wooded dunes of the Atlantic coast
16.31 to 16.35	Humid dune slacks
1.A	Machairs (* in machairs in Ireland)

Sea dunes of the Mediterranean coast

16.223	*Crucianellion maritimae* fixed beach dunes
16.224	Dunes with *Euphorbia terracina*
16.228	*Malcolmietalia* dune grasslands
16.229	*Brachypodietalia* dune grasslands with annuals
16.27	*Dune juniper thickets *(Juniperus spp.)*
16.28	Dune sclerophyllous scrubs *(Cisto-Lavenduletalia)*
16.29 × 42.8	*Wooded dunes with *Pinus pinea* and/or *Pinus pinaster*

Continental dunes, old and decalcified

64.1 × 31.223	Dry sandy heaths with *Calluna* and *Genista*
64.1 × 31.227	Dry sandy heaths with *Calluna* and *Empetrum nigrum*
64.1 × 35.2	Open grassland with *Corynephorus* and *Agrostis* of continental dunes

FRESHWATER HABITATS

Standing water

22.11 × 22.31	Oligotrophic waters containing very few minerals of Atlantic sandy plains with amphibious vegetation: *Lobelia, Littorella* and *Isoetes*
22.11 × 22.34	Oligotrophic waters containing very few minerals of West Mediterranean sandy plains with *Isoetes*
22.12 × (22.31 and 22.32)	Oligotrophic waters in medio-European and perialpine area with amphibious vegetation: Littorella or Isoetes or annual vegetation on exposed banks *(Nanocyperetalia)*
22.12 × 22.44	Hard oligo-mesotrophic waters with benthic vegetation of chara fromations
22.13	Natural euthrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation
22.14	Dystrophic lakes
22.34	*Mediterranean temporary ponds
—	*Turloughs (Ireland)

Running water

Sections of water courses with natural or semi-natural dynamics (minor, average and major beds) where the water quality shows no significant deterioration

24.221 and 24.222	Alpine rivers and the herbaceous vegetation along their banks
24.223	Alpine rivers and their ligneous vegetation with *Myricaria germanica*
24.224	Alpine rivers and their ligneous vegetation with *Salix elaegnos*

24.225	Constantly flowing Mediterranean rivers with *Glaucium flavum*
24.4	Floating vegetation of ranunculus of plane, submountainous rivers
24.52	*Chenopodietum rubri* of submountainous rivers
24.53	Constantly flowing Mediterranean rivers: *Paspalo-Agrostidion* and hanging curtains of Salix and *Populus alba*
—	Intermittently flowing Mediterranean rivers

TEMPERATE HEATH AND SCRUB

31.11	Northern Atlantic wet heaths with *Erica tetralix*
31.12	*Southern Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*
31.2	Dry heaths (all subtypes)
31.234	*Dry coastal heaths with *Erica vagans* and *Ulex maritimus*
31.3	*Endemic macaronesian dry heaths
31.4	Alpine and subalpine heaths
31.5	*Scrub with *Pinus mugo* and *Rhododendron hirsutum* (*Mugo-Rhododenretum hirsuti*)
31.622	Sub-Arctic willow scrub
31.7	Endemic oro-Mediterranean heaths with gorse

SCLEROPHYLLOUS SCRUB (MATORRAL)

Sub-Mediterranean and temperate

31.82	Stable *Buxus sempervirens* formations on calcareous rock slopes (*Berberidion p.*)
31.842	Mountain *Genista purgans* formations
31.88	*Juniperus communis* formations on calcareous heaths or grasslands
31.89	*Cistus palhinhae* formations on maritime wet heaths (*Junipero-Cistetum palhinhae*)

Mediterranean arborescent matorral

32.131 to 32.135	Juniper formations
32.17	*Matorral with *Zyzyphus*
32.18	*Matorral with *Laurus nobilis*

Thermo-Mediterranean and pre-steppe brush

32.216	Laurel thickets
32.217	Low formations of euphorbia close to cliffs
32.22 bis 32.26	All types

Phrygana

33.1	*Astragalo-Plantaginetum subulatae phrygana*
33.3	*Sarcopoterium spinosum phrygana*
33.4	Cretan formations *Euphorbieto-Verbascum*

NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS

Natural grasslands

34.11	*Karstic calcareous grasslands (*Alysso-Sedion albi*)
34.12	*Xeric sand calcareous grasslands (*Koelerion glaucae*)
34.2	Calaminarian grasslands
36.314	Siliceous Pyrenean grasslands with *Festuca eskia*
36.32	Siliceous alpine and boreal grass
36.36	Siliceous Festuca *indigesta* Iberian grasslands
36.41 bis 36.45	Alpine calcareous grasslands
36.5	Macaronesian mountain grasslands

