

# The Status and Distribution of European Mammals

Compiled by Helen J. Temple and Andrew Terry



IUCN Red List of Threatened Species™ — Regional Assessment



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IUCN Species Programme

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# Contents

|  |      |
|--|------|
| <b>Foreword</b> .....  | v    |
| <b>Acknowledgements</b> .....  | vi   |
| <b>Executive summary</b> .....   | viii |
| <b>1. Background</b> .....   | 1    |
| 1.1 The European context .....   | 1    |
| 1.2 European mammals: diversity and endemism .....                           | 1    |
| 1.3 Species threatened status .....  | 3    |
| 1.4 Objectives of the assessment .....                                       | 4    |
| <b>2. Assessment methodology</b> .....                                       | 5    |
| 2.1 Global versus regional assessment .....                                  | 5    |
| 2.2 Geographic scope .....   | 5    |
| 2.3 Taxonomic scope .....  | 5    |
| 2.4 Assessment protocol .....  | 6    |
| 2.5 Evaluation of the assessments .....                                      | 7    |
| <b>3. Results</b> .....  | 8    |
| 3.1 Threatened status of mammals .....                                       | 8    |
| 3.2 Status by taxonomic group .....  | 9    |
| 3.3 Extinctions .....  | 9    |
| 3.4 Spatial distribution of species .....                                    | 11   |
| 3.4.1 Species richness .....   | 11   |
| 3.4.2 Threatened species richness .....                                      | 11   |
| 3.4.3 Endemic species richness .....   | 11   |
| 3.5 Major threats to terrestrial mammals in Europe .....                     | 11   |
| 3.6 Major threats to marine mammals in Europe .....                          | 14   |
| 3.7 Demographic trends .....   | 15   |
| <b>4. Discussion</b> .....   | 17   |
| 4.1 Status and population trends of European mammals .....                   | 17   |
| 4.2 Protection of habitats and species in Europe .....                       | 17   |
| 4.3 Protection of habitats and species in the EU .....                       | 20   |
| 4.4 Conservation management of mammals in the EU .....                       | 20   |
| 4.5 Contribution of new Member States to mammal conservation in the EU ..... | 22   |
| 4.6 Anthropochorous taxa and conservation priorities .....                   | 22   |
| 4.7 Extinction risk versus conservation status .....                         | 23   |
| 4.8 Red List versus priority for conservation action .....                   | 24   |
| <b>5. Conclusions</b> .....  | 25   |
| 5.1 Methodology – lessons learned .....                                      | 25   |
| 5.2 Application of project outputs .....                                     | 25   |
| 5.3 Future work .....  | 25   |
| 5.4 Conservation priorities .....  | 25   |
| 5.4.1 Species conservation .....   | 25   |
| 5.4.2 Site conservation .....  | 26   |
| 5.4.3 Conservation of the wider environment .....                            | 26   |
| 5.4.4 Monitoring and research .....  | 26   |

|  |    |
|--|----|
| <b>References</b> .....  | 27 |
| <b>Appendix 1.</b> Red List status of European mammals .....   | 29 |
| <b>Appendix 2.</b> Species assessed as Not Applicable (NA) according to IUCN Regional Red Listing guidelines ..... | 35 |
| <b>Appendix 3.</b> Species listed on Annexes II, IV and V of the Habitats Directive .....                          | 37 |
| <b>Appendix 4.</b> Example species summary and distribution map .....  | 40 |

# Foreword



Europe is a continent rich in natural and cultural heritage, with a diverse range of habitat conditions from dry Mediterranean maquis in the south to the Arctic tundra of the far north.

Possibly more than anywhere else in the world we, the mammal species *Homo sapiens*, have shaped European landscapes so that now the continent is covered with a mosaic of natural and semi-natural habitats still surrounding urbanized areas. Although bringing higher diversity, this modification has obviously also placed great pressures on our wildlife and natural areas.

Numerous scientific studies show that biodiversity in Europe has been declining rapidly for some time and that this pattern has been matched by the great periods of expansion and intensification of land use. This first assessment of the Red List status of Europe's and the European Union's mammals shows us that some 15% of our species are threatened with extinction. This compares with 13% of birds, the only other vertebrate group comprehensively assessed, identified by BirdLife International as threatened. Furthermore this assessment shows that 27% of the species were identified as declining and another 33% had an unknown population trend. Unfortunately, the drivers for these declines are mostly still in place and decline of biodiversity still occurs.

Biologically speaking, mammals are our closest relatives and represent a very diverse taxonomic group. They include our charismatic species such as the brown bear

and wolf that, in their need for large wild spaces, have come to represent flagships for nature conservation. But they also include some of our rarest and most secretive species including the Bavarian pine vole that was thought to be extinct until being re-discovered in Austria in 2000. This species is now restricted to just one known site. Surprisingly our continent is also home to the world's most threatened cat species, the Iberian lynx, which through the combined impacts of declines in its prey, habitat change and persecution is identified as Critically Endangered.

What can we as Europeans do about this? Recognising the threats to biodiversity, the European Community implemented the Birds and Habitats Directives, which provided the basis for both species conservation in the EU and the establishment of the Natura 2000 network. Natura 2000 sites in both the terrestrial and marine environments will certainly provide the most important refuges for species and we are developing methodologies to assist Member States to provide the connectivity that is required for species to disperse through their landscapes, to make Natura 2000 a real, functional network.

In 2001, Member States made the commitment to halt the loss of biodiversity within the EU by 2010. The results of this study indicate that without concerted and rapid action, this target is unlikely to be met. Together we need to strive to ensure that this target can be met within the EU and through this work we hope to develop a new vision for species and habitat conservation in the future.

Ladislav Miko  
Director

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Directorate General for Environment  
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IUCN SSC Cat Specialist Group  
IUCN SSC Cetacean Specialist Group  
IUCN SSC Chiroptera Specialist Group  
IUCN SSC Deer Specialist Group  
IUCN SSC Lagomorph Specialist Group  
IUCN SSC Otter Specialist Group  
IUCN SSC Pinniped Specialist Group  
IUCN SSC Polar Bear Specialist Group  
IUCN SSC Primate Specialist Group  
IUCN SSC Small Carnivore Specialist Group  
IUCN SSC Wolf Specialist Group  
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European mammal experts reviewing the species assessments at the European Mammal Assessment workshop, 18–22 May 2006, Illmitz, Austria. © *Craig Hilton-Taylor*



# Executive summary

## Aim

The European Mammal Assessment (EMA) is the first review of the conservation status of all wild mammals in Europe according to IUCN regional Red Listing guidelines. It identifies those species that are threatened with extinction at the regional level – in order that appropriate conservation action can be taken to improve their status.

## Scope

All terrestrial and marine mammal species native to Europe or naturalized in Europe before 1500 A.D. are included. For terrestrial species, the geographical scope is continent-wide, extending from Iceland in the west to the Urals in the east, and from Franz Josef Land in the north to the Canary Islands in the south. In the southeast, where definitions of Europe are most contentious, the Caucasus region is not included. Red List assessments were made at two regional levels for terrestrial species: for geographical Europe, and for the 25 Member States of the European Union when the EMA was initiated in 2005. The marine area covered by the EMA encompasses the continental shelf seas of Europe (excluding Arctic waters), along with adjacent parts of the open seas. The whole of the Mediterranean Sea and the Black Sea is included. It corresponds to the region covered by the ACCOBAMS<sup>1</sup> and ASCOBANS<sup>2</sup> agreements plus the portion of Norway's Exclusive Economic Zone that lies south of the Arctic Circle. For marine species, a single regional assessment was made.

## Status assessment

The status of all species was assessed using the IUCN Red List Criteria (IUCN 2001), which are the world's most widely accepted system for measuring relative extinction risk. All assessments followed the *Guidelines for Application of IUCN Red List Criteria at Regional Levels* (IUCN 2003). Information on each species was compiled

by a small team, in collaboration with IUCN Specialist Groups and other experts. Regional assessments were carried out at an assessment workshop and through correspondence with relevant experts. More than 150 mammal experts from over 40 countries in Europe and adjacent regions actively participated in the assessment and review process. Assessments are available on the European Mammal Assessment website:

<http://ec.europa.eu/environment/nature/conservation/species/ema/>

## Results

Nearly one in six (15%) of Europe's 231<sup>3</sup> mammal species are threatened, and a further 9% are close to qualifying for threatened status. By comparison, 13% of European birds are threatened (BirdLife International 2004a). No other groups have yet been comprehensively assessed at the European level using the IUCN regional Red List guidelines. A higher proportion of marine mammals are threatened than terrestrial mammals (22% of 27 species versus 14% of 204 species). Two European mammal species, the aurochs *Bos primigenius* and the Sardinian pika *Prolagus sardus* have become globally extinct since 1500 A.D., and a third species, the grey whale *Eschrichtius robustus*, is regionally extinct. More than a quarter (27%) of European mammals have declining populations. A further 32% are stable, and 33% are of unknown population trend. Only 8% of species populations are increasing. A number of these increases are due to successful species-specific conservation action.

Terrestrial mammal biodiversity is greatest in south-eastern Europe (the Balkan Peninsula, Hungary, and Romania) and in the mountainous regions of Mediterranean and temperate Europe. Habitat loss and degradation is the greatest threat to terrestrial mammals in Europe. Human disturbance, pollution, accidental mortality (e.g., secondary poisoning, vehicle collisions), overexploitation and invasive species are also important threats. The main threats to marine mammals are accidental mortality (e.g., fisheries bycatch), pollution, and overexploitation.

1 The Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area; see [www.accobams.org](http://www.accobams.org)

2 The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas; see [www.ascobans.org](http://www.ascobans.org)

3 This total does not include 27 native or naturalized species that were considered Not Applicable because they were of marginal occurrence in the study region and two species that were considered Not Applicable because they were considered to be descended from ancient domestic livestock; see Section 2.3 and Appendix 2.



## Conclusions

- **Mammals in Europe require greater action to improve their status.** While many species already receive some conservation attention, others do not.
  - **Species can be, and some already have been, saved from extinction.** However, this requires a combination of sound research, careful coordination of efforts, and, in some cases, intensive management.
  - **EU Member States have committed to halt biodiversity loss by 2010.** Urgent action is needed
- to meet this target, and better monitoring capacity is required to even be able to tell if we have met this target. The European Mammal Assessment will provide a baseline against which progress can be measured, but it must be kept up-to-date, and similar initiatives are required for other taxonomic groups.
- **Considerable conservation investment is needed** from all European countries to move towards meeting the 2010 target and to ensure that the status of European mammals improves in the longer term.

The Arctic fox *Alopex lagopus* is considered to be Critically Endangered in the EU. It was originally driven close to extinction by hunting and trapping for its valuable fur. Despite over 75 years of protection, the Fennoscandian population remains at a dangerously low level. © *Vilda - Rollin Verlinde*





The European mink *Mustela lutreola* is found only in Europe, and is one of the region's most threatened species, having suffered massive population declines and range contractions. It is categorized by IUCN as Endangered at the European level and Critically Endangered within the European Union. © *Titi Maran*





# 1. Background

## 1.1 The European context

Europe is one of the seven traditional continents of the Earth. Physically and geologically, Europe is the westernmost peninsula of Eurasia. It is bounded to the north by the Arctic Ocean, to the west by the Atlantic Ocean, to the south by the Mediterranean Sea, and to the southeast by the Black Sea and the Caucasus Mountains. In the east, Europe is separated from Asia by the Ural Mountains and by the Caspian Sea (see Figure 1, page 6).

Europe is the second-smallest continent in the world in terms of area, covering approximately 10,400,000 square kilometres (4,010,000 square miles) or 2% of the Earth's surface. The only continent smaller than Europe is Australia. In terms of human population, it is the third-largest continent (after Asia and Africa) with a population of some 710,000,000 or about 11% of the world's population. Europe is the most urbanized and, together with Asia, the most densely populated continent in the world.

The European Union, comprising 27 Member States, is Europe's largest political and economic entity by area and population; while the Russian Federation (excluding the portion in Asia), a country, is the second largest entity. The European Union has the world's largest economy with an estimated nominal GDP in 2006 of 14.2 trillion US dollars. The EU's 27 Member States stretch from the Arctic Circle in the north to the Mediterranean in the south, and from the Atlantic coast in the west to the Pannonian steppes in the east. This area encompasses a great diversity of natural habitats and a wealth of flora and fauna, including several thousand types of habitats, 448 species of birds (in the EU 25: BirdLife International 2004b), and over 180 species of reptiles and amphibians, 150 species of fishes, 10,000 plant species and 100,000 species of invertebrates (Wieringa 1995). Yet, in comparison with other regions of the world, these numbers are relatively small.

Although improved conservation policies have been introduced in the Member States (see Sections 4.3 and 4.4), the EU's biodiversity continues to be under serious threat. Poor planning, indiscriminate land-use and intensive farming methods have resulted over the years in the deterioration, destruction and fragmentation of many natural habitats, and many species have been directly impacted by persecution and unsustainable exploitation (Wieringa 1995, European Environment Agency 2005).

## 1.2 European mammals: diversity and endemism

Mammals are a well-known class of vertebrates, including many familiar domesticated species and pets, as well as our own species *Homo sapiens*. All mammals are warm-blooded, and all female mammals possess mammary glands (mammary), which are used to suckle the young with milk. Mammals are further distinguished by the possession of hair or fur, although this is limited to early developmental stages in the Cetacea (whales and dolphins). The vast majority of mammals give birth to live young, the exception being the egg-laying Monotremata (a small group of mammals including the duck-billed platypus and the echidnas or spiny anteaters), which do not occur in Europe (Nowak 1999).

The mammal fauna of Europe is largely derived from the Eurasian and African biogeographic zones and therefore exhibits relatively low levels of endemism, as most species tend to have very wide ranges. Within the study region, there are 219 terrestrial mammal species, of which 59 species (26.9%) are endemic, and 41 species of marine mammal, of which none are endemic. Further details are given in Table 1. Terrestrial mammals native to Europe belong to seven taxonomic orders: Artiodactyla (even-toed ungulates), Carnivora (carnivores), Chiroptera (bats), Erinaceomorpha (hedgehogs and their relatives), Lagomorpha (rabbits, hares and pikas), Rodentia (rodents) and Soricomorpha (shrews and moles). Marine mammals native to Europe belong to two taxonomic orders, the Cetacea (whales and dolphins) and Carnivora (carnivores). European marine carnivores include the seals (Phocidae) and walrus *Odobenus rosmarus*. One species belonging to the order Primates, the Barbary macaque *Macaca sylvanus*, occurs on Gibraltar. Whilst there is good evidence that the Barbary macaque occurred in mainland Europe during the Pleistocene, it is generally believed that the Gibraltar population is the result of a relatively recent introduction (Hodges and Cortes 2006).

The majority of European terrestrial mammal species are small volant and non-volant mammals belonging to the orders Chiroptera (bats), Rodentia (rodents), and Soricomorpha (shrews and moles) (see Table 1). The largest mammal families in the region are the Cricetidae (hamsters, voles and lemmings - 40 species), Vespertilionidae (evening bats and vesper bats - 35 species) and Soricidae (shrews - 23 species). Approximately one quarter of terrestrial mammals is endemic to Europe. Endemism is particularly high in the

**Table 1. Diversity and endemism in terrestrial mammal orders and families in Europe**

| Order                                 | Family           | Europe            |                                       | EU 25             |                                       |
|---------------------------------------|------------------|-------------------|---------------------------------------|-------------------|---------------------------------------|
|                                       |                  | Number of species | Number of endemic species (% endemic) | Number of species | Number of endemic species (% endemic) |
| Artiodactyla                          | Bovidae          | 9                 | 3 (33.3%)                             | 8                 | 2 (25.0%)                             |
|                                       | Cervidae         | 6                 | 0 (0%)                                | 5                 | 0 (0%)                                |
|                                       | Suidae           | 1                 | 0 (0%)                                | 1                 | 0 (0%)                                |
| Carnivora                             | Canidae          | 5                 | 0 (0%)                                | 4                 | 0 (0%)                                |
|                                       | Felidae          | 4                 | 1 (25.0%)                             | 3                 | 1 (33.3%)                             |
|                                       | Herpestidae      | 1                 | 0 (0%)                                | 1                 | 0 (0%)                                |
|                                       | Mustelidae       | 13                | 0 (0%)                                | 11                | 0 (0%)                                |
|                                       | Ursidae          | 2                 | 0 (0%)                                | 1                 | 0 (0%)                                |
|                                       | Viverridae       | 1                 | 0 (0%)                                | 1                 | 0 (0%)                                |
| Chiroptera                            | Molossidae       | 1                 | 0 (0%)                                | 1                 | 0 (0%)                                |
|                                       | Pteropodidae     | 1                 | 0 (0%)                                | 1                 | 0 (0%)                                |
|                                       | Rhinolophidae    | 5                 | 0 (0%)                                | 5                 | 0 (0%)                                |
|                                       | Vespertilionidae | 35                | 7 (20.0%)                             | 35                | 7 (20.0%)                             |
| Erinaceomorpha                        | Erinaceidae      | 5                 | 1 (20.0%)                             | 4                 | 1 (25.0%)                             |
| Lagomorpha                            | Leporidae        | 7                 | 3 (42.9%)                             | 7                 | 3 (42.9%)                             |
|                                       | Prolagidae       | 1                 | 1 (100%)                              | 1                 | 1 (100%)                              |
| Rodentia                              | Castoridae       | 1                 | 0 (0%)                                | 1                 | 0 (0%)                                |
|                                       | Cricetidae       | 40                | 16 (40.0%)                            | 29                | 8 (27.6%)                             |
|                                       | Dipodidae        | 9                 | 1 (11.1%)                             | 2                 | 0 (0%)                                |
|                                       | Gliridae         | 5                 | 1 (20%)                               | 5                 | 0 (0%)                                |
|                                       | Hystricidae      | 1                 | 0 (0%)                                | 1                 | 0 (0%)                                |
|                                       | Muridae          | 17                | 4 (23.5%)                             | 17                | 1 (5.9%)                              |
|                                       | Sciuridae        | 11                | 3 (27.3%)                             | 6                 | 0 (0%)                                |
|                                       | Spalacidae       | 7                 | 4 (57.1%)                             | 2                 | 0 (0%)                                |
| Soricomorpha                          | Soricidae        | 23                | 9 (39.1%)                             | 21                | 6 (28.6%)                             |
|                                       | Talpidae         | 8                 | 5 (62.5%)                             | 6                 | 3 (50%)                               |
| <b>Total – terrestrial</b>            |                  | <b>219</b>        | <b>59 (26.9%)</b>                     | <b>179</b>        | <b>33 (18.4%)</b>                     |
| Carnivora                             | Odobenidae       | 1                 | 0 (0%)                                | 1                 | 0 (0%)                                |
|                                       | Phocidae         | 7                 | 0 (0%)                                | 7                 | 0 (0%)                                |
| Cetacea                               | Balaenidae       | 2                 | 0 (0%)                                | 2                 | 0 (0%)                                |
|                                       | Balaenopteridae  | 5                 | 0 (0%)                                | 5                 | 0 (0%)                                |
|                                       | Delphinidae      | 13                | 0 (0%)                                | 13                | 0 (0%)                                |
|                                       | Eschrichtidae    | 1                 | 0 (0%)                                | 1                 | 0 (0%)                                |
|                                       | Monodontidae     | 2                 | 0 (0%)                                | 2                 | 0 (0%)                                |
|                                       | Phocoenidae      | 1                 | 0 (0%)                                | 1                 | 0 (0%)                                |
|                                       | Physeteridae     | 3                 | 0 (0%)                                | 3                 | 0 (0%)                                |
|                                       | Ziphiidae        | 6                 | 0 (0%)                                | 6                 | 0 (0%)                                |
| <b>Total – marine</b>                 |                  | <b>41</b>         | <b>0 (0%)</b>                         | <b>41</b>         | <b>0 (0%)</b>                         |
| <b>Total – terrestrial and marine</b> |                  | <b>260</b>        |                                       | <b>220</b>        |                                       |

1 This table includes species that are native or naturalized since before 1500 A.D.; species introduced after this date are not included. Species that went Extinct or Regionally Extinct after 1500 A.D. are included. Species of marginal occurrence are included, as are the agrimi *Capra bircus* and mouflon *Ovis aries* (see Section 2.3 and Appendix 2.). For a definition of the marine and terrestrial areas considered by the European Mammal Assessment see Section 2.2.

small non-volant mammals (rodents and soricomorphs). Larger terrestrial mammals and bats tend to be more mobile and wide-ranging, and the majority of these species have ranges extending beyond Europe.

The largest marine mammal family in Europe is the Delphinidae (dolphins, killer whales, pilot whales and relatives - 15 species). Marine mammals tend to be large and highly mobile, and no marine mammal species are endemic to the European Mammal Assessment marine region (see definition in Section 2.2). Nevertheless there are a number of cetacean and pinniped subspecies that are endemic to Europe and of conservation concern, including the Black Sea subspecies of the short-beaked common dolphin *Delphinus delphis ponticus* and common bottlenose dolphin *Tursiops truncatus ponticus*, and the two freshwater lake dwelling subspecies of ringed seal *Pusa hispida saimensis* and *P.b. ladogensis*.

Although mammals are one of the better known taxonomic groups, there are still new discoveries to be made regarding mammalian diversity and endemism in Europe: two new species endemic to Mediterranean islands, the Sardinian long-eared bat *Plecotus sardus* and

the Cyprus mouse *Mus cypriacus* have been described in the last five years (Mucedda *et al.* 2002, Bonhomme *et al.* 2004, Cucchi *et al.* 2006).

### 1.3 Species threatened status

The threatened status of plants and animals is one of the most widely used indicators for assessing the condition of ecosystems and their biodiversity. It also provides an important tool underpinning priority-setting exercises for species conservation. At the global scale the best source of information on the conservation status of plants and animals is the *IUCN Red List of Threatened Species* (see [www.iucnredlist.org](http://www.iucnredlist.org); IUCN 2007). The Red List provides taxonomic, conservation status, and distribution information on taxa that have been evaluated using the *IUCN Red List Categories and Criteria: Version 3.1* (IUCN 2001). This system is designed to determine the relative risk of extinction, with the main purpose of cataloguing and highlighting those taxa that are facing a higher risk of extinction (i.e., those listed as Critically Endangered, Endangered and Vulnerable). The IUCN Red List is intended to be policy-relevant, and it can be used

The Iberian lynx *Lynx pardinus* is the world's most threatened felid. It is endemic to Spain and Portugal, and is currently categorized by IUCN as Critically Endangered.  
© Programa de Conservación Ex Situ del Lince Ibérico [www.lynxexsitu.es](http://www.lynxexsitu.es)





to inform conservation planning and priority setting processes, but it is not intended to be policy-prescriptive, and it is not in and of itself a biodiversity conservation priority-setting system.

## 1.4 Objectives of the assessment

The European Mammal Assessment has four main objectives:

- To assist in regional conservation planning through provision of a baseline dataset reporting the status of European mammals.
- To identify those geographic areas and habitats needing to be conserved to prevent extinctions and to ensure that European mammals achieve and maintain a favourable conservation status.
- To identify the major threats and to propose mitigating measures and conservation actions to address them.
- To strengthen the network of experts focused on mammal conservation in Europe, so that the European Mammal Assessment can be kept current, and expertise can be targeted to address the highest conservation priorities.

The assessment provides four main outputs:

- This summary report on the status of European mammals;
- A freely available database holding the baseline data for monitoring the status and distribution of European mammals;
- A website <http://ec.europa.eu/environment/nature/conservation/species/ema/> showcasing this data in the form of species factsheets for all European mammals, along with background and other interpretative material;
- A booklet “Mammals in the EU”, presenting the key findings of the European Mammal assessment in a format that is accessible to policymakers and the general public.

The data presented in this report and the booklet provides a snapshot based on available knowledge at the time of writing. The database will continue to be updated and made freely and widely available. IUCN will ensure wide dissemination of this data to relevant decision makers, NGOs, and scientists to inform the implementation of conservation actions on the ground.

The Mediterranean subpopulation of *Delphinus delphis* has declined by more than 50% over the last 30–45 years and is assessed as Endangered. There has been a reduction in the availability of dolphin prey in the Mediterranean through a combination of environmental changes, overfishing and habitat degradation. Competition with fisheries and bycatch directly threaten the subpopulation, while high levels of polychlorinated biphenyls (PCBs) in Mediterranean dolphins, compared to levels in dolphins from other areas, may cause immune suppression and reproductive impairment. © Tethys - Giovanni Bearzi



# 2. Assessment methodology

## 2.1 Global versus regional assessment

A large number of regional (i.e., sub-national, national and regional) Red Data Books and Red Data Lists have been published around the world. Europe alone is estimated to have some 3,500 different Red Data Books and Lists (Köppel *et al.* 2003). In some of these publications, the Red List assessments are based on classification systems of threat developed and adopted within the country concerned; others have used classifications based on the pre-1994 system of qualitative IUCN Red List Categories; but an ever increasing number of regional Red List assessments are based on the IUCN Red List Categories and Criteria (IUCN 1994, 2001). The IUCN Red List Categories and Criteria, however, were developed primarily for application at the global level. Hence assessments of non-endemic species at national levels based on these criteria could result in incorrect and even misleading listings (especially when linked to conservation priority setting schemes). As a result, IUCN formulated regional guidelines to guide the assessment of endemic and non-endemic species at the regional level (IUCN 2003; <http://www.iucn.org/themes/ssc/redlists/regionalguidelines.htm>).