Semi-natural dry grasslands and scrubland facies

34.31 to 34.34	On calcareous substrates *(Festuco Brometalia)* (* important orchid sites)
34.5	*Pseudo-steppe with grasses and annuals *(Thero-Brachypodietea)*
35.1	*Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in continental Europe)

Sclerophyllous grazed forests (dehesas)

32.11	With *Quercus suber* and/or *Quercus ilex*

Semi-natural tall-herb humid meadows

37.31	Molinia meadows on chalk and clay *(Eu-Molinion)*
37.4	Mediterranean tall-herb and rush meadows *(Molinio-Holoschoenion)*
37.7 and 37.8	Eutrophic tall herbs
—	*Cnidion venosae* meadows liable to flooding

Mesophile grasslands

38.2	Lowland hay meadows *(Alopecurus pratensis, Sanguisorba officinalis)*
38.3	Mountain hay meadows (British types with *Geranium sylvaticum*)

RAISED BOGS AND MIRES AND FENS

Sphagnum acid bogs

51.1	*Active raised bogs
51.2	Degraded raised bogs (still capable of natural regeneration)
52.1 and 52.2	Blanket bog (* active only)
54.5	Transition mires and quaking bogs
54.6	Depressions on peat substrates *(Rhynchosporion)*

Calcareous fens

53.3	*Calcareous fens with *Cladium mariscus* and *Carex davalliana*
54.12	*Petrifying springs with tufa formation *(Cratoneurion)*
54.2	Alkaline fens
54.3	*Alpine pioneer formations of *Caricion bicoloris-atrofuscae*

ROCKY HABITATS AND CAVES

Scree

61.1	Siliceous
61.2	Eutric
61.3	Western Mediterranean and alpine thermophilous
61.4	Balkan
61.5	Medio-European siliceous
61.6	*Medio-European calcareous

Chasmophytic vegetation on rocky slopes

62.1 and 62.1A	Calcareous sub-types
62.2	Silicicolous sub-types
62.3	Pioneer vegetation of rock surfaces
62.4	*Limestone pavements

Other rocky habitats

65	Caves not open to the public
—	*Fields of lava and natural excavations

—	Submerged or partly submerged sea caves
—	Permanent glaciers

FORESTS

(Sub)natural woodland vegetation comprising native species forming forests of tall trees, with typical undergrowth, and meeting the following criteria: rare or residual, and/or hosting species of Community interest

Forests of temperate Europe

41.11	*Luzulo-Fagetum* beech forests
41.12	Beech forests with *Ilex* and *Taxus*, rich in epiphytes *(Ilici-Fagion)*
41.13	*Asperulo-Fagetum* beech forests
41.15	Subalpine beech woods with *Acer* and *Rumex arifolius*
41.16	Calcareous beech forest *(Cephalanthero-Fagion)*
41.24	*Stellario-Carpinetum* oak-hornbeam forests
41.26	*Galio-Carpinetum* oak-hornbeam forests
41.4	**Tilio-Acerion* ravine forests
41.51	Old acidophilous oak woods with *Quercus robur* on sandy plains
41.53	Old oak woods with *Ilex* and *Blechnum* in the British Isles
41.86	*Fraxinus angustifolia* woods
42.51	*Caledonian forest
44.A1 to 44.A4	*Bog woodland
44.3	*Residual alluvial forests *(Alnion glutinoso-incanae)*
44.4	Mixed oak-elm-ash forests of great rivers

Mediterranean deciduous forests

41.181	*Apennine beech forests with *Taxus* and *Ilex*
41.184	*Apennine beech forests with *Abies alba* and beech forests with *Abies nebrodensis*
41.6	Galicio-Portuguese oak woods with *Quercus robur* and *Quercus pyrenaica*
41.77	*Quercus faginea* woods (Iberian Peninsula)
41.85	*Quercus trojana* woods (Italy and Greece)
41.9	Chestnut woods
41.1A × 42.17	Hellenic beech forests with *Abies borisii-regis*
41.1B	*Quercus frainetto* woods
42.A1	Cypress forests *(Aceri-Cupression)*
44.17	*Salix alba* and *Populus alba* galleries
44.52	Riparian formations on intermittent Mediterranean water courses with *Rhododendron ponticum*, *Salix* and others
44.7	Oriental plane woods *(Platanion orientalis)*
44.8	Thermo-Mediterranean riparian galleries *(Nerio-Tamaricetea)* and south-west Iberian Peninsula riparian galleries *(Securinegion tinctoriae)*