The regional application guidelines are not a fixed set of rules that must be followed, but are instead a set of best-practice guidelines that indicate the preferred approaches to be followed and the issues that need to be addressed. The use of the regional guidelines helps make regional Red Lists more comparable and promotes the sharing of species information between neighbouring countries, and the better flow of information between the regional and global levels. A regional approach to identifying threatened species complements global conservation status assessments, and provides information at an appropriate scale for international conservation treaties (such as the Bern Convention) and legislation (such as the EU Habitats Directive) that have a regional focus. The information provided here will help to put national conservation priorities into an EU-wide and continental context, thus maximizing the effectiveness of local and national conservation measures, and facilitating the development of integrated regional conservation strategies.

## 2.2 Geographic scope

For terrestrial species, the geographical scope is continent-wide, extending from Iceland in the west to the Urals in the east (including European parts of the Russian Federation), and from Franz Josef Land in the north to the Mediterranean in the south (see Figure 1). The Canary Islands, Madeira and the Azores were also included. In the southeast, where definitions of Europe are most contentious, the Caucasus region was not included. Red List assessments were made at two regional levels for terrestrial species: for geographical Europe, and for the 25 Member States of the European Union when the European Mammal Assessment was initiated in 2005.

The marine area covered by the European Mammal Assessment is shown in Figure 1. It encompasses the continental shelf seas of Europe (excluding Arctic waters), along with adjacent parts of the open seas. The whole of the Mediterranean Sea and the Black Sea is included. The EMA marine area corresponds to the region covered by the ACCOBAMS<sup>5</sup> and ASCOBANS<sup>6</sup> agreements plus the portion of Norway's Exclusive Economic Zone that lies south of the Arctic Circle. For marine species, a single assessment was made, which applies to both geographical Europe and the EU.

## 2.3 Taxonomic scope

All terrestrial and marine mammal species native to Europe or naturalized in Europe before 1500 A.D. were included in the assessment. Domesticated species are not eligible for classification according to IUCN Red List Categories and Criteria, and were excluded from the assessment. Species introduced to Europe by man after 1500 A.D. were considered by the assessment, but were classed as Not Applicable. Similarly, species that are vagrant or of marginal occurrence in Europe were classed as Not Applicable. A full list of mammal species classed as Not Applicable, and the reasons for this classification, can be found in Appendix 2. The EMA uses Mammal Species of the World (Wilson and Reeder 2005) as its default taxonomy for most taxonomic groups, although it departs from this in a few justified circumstances.

5 The Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area; see [www.accobams.org](http://www.accobams.org).

6 The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas; see [www.ascobans.org](http://www.ascobans.org).

The first priority of the European Mammal Assessment was to assess the status of all mammal species in Europe against the IUCN Red List Criteria. However, in some cases subspecies and subpopulations were also assessed. The assessment of subspecies and subpopulations was done on an *ad hoc* basis, but primarily when participating experts indicated that there was good reason to do so. It was beyond the scope of this project to comprehensively assess all subspecies of mammals in Europe, so some subspecies of conservation concern may have been omitted. Details of subspecies and subpopulation assessments can be found on the relevant species information sheet on the IUCN European Mammal Assessment website: <http://ec.europa.eu/environment/nature/conservation/species/ema/>

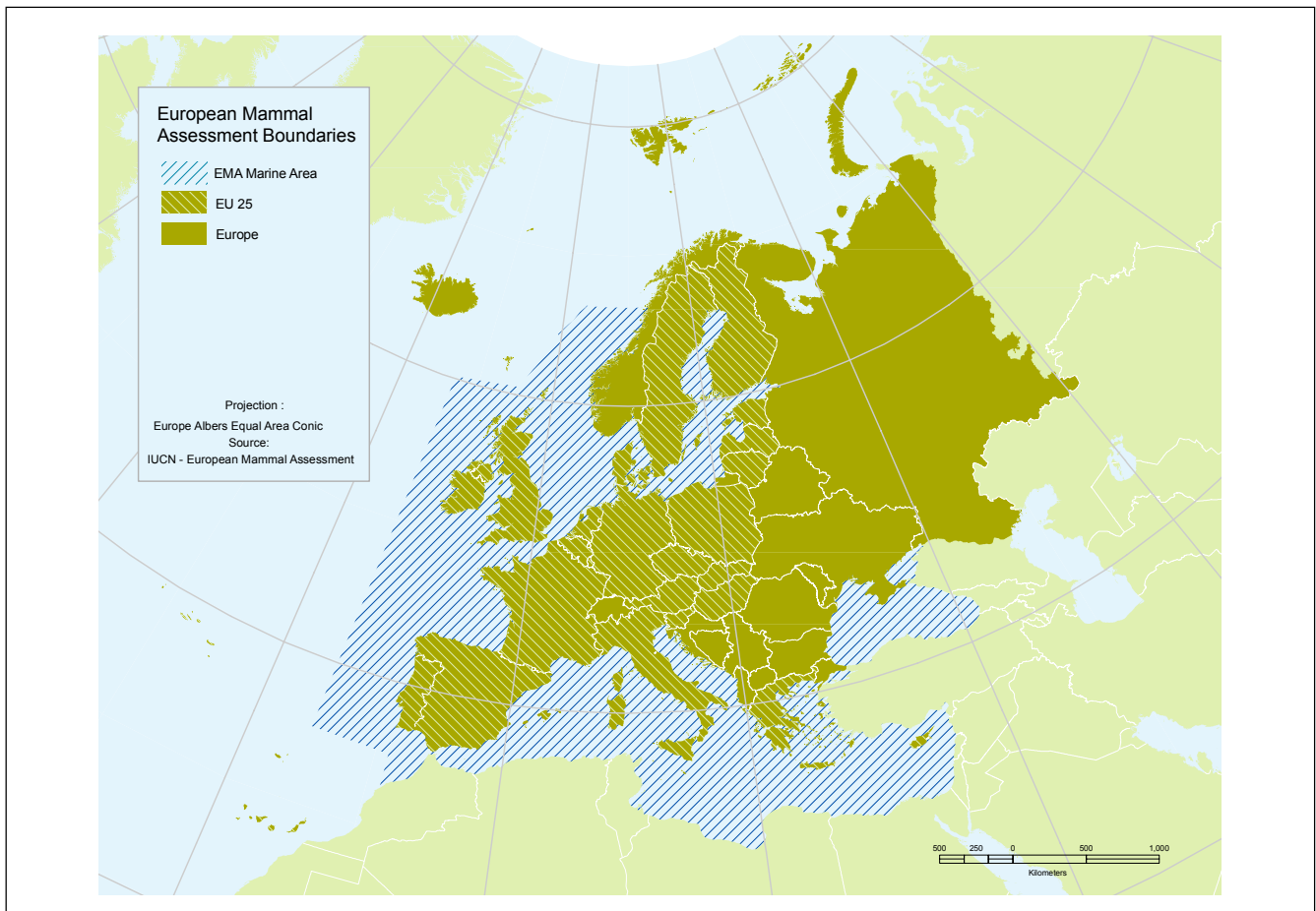
- Species' taxonomic classification
- Geographic range (including a distribution map)
- Red List Category and Criteria
- Population information
- Habitat preferences
- Major threats
- Conservation measures
- Species utilization
- Other general information
- Key literature references.

The task of collecting the initial data was divided up geographically and taxonomically. For most terrestrial mammal species, data were initially compiled by Helen Temple, with the following main exceptions: data on mammal species whose European range is restricted to Ukraine and the Russian Federation were compiled by Katerina Tsytsulina; bat data were compiled by the IUCN SSC Chiroptera Specialist Group; and large carnivore data were compiled and reviewed by the Large Carnivore Initiative for Europe (LCIE). Preliminary data compilation

## 2.4 Assessment protocol

For every mammal species native to Europe or naturalized before 1500 A.D., the following data were collected.

**Figure 1. Regional assessments of terrestrial species were made for two areas – continental Europe and the EU 25. For marine species a single regional assessment was made**



for cetaceans was carried out by Justin Cooke, Tom Jefferson, and Bill Perrin. Pinniped data were initially compiled by Tom Jefferson and Marc Webber. All data collected were entered into the IUCN SSC Species Information Service Data Entry Module (SIS DEM).

All the species had their status assessed according to the 2001 IUCN Red List Categories and Criteria: Version 3.1 ([http://www.iucnredlist.org/info/categories\\_criteria2001](http://www.iucnredlist.org/info/categories_criteria2001)) and the Guidelines for Application of IUCN Red List Criteria at Regional Levels: Version 3.0 (<http://www.iucn.org/themes/ssc/redlists/regionalguidelines.htm>).

## 2.5 Evaluation of the assessments

For most terrestrial species the preliminary data were reviewed and draft Red List assessments made at the European Mammal Assessment workshop, held on the 18-

22 May 2006 at the Neusiedler-See National Park in Illmitz, Austria. Completed assessments subsequently went through two rounds of review by a larger number of experts. Cetacean assessments were carried out in conjunction with the Global Mammal Assessment (GMA) Cetacean Red Listing workshop held in La Jolla, California, on 22–26 January 2007. A small number of species were assessed by correspondence with appropriate experts. In all, more than 150 mammal experts from at least 40 different countries contributed to the assessment; a full list of participants can be found in the Acknowledgements.

Staff from the IUCN Red List Unit and Global Mammal Assessment evaluated the assessments to check they complied with the guidelines for application of the IUCN Red List Categories and Criteria and included the most up-to-date, comprehensive information. The resulting assessments are a product of scientific consensus concerning species status and are backed by relevant literature and data sources.

The lesser horseshoe bat *Rhinolophus hipposideros* is widespread in Europe, but has undergone substantial range reductions over the past 50 years as a result of habitat loss and disturbance and destruction of roost sites. It is classed as Near Threatened at both the European and EU 25 levels. © Vilda - Rollin Verlinde





# 3. Results

## 3.1 Threatened status of mammals

A primary goal of the European Mammal Assessment was to assess the status of European mammals with respect to the 2001 IUCN Red List Categories and Criteria ([http://www.iucnredlist.org/info/categories\\_criteria2001](http://www.iucnredlist.org/info/categories_criteria2001)) and the IUCN Guidelines for the Application of Red List Criteria at Regional levels <http://www.iucn.org/themes/ssc/redlists/regionalguidelines.htm>. These categories provide an explicit framework for determining a species' conservation status, with an emphasis on identifying those at highest risk of extinction. In this context, the term "threatened" refers to those species classified under the Red List Categories Vulnerable, Endangered or Critically Endangered.

The EMA assessed the status of terrestrial species at two regional levels: geographical Europe, and the EU 25. Marine species were assessed at one regional level (see Figure 1), so the European and EU 25 Red List status is the same for any given species. At the European regional level, 14.2% of terrestrial mammals are threatened, with 1.5% Critically Endangered, 3.4% Endangered, and 9.3% Vulnerable. A further 3.4% were classed as Data Deficient. Within the EU 25, the pattern is similar, with 14.4% of terrestrial mammals threatened, although a higher proportion of species are Critically Endangered (2.4%) (see

Table 2 and Figures 2 and 3). A higher proportion of marine species were assessed as threatened: 22.2% in total, evenly split between the threatened categories with 7.4% Critically Endangered, 7.4% Endangered and 7.4% Vulnerable (see Figure 4). The true proportion of threatened species may be even higher, as a large proportion of marine mammals (44.4%) were assessed as Data Deficient.

Overall, considering both terrestrial and marine species at the European regional level, 15.2% of species are threatened. A further 9.1% are considered Near Threatened, and 1.3% are already regionally or globally Extinct. By comparison, 13% of European birds are threatened (BirdLife International 2004a). No other groups have yet been comprehensively assessed at the European level according to IUCN regional Red List guidelines. Species classed as threatened (Critically Endangered, Endangered and Vulnerable) at the European and EU 25 level are listed in Table 3.

A further 51 species were classed as Not Applicable (22 were introduced after 1500 A.D., 27 are of marginal occurrence in the European region, and two are feral descendants of ancient domesticated animals, see Appendix 2).

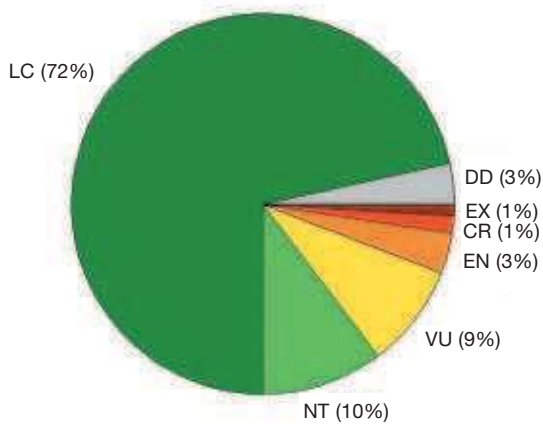
**Table 2. Summary of numbers of species within each category of threat**

| IUCN Red List categories     |                                   | No. species (Europe terrestrial) | No. species (EU 25 terrestrial) | No. species (marine) | (Europe terrestrial and marine) |
|------------------------------|-----------------------------------|----------------------------------|---------------------------------|----------------------|---------------------------------|
|                              | Extinct (EX)                      | 2                                | 2                               | 0                    | 2                               |
|                              | Extinct in the Wild (EW)          | 0                                | 0                               | 0                    | 0                               |
|                              | Regionally Extinct (RE)           | 0                                | 0                               | 1                    | 1                               |
| <b>Threatened categories</b> | Critically Endangered (CR)        | 3                                | 4                               | 2                    | 5                               |
|                              | Endangered (EN)                   | 7                                | 5                               | 2                    | 9                               |
|                              | Vulnerable (VU)                   | 19                               | 15                              | 2                    | 21                              |
|                              | Near Threatened (NT)              | 20                               | 19                              | 1                    | 21                              |
|                              | Least Concern (LC)                | 146                              | 113                             | 7                    | 153                             |
|                              | Data Deficient (DD)               | 7                                | 9                               | 12                   | 19                              |
|                              | Total number of species assessed* | 204                              | 167                             | 27                   | 231                             |
|                              | Total number of extant species*   | 202                              | 165                             | 26                   | 228                             |

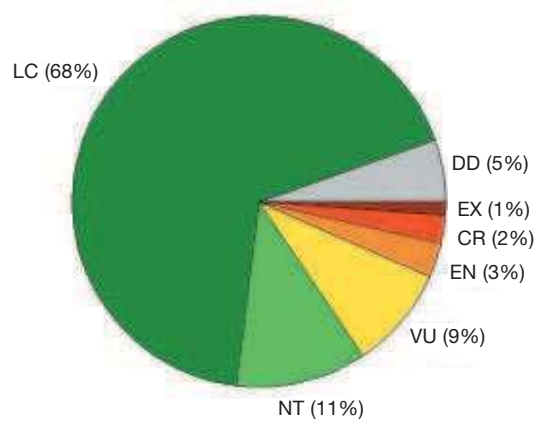
\* Excluding species that are considered Not Applicable.



**Figure 2. Red List status of terrestrial mammals in Europe**



**Figure 3. Red List status of terrestrial mammals in the EU 25**



### 3.2 Status by taxonomic group

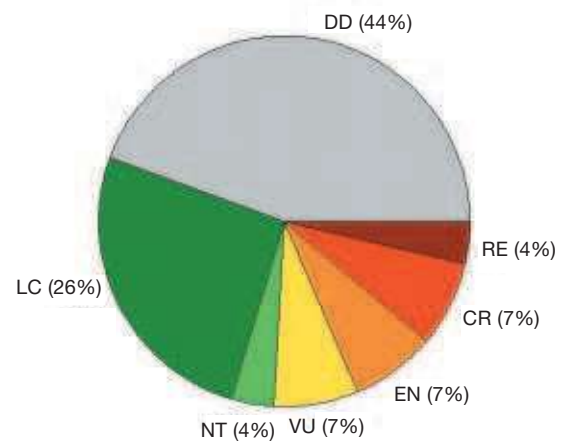
Terrestrial mammals native to Europe belong to eight major groups, or taxonomic orders: Artiodactyla (even-toed ungulates), Carnivora (carnivores), Cetacea (whales, dolphins and porpoises), Chiroptera (bats), Erinaceomorpha (hedgehogs and their relatives), Lagomorpha (rabbits, hares and pikas), Rodentia (rodents) and Soricomorpha (shrews and moles). Considerable differences exist among these groups in both species numbers as well as threatened status (see Table 4). Rodents, bats, and soricomorphs (shrews and moles) constitute the majority of European mammals. Carnivores, ungulates, bats and lagomorphs (rabbits and hares) are particularly threatened.

### 3.3 Extinctions

Two European terrestrial mammal species (1.0% of the total number assessed) are known to have gone extinct since 1500 A.D. These two species are the aurochs *Bos primigenius* and the Sardinian pika *Prolagus sardus*. The aurochs was Extinct in the Wild, except in Jaktorowka Forest, Masovia, Poland, by the start of the 15th century. The last wild individual is reputed to have died in 1627. The aurochs is the ancestor of domestic cattle (Vuure 2005). The Sardinian pika was a pika native to the Mediterranean islands of Sardinia and Corsica until its extinction, which probably occurred in the late 1700s or early 1800s (Nowak 1999).

One marine mammal, the grey whale *Eschrichtius robustus*, is Regionally Extinct. It formerly occurred in the North Atlantic and adjacent waters, but was extirpated by hunting. Sub-fossil remains, the most recent dated at around 1675 A.D., have been found on the eastern seaboard of North America from Florida to New Jersey,

**Figure 4. Red List status of marine mammals in Europe and the EU 25**



The grey whale *Eschrichtius robustus* is extinct in the North Atlantic. This photograph is of a grey whale from the Critically Endangered Northwest Pacific subpopulation. © David W. Weller



**Table 3. The threatened species at the European and EU 25 level\***

| Order        | Genus               | Species              | Common Name                   | Red List status |       |
|--------------|---------------------|----------------------|-------------------------------|-----------------|-------|
|              |                     |                      |                               | Europe          | EU 25 |
| ARTIODACTYLA | <i>Saiga</i>        | <i>tatarica</i>      | Saiga                         | CR              | NE    |
| CARNIVORA    | <i>Lynx</i>         | <i>pardinus</i>      | Iberian lynx                  | CR              | CR    |
| CARNIVORA    | <i>Monachus</i>     | <i>monachus</i>      | Mediterranean monk seal       | CR              | CR    |
| CETACEA      | <i>Eubalaena</i>    | <i>glacialis</i>     | North Atlantic right whale    | CR              | CR    |
| RODENTIA     | <i>Microtus</i>     | <i>bavaricus</i>     | Bavarian pine vole            | CR              | CR    |
| CARNIVORA    | <i>Mustela</i>      | <i>lutreola</i>      | European mink                 | EN              | CR    |
| CETACEA      | <i>Balaenoptera</i> | <i>borealis</i>      | Sei whale                     | EN              | EN    |
| CETACEA      | <i>Balaenoptera</i> | <i>musculus</i>      | Blue whale                    | EN              | EN    |
| CHIROPTERA   | <i>Nyctalus</i>     | <i>azoreum</i>       | Azores noctule                | EN              | EN    |
| CHIROPTERA   | <i>Pipistrellus</i> | <i>maderensis</i>    | Madeira pipistrelle           | EN              | EN    |
| CHIROPTERA   | <i>Plecotus</i>     | <i>teneriffae</i>    | Canary long-eared bat         | EN              | EN    |
| RODENTIA     | <i>Myomimus</i>     | <i>roachi</i>        | Roach's mouse-tailed dormouse | EN              | DD    |
| RODENTIA     | <i>Spalax</i>       | <i>arenarius</i>     | Sandy mole rat                | EN              | NE    |
| SORICOMORPHA | <i>Crocidura</i>    | <i>canariensis</i>   | Canary shrew                  | EN              | EN    |
| ARTIODACTYLA | <i>Bison</i>        | <i>bonasus</i>       | European bison                | VU              | VU    |
| CARNIVORA    | <i>Gulo</i>         | <i>gulo</i>          | Wolverine                     | VU              | VU    |
| CARNIVORA    | <i>Ursus</i>        | <i>maritimus</i>     | Polar bear                    | VU              | NE    |
| CARNIVORA    | <i>Vormela</i>      | <i>peregrina</i>     | Marbled polecat               | VU              | NA    |
| CETACEA      | <i>Phocoena</i>     | <i>phocoena</i>      | Harbour porpoise              | VU              | VU    |
| CETACEA      | <i>Physeter</i>     | <i>catodon</i>       | Sperm whale                   | VU              | VU    |
| CHIROPTERA   | <i>Barbastella</i>  | <i>barbastellus</i>  | Western barbastelle           | VU              | VU    |
| CHIROPTERA   | <i>Myotis</i>       | <i>bechsteinii</i>   | Bechstein's myotis            | VU              | VU    |
| CHIROPTERA   | <i>Myotis</i>       | <i>capaccinii</i>    | Long-fingered bat             | VU              | VU    |
| CHIROPTERA   | <i>Plecotus</i>     | <i>sardus</i>        | Sardinian long-eared bat      | VU              | VU    |
| CHIROPTERA   | <i>Rhinolophus</i>  | <i>blasii</i>        | Blasius' horseshoe bat        | VU              | DD    |
| CHIROPTERA   | <i>Rhinolophus</i>  | <i>euryale</i>       | Mediterranean horseshoe bat   | VU              | VU    |
| CHIROPTERA   | <i>Rhinolophus</i>  | <i>mebelyi</i>       | Mehely's horseshoe bat        | VU              | VU    |
| LAGOMORPHA   | <i>Lepus</i>        | <i>castroviejoi</i>  | Broom hare                    | VU              | VU    |
| LAGOMORPHA   | <i>Lepus</i>        | <i>corsicanus</i>    | Corsican hare                 | VU              | VU    |
| RODENTIA     | <i>Microtus</i>     | <i>cabrae</i>        | Cabrera's vole                | VU              | VU    |
| RODENTIA     | <i>Spalax</i>       | <i>giganteus</i>     | Giant mole rat                | VU              | NE    |
| RODENTIA     | <i>Spalax</i>       | <i>zemni</i>         | Podolsk mole rat              | VU              | NE    |
| RODENTIA     | <i>Spermophilus</i> | <i>citellus</i>      | European souslik              | VU              | VU    |
| SORICOMORPHA | <i>Crocidura</i>    | <i>zimmermanni</i>   | Cretan white-toothed shrew    | VU              | VU    |
| SORICOMORPHA | <i>Desmana</i>      | <i>moschata</i>      | Russian desman                | VU              | NE    |
| CHIROPTERA   | <i>Plecotus</i>     | <i>macrobullaris</i> | Mountain long-eared bat       | NT              | VU    |
| RODENTIA     | <i>Sicista</i>      | <i>subtilis</i>      | Severtzov's birch mouse       | NT              | VU    |
| CARNIVORA    | <i>Alopex</i>       | <i>lagopus</i>       | Arctic fox                    | LC              | CR    |
| CARNIVORA    | <i>Mustela</i>      | <i>eversmanni</i>    | Steppe polecat                | LC              | EN    |

\* Species listed as NA (Not Applicable) in the EU 25 are of marginal occurrence, and species listed as NE (Not Evaluated) do not occur in the region.

**Table 4. Red List Status (European Regional level) by Taxonomic Order**

| Order          | Total*     | EX       | EW       | RE       | CR       | EN       | VU        | NT        | LC         | DD        | % Threatened or Extinct |
|----------------|------------|----------|----------|----------|----------|----------|-----------|-----------|------------|-----------|-------------------------|
| Artiodactyla   | 14         | 1        | 0        | 0        | 1        | 0        | 1         | 0         | 11         | 0         | 21.4%                   |
| Carnivora      | 27         | 0        | 0        | 0        | 2        | 1        | 3         | 1         | 20         | 0         | 22.2%                   |
| Cetacea        | 23         | 0        | 0        | 1        | 1        | 2        | 2         | 1         | 4          | 12        | 21.7%                   |
| Chiroptera     | 40         | 0        | 0        | 0        | 0        | 3        | 7         | 8         | 20         | 2         | 25.0%                   |
| Erinaceomorpha | 4          | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 4          | 0         | 0%                      |
| Lagomorpha     | 8          | 1        | 0        | 0        | 0        | 0        | 2         | 1         | 4          | 0         | 37.5%                   |
| Rodentia       | 85         | 0        | 0        | 0        | 1        | 2        | 4         | 8         | 69         | 1         | 8.2%                    |
| Soricomorpha   | 30         | 0        | 0        | 0        | 0        | 1        | 2         | 2         | 21         | 4         | 10%                     |
| <b>Total</b>   | <b>231</b> | <b>2</b> | <b>0</b> | <b>1</b> | <b>5</b> | <b>9</b> | <b>21</b> | <b>21</b> | <b>153</b> | <b>19</b> | <b>16.5%</b>            |

\* Does not include species classed as Not Applicable (NA).

and on the coasts of the English Channel and the North and Baltic seas. There are historical accounts of living grey whales from Iceland in the early 1600s and possibly off New England in the early 1700s (Rice 1998). The species now survives only in the North Pacific and adjacent waters.