Mediterranean sclerophyllous forests

41.7C	Cretan *Quercus brachyphylla* forests
45.1	*Olea* and *Ceratonia* forests
45.2	*Quercus suber* forests
45.3	*Quercus ilex* forests
45.5	*Quercus macrolepis* forests
45.61 to 45.63	*Macaronesian laurel forests *(Laurus, Ocotea)*
45.7	*Palm groves of *Phoenix*
45.8	Forests of *Ilex aquifolium*

Alpine and subalpine coniferous forests

42.21 to 42.23	Acidophilous forests *(Vaccinio-Piceetea)*
42.31 and 42.32	Alpine forests with larch and *Pinus cembra*
42.4	*Pinus uncinata* forests (* on gypsum or limestone)

Mediterranean mountainous coniferous forests

42.14	*Appenine *Abies alba* and *Picea excelsa* forests
42.19	*Abies pinsapo* forests
42.61 to 42.66	*Mediterranean pine forests with endemic black pines
42.8	Mediterranean pine forests with endemic Mesogean pines, including *Pinus mugo* and *Pinus leucodermis*
42.9	Macaronesian pine forests (endemic)
42.A2 to 42.A5 and 42.A8	*Endemic Mediterranean forests with *Juniperus* spp.
42.A6	**Tetraclinis articulata* forests (Andalusia)
42.A71 to 42.A73	**Taxus baccata* woods

ANNEX 12: **Inventory and Cartography of the Flora and Fauna of Europe (Harding, 1992)**

INVENTORY AND CARTOGRAPHY OF THE FLORA AND FAUNA OF EUROPE - SOME THOUGHTS AND RECOMMENDATIONS

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1 INTRODUCTION

The natural biodiversity of Europe is part of our cultural heritage and provides the ecological framework of our human habitat. Basic knowledge of the occurrence of species (such as: what are the species and where do they occur?) is essential if that heritage and framework is to be protected for, and used by, future generations. Much relevant knowledge already exists at a regional or national level throughout Europe, but there is no effective mechanism to collate, synthesise and interpret the information at a pan-European level.

This paper examines the need for, and sources of, information on the occurrence of species, and recommends collaborative action throughout Europe to collate and use the information.

2 WHY INFORMATION IS REQUIRED

Most of the species of wild flora and fauna which occur in Europe occur in more than one country, but there are also numbers of endemic taxa which are confined to small areas, often in only one country. Therefore, each country has a responsibility to help protect its part of the European heritage of natural biodiversity, and Europe, as a whole, has a responsibility to each country to help with that protection.

International collaboration is already taking place, throughout Europe and beyond, to study and protect the biodiversity and the wildlife heritage of Europe. The need for collated information, at a pan-European scale, is becoming increasingly apparent as international legislation and conventions are formulated to protect individual species, assemblages of species, and the habitats and sites at which they occur. At present, there is no collated resource of information on the occurrence of the flora and flora of Europe other than some species mapping projects (see 3.1 and Annex 1).

Assessments of, and research on, biological responses to environmental changes (for example of climate or land use) must be, and are being, developed beyond the boundaries of individual countries with a consequent need for authoritative data on species and habitats at the European level.

Recommendations

i) Present and potential user-groups for information collated at the pan-European level, which cannot easily be provided by the existing sources, must be identified.

ii) Technical specifications for a collated information system on wild species of flora and fauna in Europe should be prepared, based on the needs of these user-groups.

3 SOURCES OF INFORMATION

3.1 International species mapping projects

Several projects have been set up to map the European distributions of species (Annex 1). These projects have been initiated by experts in the respective taxonomic groups, for purely scientific purposes related to their specialisms. These projects aim to collate data from experts or databanks in individual nations and regions. The data collated are normally summarised, usually only to the level of the cartographic unit used for mapping (e.g. 50-km square/cell), and are therefore inadequate for detailed site and species protection. [For further information see the papers by H. Maurin and R.D.Kime at this seminar.]

None of these projects have received sufficient national or international funding to develop a comprehensive pan-European database. In most cases the projects are funded as academic research projects or by voluntary subscriptions by interested specialists.

In addition, a few projects to collate data on selected taxonomic groups or species, from a small group of countries (e.g. Nordic states,francophone countries), have been set up or are proposed.