### 3.4 Spatial distribution of species

#### 3.4.1 Species richness

Information on the species richness of mammals within orders and families has already been given in Section 1.2 and Table 1. The geographic distribution of mammal species richness in Europe is presented in Figure 5. The mountainous regions of temperate and Mediterranean Europe (including the Cantabrian mountains, Pyrenees, Massif Central, Alps, Apennines, Carpathians, and the mountains of the Balkan peninsula) clearly stand out as areas of high species richness. The whole Balkan peninsula emerges as a hotspot of mammalian diversity, highlighting the importance of the new Member States Bulgaria and Romania for biodiversity conservation in the EU. There is a marked latitudinal gradient in species richness, with southern Europe (especially south-eastern Europe) containing a greater diversity of mammal species than the north. In the marine realm, species richness is higher in the open Atlantic ocean than it is in the enclosed Baltic, Mediterranean and Black Seas.

Looking at mammalian diversity from a country perspective, the top five EU countries in terms of species richness are (in descending order): France, Spain, Italy, Germany and Greece (see Table 5).

#### 3.4.2 Threatened species richness

A map showing the distribution of threatened mammals in Europe (Figure 6) reveals somewhat different patterns from depictions of overall species diversity. The greatest

concentration of threatened species is found in the Balkan Peninsula, especially Bulgaria. This again illustrates the importance of the Balkan region for mammal conservation in Europe. The Mediterranean islands of Corsica and Sardinia are also highlighted as having a high number of threatened mammal species, as well as parts of Iberia, the Pyrenees, and the Apennines. The distribution of threatened marine mammals correlates with overall marine mammal species richness - there is a higher number of threatened species in the Atlantic than in the Mediterranean, Black and Baltic Seas.

#### 3.4.3 Endemic species richness

Figure 7 shows the distribution of endemic mammal species (e.g., those that are unique to Europe and are found nowhere else in the world). Endemism is particularly high in a number of mountainous regions including the Pyrenees, the Cantabrian mountains, the Alps, and the Apennines. The Italian and Iberian peninsulas also hold important concentrations of endemic mammal species. There are no marine species endemic to the EMA marine area.

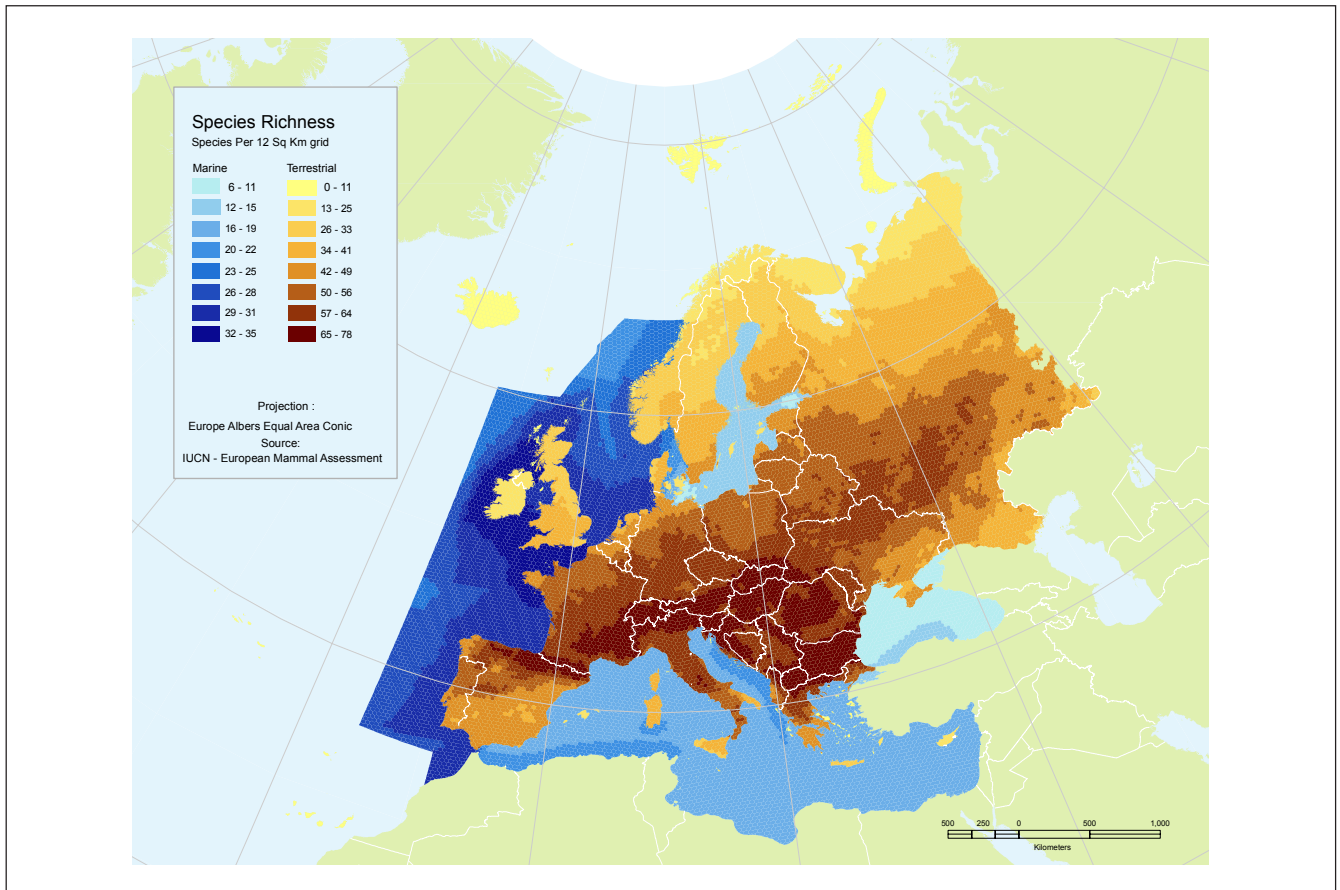
### 3.5 Major threats to terrestrial mammals in Europe

The major threats to each species were coded using the IUCN Major Threats Authority File. A summary of the relative importance of the different threatening processes is shown in Figure 8.

Habitat loss and degradation have by far the largest impact on both threatened and non-threatened species, affecting 27 of the 29 threatened species, and 94 species in total. The number of species impacted by habitat loss and degradation is nearly three times greater than the next most common threat, pollution (including global climate change, see Box 1). Human disturbance, accidental



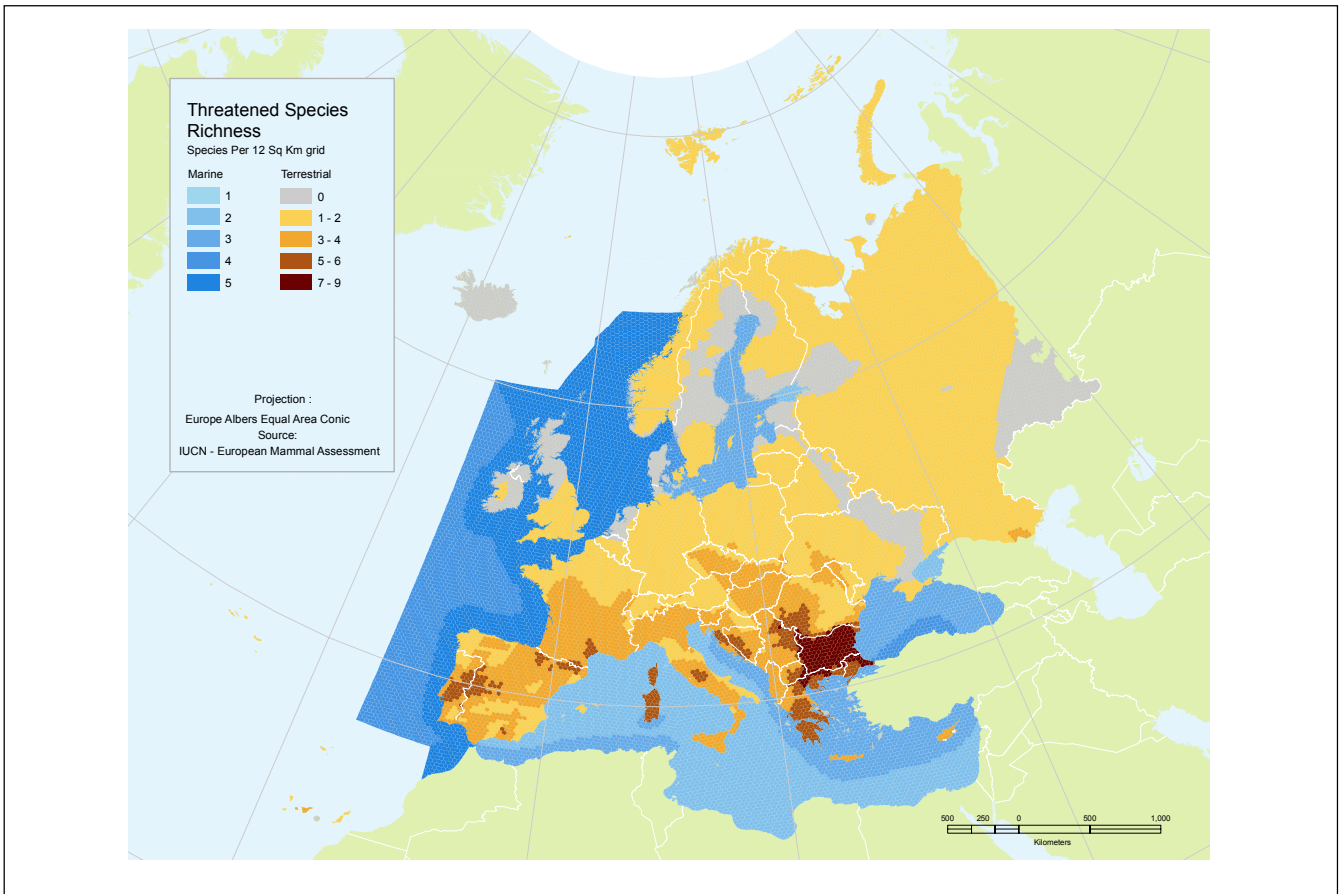
Figure 5. Species richness of European mammals



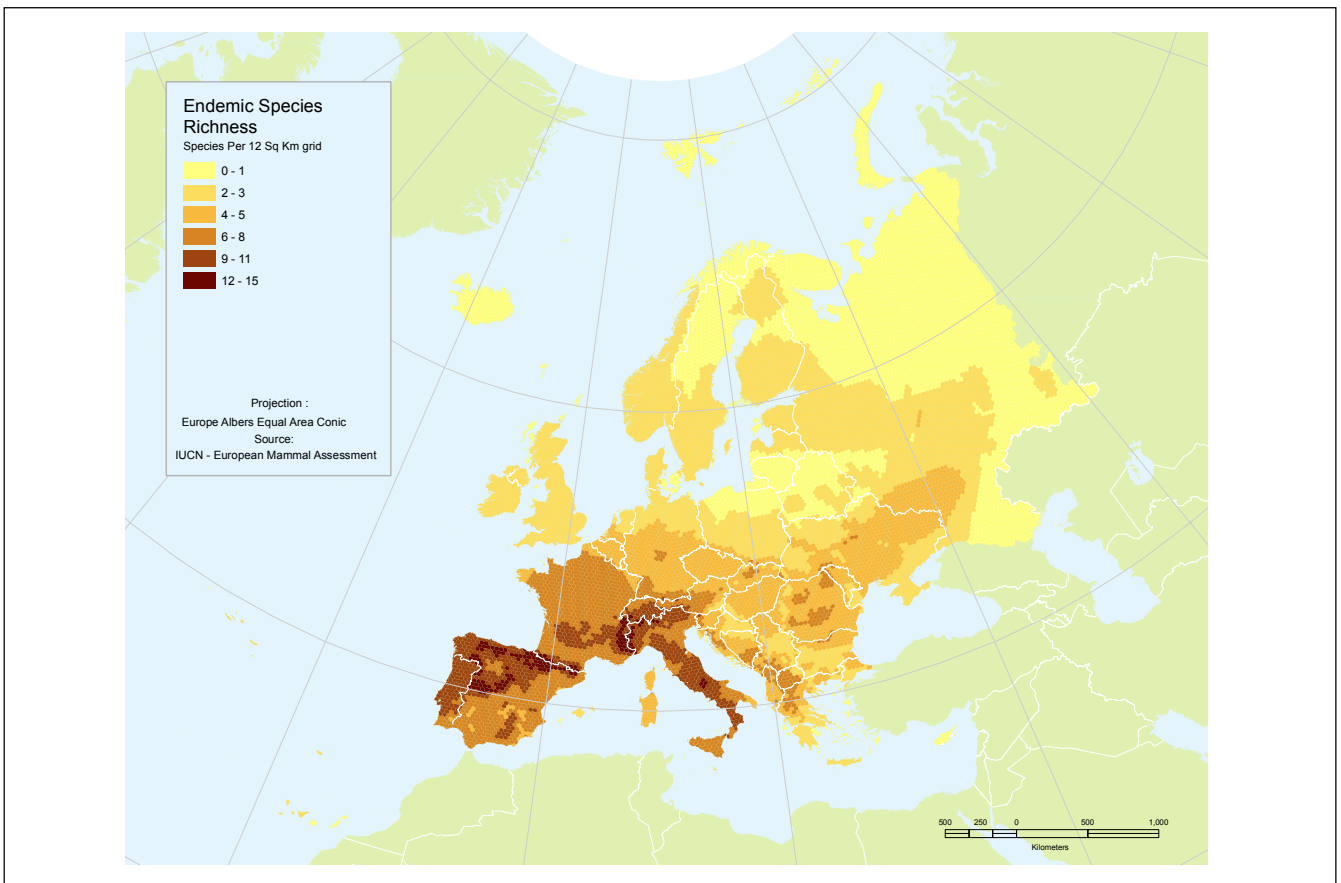
The Bavarian pine vole *Microtus bavaricus* is endemic to a small area in the Tyrolean Alps of Austria. It was formerly also found in the Bavarian Alps of Germany, but is now extinct there. It is currently categorized by IUCN as Critically Endangered. © Edmund Weiss



**Figure 6. Distribution of threatened mammals in Europe**



**Figure 7. Endemic species richness**



**Table 5. Number of mammal species in the 27 current EU member states (excluding species introduced since 1500 A.D.)**

| Country        | Total number of species (terrestrial and marine) |
|----------------|--|
| Austria        | 100  |
| Belgium        | 79   |
| Bulgaria       | 101  |
| Cyprus         | 33   |
| Czech Republic | 82   |
| Denmark        | 74   |
| Estonia        | 63   |
| Finland        | 69   |
| France         | 142  |
| Germany        | 117  |
| Greece         | 106  |
| Hungary        | 82   |
| Ireland        | 60   |
| Italy          | 123  |
| Latvia         | 63   |
| Lithuania      | 66   |
| Luxembourg     | 55   |
| Malta          | 26   |
| Netherlands    | 88   |
| Poland         | 99   |
| Portugal       | 104  |
| Romania        | 101  |
| Slovakia       | 87   |
| Slovenia       | 97   |
| Spain          | 128  |
| Sweden         | 81   |
| United Kingdom | 90   |

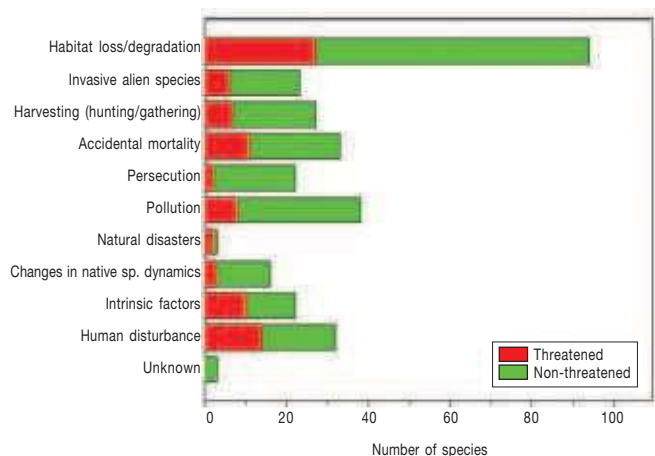
mortality (e.g., bycatch or vehicle collisions), invasive alien species and overharvesting were also identified as significant threats.

Information has not been collected during the EMA on the relative importance of one threat compared to another for a particular species. Development of such information in the future is a priority for the assessment and will enable a more complete analysis of significant threats to mammals.

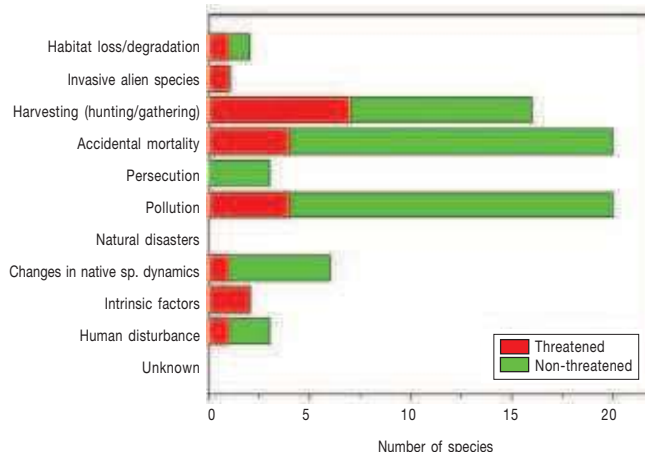
### 3.6 Major threats to marine mammals in Europe

The two most frequently recorded major threats to marine species were accidental mortality (e.g., entanglement in fishing gear and ship strikes) and pollution (see Figure 9). These threats are particularly severe in the enclosed seas of the continent such as the Mediterranean, the Black Sea, and the Baltic. Although harvesting (e.g., overexploitation through unregulated commercial whaling) only ranked third overall when looking at both threatened and non-threatened species, it was shown to be a highly significant threat to threatened species. All Vulnerable, Endangered, Critically Endangered, and Regionally Extinct species had harvesting listed as a major threat. For a number of these species, historic overexploitation is the main reason why they are currently listed as threatened; some species have failed to recover even though their harvest has now ceased.

**Figure 8. Major Threats to Terrestrial Mammals in Europe**



**Figure 9. Major Threats to Marine Mammals in Europe**

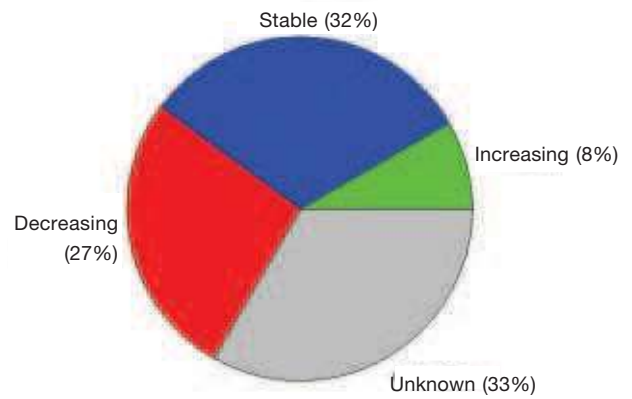




### 3.7 Demographic trends

Documenting population trends is a key to assessing species status, and a special effort was made to determine which species are declining, stable, or increasing. More than a quarter (27%) of European mammals are declining in population. A further 32% are stable, and only 8% are increasing (see Figure 10). A number of these increases are due to successful species-based conservation action. Because trend information is not available for 33% of species, however, the percentage of species in decline may actually be considerably higher.

Figure 10. Population trends of European mammals



The lesser white-toothed shrew *Crocidura suaveolens* is widespread and abundant in Europe. It is currently classed by IUCN as Least Concern. © Vilda - Rollin Verlinde



### Box 1. The polar bear – a symbol of climate change

Polar bears are set to become one of the most notable casualties of global warming. The impact of climate change is increasingly felt in polar regions, where summer sea ice is expected to decrease by 50–100% over the next 50–100 years. In other words, within the next century the polar ice cap may completely disappear during the summer. Already, record losses of the ice cap have been observed: NASA data shows that Arctic perennial sea ice, which normally survives the summer melt season and remains year-round, shrunk abruptly by 14% between 2004 and 2005. According to researchers, the loss of perennial ice in the East Arctic Ocean (above Europe and Asia) neared 50% during that time. Dependent upon Arctic ice-floes for hunting seals and highly specialized for life in the Arctic marine environment, polar bears are predicted to suffer a population decline greater than 30% in the next 45 years. Because polar bears feed almost exclusively on ice-associated seals, changes in the sea ice that affect access to prey will have a negative effect on the bears. With less food, polar bears will fail to reproduce more often and give birth to smaller young that have higher mortality rates.

Polar bears are totally reliant on the sea ice as their primary habitat. If climate change alters the period of ice cover, bears may be driven on shore for extended periods and forced to rely on stored fat. If these periods become excessively long, mortality will increase. Further, as ice melts and the distance between floes increases, leaving more open water, young cubs which are unable to swim long distances may suffer greater mortality. In the last few years scientists have seen the first evidence of polar bears drowning, and in the same period surveys have shown a marked increase in the number of polar bears that are seen swimming in the open sea as opposed to near the ice shelf. Sea ice is also used for access to den areas and if ice patterns change, existing den areas may be unreachable. Another factor is that in some areas, warmer temperatures and higher winds may reduce ice thickness and increase ice drift. Because polar bears must walk against the moving ice (like walking the wrong way on an escalator) increased ice movements will increase energy use and reduce growth and reproduction. Another problem is unusual warm spells during the period that



Polar bear *Ursus maritimus* © Robert and Carolyn Buchanan

females are on land in dens. If severe rain events occur during the den period, it is possible that snow banks slump and can kill mothers and their cubs. Such an event was observed in northern Canada and unusual rain events have been noted in western Hudson Bay and Svalbard with unknown consequences.

Previously listed by IUCN as a conservation dependent species, the polar bear moves into the threatened categories and has been classified as Vulnerable at both the global and European regional level. Polar bears are a keystone species in ice-covered Arctic marine ecosystems and alterations to the distribution, density or abundance of this top predator will likely have impacts throughout the arctic ecosystem.



# 4. Discussion

## 4.1 Status and population trends of European mammals

The EMA assessed the status of terrestrial species at two regional levels: geographical Europe, and the EU 25. Marine species were assessed at one regional level (see Section 2.2 and Figure 1), so the European and EU 25 Red List status is the same for any given species. Patterns of terrestrial species status were similar at the European and EU 25 level, although there were some interesting differences. At the European regional level, 14.2% of terrestrial mammals are threatened, with 1.5% Critically Endangered, 3.4% Endangered, and 9.3% Vulnerable. A further 3.4% were classed as Data Deficient. Within the EU 25, the pattern is similar, with 14.4% of terrestrial mammals threatened, although a higher proportion of species are Critically Endangered (2.4%). Proportions of Endangered and Vulnerable species were similar but slightly lower to those found at the European level, at 3.0% and 9.0% respectively (see Table 2 and Figures 2 and 3). Two terrestrial mammal species qualified as Critically Endangered at the EU 25 level, although they were considered less threatened at the European regional level. These were the European mink *Mustela lutreola* (considered CR in the EU 25 but EN in Europe) and the Arctic fox *Alopex lagopus* (considered CR in the EU 25 but LC in Europe). The European mink qualified as threatened at both levels because of very rapid population declines throughout its range; better information from the eastern part of its range might result in a future uplisting to Critically Endangered at the European regional level too. By contrast, the Arctic fox has a tiny and severely threatened population in the European Union (Sweden and Finland), but is not considered threatened at the European regional level because of the presence of large populations in the Russian Federation that are not believed to be declining at a rate approaching the IUCN Red List thresholds.

Birds are the only other taxonomic group that has been subject to a status assessment at both the European and the EU 25 level. A higher proportion of bird species have Unfavourable conservation status at the EU 25 level than at the pan-European level (BirdLife International 2004b, see Section 4.7 for a discussion of the important differences between Unfavourable conservation status *sensu* the EU Habitats Directive and threatened status *sensu* IUCN Red List Criteria). Almost half (48%) of the EU 25's 448 species were assessed as having Unfavourable conservation status, whereas only

43% of 524 European species had Unfavourable conservation status (BirdLife International 2004b).

Marine mammals showed a notably high proportion of Data Deficient species. This was driven in part by the inclusion in the assessment of six species of the family Ziphiidae (beaked whales). These rarely-recorded and inconspicuous deepwater species are the most poorly known of cetaceans; they tend to remain well out to sea, avoid ships, and dive to great depths and are consequently often missed in surveys (Barlow 1999, Nowak 1999). All six of these species were classed as Data Deficient.