Recommendations

i) The progress and operation of these international projects should be reviewed before any further consideration is given to the collation of pan-European data on species.

ii) The feasibility of building on existing projects and operational data centres, to develop pan-European systems covering all major taxonomic groups, should be investigated.

iii) Any future work to collate information on the occurrence of species at a pan-European level should be appropriately funded by the user community.

3.2 National and regional databanks

National biological databanks have been set up in many countries, usually in association with museums, universities, wildlife conservation agencies or research institutions. A preliminary list of databanks, many of which hold data of relevance, was published by the Council of Europe (1985). A subsequent survey by the Council of Europe in 1988 was never completed. A comparable, but more detailed survey has recently been initated to cover the United Kingdom (Harding & Ely in press). In April 1987, the Ministerial Committee of the Council of Europe approved a Recommendation that 'member States should take appropriate steps to promote and support the development and of local regional and national [biological] databanks'.

Recommendations

i) A comprehensive register of national and regional biological databanks should be compiled as an essential stage in assessing the resource of data already available in Europe.

ii) National and regional biological databanks should be encouraged to develop compatible standards and methods, especially for the exchange of validated data.

3.3 Dispersed sources

Inevitably, a detailed survey of the above sources (3.1 & 3.2) will detect gaps in knowledge and geographical coverage. National and international experts and specialist groups already exist which may be able to add to the resources of knowledge described above.

Recommendation

Consultation with relevant experts will be necessary to establish whether and how gaps in knowledge and geographical coverage can be filled from existing sources.

4 INTEGRATED DATA MANAGEMENT

4.1 Centralised database

The advantages of a single, centralised, computer database, to collate relevant summarised data from regionally- or nationally-based sources, have already been demonstrated by the CORINE Project. More detailed information is normally held in an accessible form in the relevant regional or national database.

In some cases the main sources of data on the occurrence of species in individual countries will be the same as those which are collaborating in the CORINE Biotopes project. However, relying on potential sources already known through CORINE would certainly overlook many additional, important and possibly unique sources of data.

Recommendation

The types of information to be collated on the occurrence of species must be considered in the context of:

a) What will be required at the pan-European level (as opposed to what is needed at the national level),
b) What can be reliably acquired from the majority of regions and countries,
c) What will be meaningful for each major taxonomic group.

Consequently, an assessment of the data available at existing sources will be necessary before the collated database is designed.

4.2 Taxonomy and nomenclature

The problems of differing views on the taxonomy and nomenclature used in different countries have already been encountered in the CORINE Biotopes project (Moss in press). The Council of Europe has proposed the concept of lists of 'Standard Names' of species. Criteria for the selection of such lists have been discussed by a select committee and components of a European biological nomenclature database have been proposed (Harding 1990).

Recommendation

Protocols for dealing with taxonomic opinions and nomenclatural standardisation should be developed before data collation is attempted.

5 Interpretation and application of collated information

The main objective of collating information will be for applications in relation to identified needs, for example in planning and legislation. However, opportunities will exist to develop the research applications of the data collated in a centralised database (for example in relation to climate and land use changes, or on the ecology of individual species). Such uses would extending the value and importance of the data beyond their immediate international or national uses.

Recommendation

Protocols should be developed to ensure that use of data in planning, legislation and research will be positively encouraged and that future access to data will not be unnecessarily influenced by political or financial constraints.

6 CONCLUSIONS

International collaboration has led to the documentation of important wildlife sites through the CORINE Biotopes project. International agreements, such as the Bern Convention, have assisted in the protection of some threatened species. Both such initiatives are unlikely to achieve their full potential because data on species are incomplete and unco-ordinated at a pan-European level.

There are now opportunities, using modern computer technologies, to make greater international use of existing data on species which are held regionally and nationally. These data need to be collated and made available centrally for wider use throughout Europe in planning, legislation and research.

This seminar provides a unique forum at which to consider the opportunities which currently exist for the collation and use of information on the occurrence of the wild flora and fauna of Europe.

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ANNEX 1 EUROPEAN SPECIES MAPPING PROJECTS

***Already in operation*:**

Atlas Florae Europaeae
Atlas des mammifers de l'Europe
Atlas des reptiles et amphibiens de l'Europe
European Atlas of Plant Nematodes
European Invertebrate Survey
Faunistica Lepidopterorum Europaeorum
European Myriapod Survey
European Ornithological Atlas

***Proposed or pilot projects*:**

European Bryophyte Atlas
European Butterfly Atlas