The European Mammal Assessment showed that more than a quarter (27%) of European mammals have declining populations. A further 32% are stable, and 33% are of unknown population trend. Only 8% of species populations are increasing. These results are approximately comparable with population trends recorded for birds in Europe: from 1990 to 2000, 23% of European bird species showed population declines, 51% were stable, 9% were increasing and 17% were of unknown population trend (BirdLife 2004a). The status assessment of European bird species benefited from quantitative population trend data from a well established monitoring network covering the majority of species and countries in Europe. By contrast, comprehensive and reliable population trend data are available for very few mammal species. The population trend analysis in this report is based in many cases on survey data from a small and potentially non-representative part of the species' range, or on a subjective assessment of population trend based on known threats. A challenge for the future is to strengthen capacity for monitoring mammal populations in Europe, especially those of threatened, Near Threatened and Data Deficient species.

## 4.2 Protection of habitats and species in Europe

At the international level, European countries and the EU have signed up to a number of important conventions aimed at conserving biodiversity that have particular relevance for mammals, including the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats, the 1979 Bonn Convention on Migratory Species, the 1991 Convention on the Protection of the Alps and, most importantly, the 1992 Rio Convention which enshrines the principle of sustainable development.

The Bern Convention supports the conservation and sustainable use of European species and habitats. The Convention is a binding legal treaty covering all European countries and some African states. Considerable work has been undertaken within the Convention for the protection of mammal species, especially large carnivores. Apart from numerous workshops and seminars, the Convention has adopted recommendations and developed Action Plans for certain species (e.g., all large carnivores, European bison, several bat species etc.) and also established the Large Carnivores Initiative for Europe (LCIE) as an expert body, now incorporated as a working group of the IUCN Species Survival Commission (see Box 2).

Under the framework of the Convention on Migratory Species (CMS), there are three key regional agreements for mammals:

- Conservation of populations of European Bats (EUROBATS)
- Cetaceans of the Mediterranean Sea, Black Sea and Contiguous Atlantic Area (ACCOBAMS)
- Small Cetaceans of the Baltic and North Seas (ASCOBANS)
- Seals in the Wadden Sea.

An important commitment made by European countries and the EU was to halt the loss of biodiversity within Europe by 2010. This means that population declines should be stopped and ideally reversed. This assessment has shown that a large number of species show a long term decline with a proportion of threatened species that matches levels identified for European birds (BirdLife International 2004a). Reversing this trend before 2010 will be extremely difficult and requires considerable conservation investment from all European countries.

The Alpine ibex *Capra ibex* came close to extinction at the beginning of the 19th century, when overexploitation reduced the population to about 100 individuals restricted to Italy's Gran Paradiso massif. However, as a result of intensive conservation management (including reintroductions and introductions, hunting restrictions, and the establishment of protected areas) the species is now recovering, and has an expanding population of over 30,000 individuals. It is classed as Least Concern in Europe and the EU.

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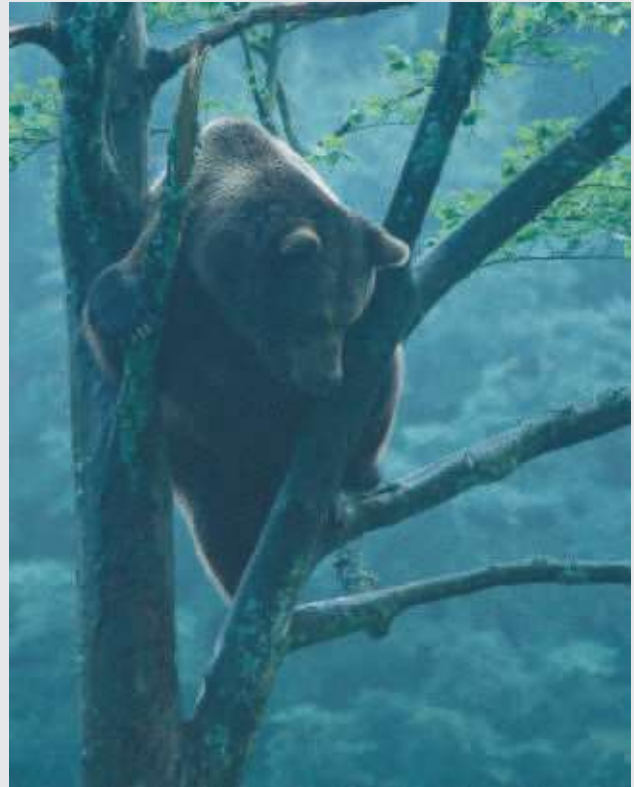


The garden dormouse *Eliomys quercinus* is endemic to Europe, and is classed by IUCN as Near Threatened. This species has declined more than almost any other rodent in Europe, and may have disappeared from as much as 50% of its former range during the last 30 years.



## Box 2. Population Level Management Plans for Large Carnivores in Europe

Continental Europe is home to five species of large carnivore – the wolf *Canis lupus*, the wolverine *Gulo gulo*, the brown bear *Ursus arctos*, the Eurasian lynx *Lynx lynx* and the Iberian lynx *Lynx pardinus*. Conserving these animals is a significant challenge in landscapes which are as densely populated and heavily modified as those found in much of Europe. The main conservation challenges stem from the most fundamental characteristic of these species: as top predators they require a lot of space. Home range sizes of individual large carnivores in Europe tend to vary between 100 and 1,000 km<sup>2</sup> (Herfindal *et al.* 2005, Nilsen *et al.* 2005), and dispersing juveniles may travel hundreds of kilometres. Large carnivores never reach very high densities – figures of 0.1 to 3 individuals per 100 km<sup>2</sup> are typical – and consequently very few European protected areas are large enough to embrace the home ranges of more than a few individuals (Linnell *et al.* 2001). Successful conservation depends upon the continued presence of these species not only in protected areas, but also in the matrix of habitat that surrounds these protected areas and constitutes the majority of the European landscape. However, the presence of large carnivores in these multi-use landscapes leads to a number of conflicts with human interests (Thirgood *et al.* 2005, Woodroffe *et al.* 2005). A further consequence of their low densities and wide ranging behaviour is that very few administrative units are large enough to contain a viable population of any large carnivore species on their own. It is therefore vital that conservation planning for large carnivores occurs in a coordinated and cooperative manner between all the administrative units (protected areas, municipalities, counties, states, countries, and even super-national entities like the European Union) that share populations. A first step towards a coordinated management strategy for large carnivores in Europe occurred in 1999 when the Bern Convention endorsed a series of action plans for bears, wolves, Eurasian lynx and wolverines (Boitani 2000, Breitenmoser *et al.* 2000, Landa *et al.* 2000, Swenson *et al.* 2000) produced by the Large Carnivore Initiative for Europe ([www.lcie.org](http://www.lcie.org)). A second step was made in 2005, when the European Commission launched a call for tenders (ENV.B.2/SER/2005/0085r) for the development of “Guidelines for population level management plans for large carnivores in Europe”. The Iberian lynx was not covered in either of these initiatives, because its distribution is very limited and the conservation issues differ greatly from the other four species. The contract was won by the Istituto di Ecologia Applicata (Italy) in cooperation with the



Brown bear *Ursus arctos*. © Vilda - Rollin Verlinde

Norwegian Institute for Nature Research (Norway), Callisto (Greece) and KORA (Switzerland). These institutions are working together with a wide range of experts from across Europe, including many members of the IUCN SSC Large Carnivore Initiative for Europe Working Group and the IUCN SSC Wolf, Bear and Cat Specialist Groups to develop a large carnivore management strategy that will be integrated into the Habitats Directive and will fulfill two fundamental requirements. The first is that the unit for conservation planning should not be just the portion of a population that falls within a given state or country's boundaries. Rather it should be the entire biological unit, involving all administrative units within its distribution. The second is that large carnivore conservation requires their integration with human activities in human-dominated landscapes. Coexistence between large carnivores and humans is not always easy to achieve, and almost always requires active management (such as reintroduction, translocation, hunting, lethal control) and coordinated planning with conflicting land-uses and activities. The need for (and the acceptance of) different management options varies greatly throughout Europe (Boitani 2003), necessitating a conservation system which is both coordinated and flexible – to permit local adaptation of the means needed to achieve a global vision.



### 4.3 Protection of habitats and species in the EU

EU nature conservation policy is based on two main pieces of legislation – the Birds Directive<sup>7</sup> and the Habitats Directive<sup>8</sup> – and until 2006 benefited from a specific financial instrument – the LIFE-Nature fund (see Section 4.4). The main aim of this nature conservation policy is to ensure the favourable conservation status (see Box 3) of the habitats and species found in the EU. One of the main tools to enhance and maintain this status is the Natura 2000 network of protected areas. EU nature conservation policy also foresees the integration of its protection requirements into other EU sectoral policies such as agriculture, regional development and transport. The Habitats Directive, which aims to protect other wildlife species and habitats, applies to both terrestrial and marine regions. Each Member State is required to identify sites of European importance and encouraged to put in place a special management plan to protect them, combining long-term conservation with economic and social activities as part of a sustainable development strategy. These sites, together with those of the Birds Directive, make up the Natura 2000 network – the cornerstone of EU nature protection policy. The Natura 2000 network comprises 20,862 sites under the Habitats Directive (December 2006), which includes 1,248 marine sites and covers 12% of the EU's surface area and 4,617 sites under the Birds Directive including 484 marine sites or 10% of the EU's surface area. The Habitats Directive contains a series of Annexes that mostly identify habitats and species of European Community concern. Member States are required to designate Natura 2000 sites for the species listed on Annex II and Annex IV species are subject to a strict protection system. Table 6 shows those mammals identified as threatened by the assessment and their inclusion in the protected species Annexes of the Habitats Directive and Appendices of the Bern Convention. A notable absence from the Annexes is the Bavarian pine vole *Microtus bavaricus*, which was re-discovered in 2000 after having thought to be extinct, and is now classed as Critically Endangered. Three more species that are endemic to the EU and listed as threatened according to IUCN Red List Criteria (the Cretan white-toothed shrew *Crocidura zimmermanni*, the broom hare *Lepus castroviejo* and the Corsican hare *L. corsicanus*) do not appear on Annexes II or IV of the Habitats Directive.

### 4.4 Conservation management of mammals in the EU

The main financial instrument for *in situ* conservation in the EU has been the LIFE programme (L'Instrument Financier pour l'Environnement), which ran from 1992 to 2006. In total approximately 1.8 billion EUR has been allocated to the three separate strands, LIFE-Nature, LIFE-Environment and LIFE-Third Countries, for the implementation of projects to support the European Communities environmental policy. LIFE-Nature specifically aims to support the implementation of the Birds and Habitats Directives and establish the Natura 2000 network. Projects involve a variety of actions including habitat restoration, site purchases, communication and awareness-raising, protected area infrastructure and conservation planning.

Based on a search of the LIFE Nature project database that lists all past and current LIFE projects, 137 projects link their actions to mammal conservation (approximately 14% of the 970 LIFE Nature projects) and 72 target specific species. Table 7 shows the taxonomic breakdown of these projects, highlighting the prevalence of projects aimed towards the conservation of large carnivores in Europe. Examples of actions taken within these projects include the development of species action plans, habitat restoration, habitat conservation and re-introductions.

The LIFE Programme has been a very important tool for the conservation of mammals in Europe. One of the possible constraints of the programme has been that projects were usually focused on existing or potential Natura 2000 sites. This means that actions to support the connectivity between sites were limited. Such actions are very important for mammals with large range sizes. The LIFE Programme ended in 2006 and at the time of writing, a future programme has been announced under the name LIFE+. The new regulation, with a budget of 2.1bn EUR until 2013, has three strands: Nature and Biodiversity, Environment Policy and Governance and Information and Communication. One of the key differences with the LIFE programme is that the majority (80%) of funds will be allocated at the Member State level, rather than via the European Commission.

7 Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds.

8 Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna.

**Table 6. The threatened taxa identified by the assessment and their presence on either Annexes II and IV of the Habitats Directive or Annexes II or III of the Bern Convention. An asterisk indicates the species is a priority species for the Habitats Directive**

| Genus               | Species              | Red List status Europe | Habitats Directive EU 25 | Bern Convention Annexes | Appendices |
|---------------------|----------------------|------------------------|--------------------------|-------------------------|------------|
| <i>Saiga</i>        | <i>tatarica</i>      | CR                     | Not present              |                         |            |
| <i>Lynx</i>         | <i>pardinus</i>      | CR                     | CR                       | II*/IV                  | II         |
| <i>Monachus</i>     | <i>monachus</i>      | CR                     | CR                       | II*/IV                  | II         |
| <i>Eubalaena</i>    | <i>glacialis</i>     | CR                     | CR                       | IV                      | II         |
| <i>Microtus</i>     | <i>bavaricus</i>     | CR                     | CR                       |                         | II         |
| <i>Mustela</i>      | <i>lutreola</i>      | EN                     | CR                       | II*/IV                  | II         |
| <i>Balaenoptera</i> | <i>borealis</i>      | EN                     | EN                       | IV                      | II (Med.)  |
| <i>Balaenoptera</i> | <i>musculus</i>      | EN                     | EN                       | IV                      | II         |
| <i>Nyctalus</i>     | <i>azoreum</i>       | EN                     | EN                       | IV                      | II         |
| <i>Pipistrellus</i> | <i>maderensis</i>    | EN                     | EN                       | IV                      | II         |
| <i>Plecotus</i>     | <i>teneriffae</i>    | EN                     | EN                       | IV                      | II         |
| <i>Myomimus</i>     | <i>roachi</i>        | EN                     | DD                       | II/IV                   | II         |
| <i>Spalax</i>       | <i>arenarius</i>     | EN                     | Not present              |                         |            |
| <i>Crocidura</i>    | <i>canariensis</i>   | EN                     | EN                       | IV                      | II         |
| <i>Bison</i>        | <i>bonasus</i>       | VU                     | VU                       | II*/IV                  | III        |
| <i>Gulo</i>         | <i>gulo</i>          | VU                     | VU                       | II*/IV                  | II         |
| <i>Ursus</i>        | <i>maritimus</i>     | VU                     | Not present              |                         | II         |
| <i>Vormela</i>      | <i>peregrina</i>     | VU                     | NA                       | II/IV                   | II         |
| <i>Phocoena</i>     | <i>phocoena</i>      | VU                     | VU                       | II/IV                   | II         |
| <i>Physeter</i>     | <i>catodon</i>       | VU                     | VU                       | IV                      | II (Med.)  |
| <i>Barbastella</i>  | <i>barbastellus</i>  | VU                     | VU                       | II/IV                   | II         |
| <i>Myotis</i>       | <i>bechsteinii</i>   | VU                     | VU                       | II/IV                   | II         |
| <i>Myotis</i>       | <i>capaccinii</i>    | VU                     | VU                       | II/IV                   | II         |
| <i>Plecotus</i>     | <i>sardus</i>        | VU                     | VU                       | IV                      | II         |
| <i>Rhinolophus</i>  | <i>blasii</i>        | VU                     | DD                       | II/IV                   | II         |
| <i>Rhinolophus</i>  | <i>euryale</i>       | VU                     | VU                       | II/IV                   | II         |
| <i>Rhinolophus</i>  | <i>mebelyi</i>       | VU                     | VU                       | II/IV                   | II         |
| <i>Lepus</i>        | <i>castroviejoi</i>  | VU                     | VU                       |                         |            |
| <i>Lepus</i>        | <i>corsicanus</i>    | VU                     | VU                       |                         |            |
| <i>Microtus</i>     | <i>cabreræ</i>       | VU                     | VU                       | II/IV                   | II         |
| <i>Spalax</i>       | <i>giganteus</i>     | VU                     | Not present              |                         |            |
| <i>Spalax</i>       | <i>zemni</i>         | VU                     | Not present              |                         |            |
| <i>Spermophilus</i> | <i>citellus</i>      | VU                     | VU                       | II/IV                   | II         |
| <i>Crocidura</i>    | <i>zimmermanni</i>   | VU                     | VU                       |                         | III        |
| <i>Desmana</i>      | <i>moschata</i>      | VU                     | Not present              |                         | II         |
| <i>Plecotus</i>     | <i>macrobullaris</i> | NT                     | VU                       | IV                      | II         |
| <i>Sicista</i>      | <i>subtilis</i>      | NT                     | VU                       | II/IV                   | II         |
| <i>Alopex</i>       | <i>lagopus</i>       | LC                     | CR                       | II*/IV                  | II         |
| <i>Mustela</i>      | <i>eversmanni</i>    | LC                     | EN                       | II/IV                   | II         |

## 4.5 Contribution of new Member States to mammal conservation in the EU

The enlargement of the EU in 2004 and 2007 to include countries of Central and Eastern Europe, Cyprus and Malta has provided opportunities and challenges regarding the Community's nature and biodiversity policies. The new Member States significantly enrich the EU's biodiversity, but ensuring that these wildlife riches are conserved and sustainably managed will be a major challenge for policymakers in the years ahead. This report highlights the importance of the new Member States Romania and Bulgaria for species conservation in Europe – both of these countries have notably high mammalian biodiversity, as well as important concentrations of threatened species.

The addition of Romania and Bulgaria to the EU in 2007 has brought three new mammal species that did not previously occur in the EU (increasing the total number of terrestrial mammal species in the EU from 179 to 182). These three species are the Romanian hamster *Mesocricetus newtoni* and the Balkan mole-rat *Spalax graecus* (both assessed as Near Threatened at the European regional level), as well as the Levant mole *Talpa levantis* (assessed as Least Concern). The Romanian

hamster and the Balkan mole-rat are both of conservation concern as they have very restricted ranges and are believed to be negatively affected by *inter alia* agricultural intensification. The Romanian hamster has already been listed on Annexes II and IV of the Habitats Directive, but the Balkan mole-rat is not currently listed. Romania is the global stronghold for the latter species. Although the Balkan mole-rat also occurs in natural grasslands, one of its main habitats is agricultural land, so it is very important that any changes to agricultural policies and practices implemented as a result of EU accession take into account the needs of this species.

Romania and Bulgaria also hold important populations of two species that were previously only of marginal occurrence in Europe, and which were consequently assessed as Not Applicable at the EU 25 level. These are the marbled polecat *Vormela peregusna* (assessed at the pan-European level as Vulnerable) and the grey hamster *Cricetulus migratorius* (assessed at the pan-European level as Least Concern). *V. peregusna* has been listed on Annexes II and IV of the Habitats Directive.

## 4.6 Anthropochorous taxa and conservation priorities

**Table 7. The number of LIFE-Nature projects targeted either towards specific species or broader taxonomic groups. This review is based on a search for mammal species on the LIFE Nature database which identified 72 projects (some projects target more than one species). Species based projects were not included in the count for taxonomic group projects**

| Species   | Projects |
|---|----------|
| Brown bear  | 14       |
| Iberian lynx  | 7        |
| European mink   | 7        |
| Wolf  | 7        |
| Mediterranean monk seal   | 4        |
| Otter   | 3        |
| <i>Tursiops</i> spp.  | 3        |
| Root vole <i>Microtus oeconomus arenicola</i>                         | 2        |
| Chamois <i>Rupicapra pyrenaica ornata</i> and <i>Rupicapra ornata</i> | 2        |
| Arctic fox  | 2        |
| Beaver  | 1        |
| Reindeer <i>Rangifer tarandus fennicus</i>                            | 1        |
| European bison  | 1        |
| Corsican mouflon  | 1        |
| Flying squirrel   | 1        |
| <b>Taxonomic Group</b>  |          |
| Cetaceans   | 5        |
| Large carnivores  | 5        |
| Chiroptera  | 10       |

Anthropochorous taxa have been defined as “introduced populations that have been formally described taxonomically” (Gippoliti and Amori 2002). The Mediterranean Basin, one of the 25 global biodiversity hotspots recognized by Myers *et al.* (2000), probably has more anthropochorous taxa than any other part of the world (Gippoliti and Amori 2006). Human civilizations have been continually present in this region for at least 9,000 years, causing widespread damage and destruction of natural habitats, and intentionally or unintentionally transporting animals and plants between different island and mainland locations. Mediterranean islands once were home to an array of unique endemic mammals, including dwarf elephants and hippos (Kotsakis 1990, Vigne 1992, Palombo 1996), but in part as a result of human activities almost all of these endemic mammal species are now extinct (Vigne *et al.* 1997, Simmons 1999, Gippoliti and Amori 2006), and it has been contended that as few as three ancient endemic species still survive (two shrews and one mouse: Gippoliti and Amori 2006). The modern mammal fauna of Mediterranean islands consists largely of populations introduced in ancient or modern times by man, although some of these populations have been isolated for so long that they are phenotypically distinct from mainland forms and have been recognized at the subspecific or even specific level. Two examples of anthropochorous taxa found on Mediterranean islands are the agrimi and the mouflon. These taxa are listed on Annexes II and IV of the Habitats Directive as “*Capra*

*aegagrus* (natural populations)” and “*Ovis gmelini musimon* (*Ovis ammon musimon*) (natural populations - Corsica and Sardinia)”, respectively (see Appendix 3). Genetic and archaeozoological studies suggest that they are feral populations of ancient domestic livestock (e.g., Groves 1989, Vigne 1994, Hiendleder *et al.* 1998, Manceau *et al.* 1999, Kahila bar-Gal *et al.* 2002), and should be included in the respective domestic species (Gentry *et al.* 1996, Gentry *et al.* 2004). By contrast, two out of the three Mediterranean island species identified as genuine palaeoendemics by Gippoliti and Amori (2006), namely *Crocidura zimmermanni* and *Mus cypriacus*, are not listed on the Habitats Directive Annexes.

There has been a historical tendency in Europe and worldwide for conservation interventions to focus on large mammals and birds. In some areas, including the Mediterranean (which, it should be remembered, qualifies as a hotspot largely as a consequence of the diversity and endemism of its vascular plants), there is evidence to suggest that a disproportionate focus on large mammal conservation may have a detrimental effect on other biodiversity values (see Gippoliti and Amori 2004, 2006 and references therein for examples). For example, mouflon continue to be introduced to Mediterranean islands (including protected areas) because they are considered typical of the region (Gippoliti and Amori 2006), even though there is evidence that overgrazing has a significant negative impact on native plants (Fabbri 1966, Greuter 1979, Gippoliti and Amori 2004), and many small Mediterranean islands are regarded as conservation priorities because of the lack of anti-grazing adaptations in the endemic plants (Greuter 2001). It is important that any conservation strategy aimed at maintaining biodiversity and its evolutionary potential takes into account the history (including recent history) of the regional biota, and makes an effort: (1) to identify and direct attention towards ancient endemic species that escaped previous extinction events and are the repository of unique phylogenetic information; and (2) to strike an appropriate balance between conserving large, charismatic mammals (that may in some cases be relatively recent additions to the regional fauna) and protecting other forms of native biodiversity.

#### 4.7 Extinction risk versus conservation status

The IUCN Red List Criteria classify species solely on the basis of their relative extinction risk (IUCN 2001). However, Unfavourable conservation status according to the EU Habitats Directive has a much broader definition. This is identified clearly in Article 1 of the Directive (see Box 3). No species meeting the IUCN Red List Criteria at a regional level can be considered to have a Favourable conservation status in the EU. To be classified as

Vulnerable (the lowest of the three IUCN threatened categories) a species must undergo a reduction in population size of at least 30% over 10 years or three generations (or have a very small or small and declining population or geographic range; see the 2001 IUCN Red List Categories and Criteria version 3.1 [http://www.iucnredlist.org/info/categories\\_criteria2001](http://www.iucnredlist.org/info/categories_criteria2001)). It is difficult to claim that a species experiencing a decline of this magnitude is maintaining its population, that its range is stable, and that it remains a viable component of its habitat. Crucially, however, this does not mean that the opposite is true: species that are not threatened as defined by IUCN Red List Criteria do not necessarily have a Favourable conservation status. Recent guidelines issued by the European Commission on the protection of animal species under the Habitats Directive reinforce this message that “the fact that a habitat or species is not threatened (i.e. not faced by any direct extinction risk) does not necessarily mean that it has a favourable conservation status” (Anon. 2007).

Many mammal species remain widely distributed in Europe, although their populations and ranges have suffered significant long-term decline, mainly owing to habitat loss or degradation although a number of other threats have also played a significant role (see Sections 3.5 and 3.6). The European Mammal Assessment has highlighted the fact that currently more than a quarter (27%) of European mammal species are declining, while 32% are stable, 8% are increasing, and 33% are of unknown population trend (see Figure 10). Additionally, some species experienced dramatic population declines during the last few centuries (often

#### Box 3. Selected provisions of the EU Habitats Directive (92/43/EEC).

Article 1(i) defines the conservation status of a species as “the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations in the European territory of the Member States”. It states that a species’ conservation status will be taken as Favourable when:

- Population dynamics data on the species concerned suggests that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- The natural range of the species is neither being reduced nor is likely to be reduced for the considerable future; and
- There is, and probably will continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.



as a result of overexploitation or persecution), and now persist only at very depleted levels. Typically these species have declined at a rate that does not exceed 30% over the last 10 years or three generations, and thus does not trigger IUCN Red List Criterion A. In many cases, these declines continue to the present day, albeit often at a reduced rate because of the heavy losses already suffered. In other cases, populations are now stable or increasing, but still cannot be said to be secure because past losses have left fragmented subpopulations that are so small that their long-term viability is questionable. Examples include Europe's large carnivore species such as the wolf, European lynx, and brown bear. Under the IUCN Red List Criteria, these species qualify as Least Concern at the European regional level, because of the existence of relatively large and secure populations in eastern Europe. In much of western Europe, however, these species persist only in tiny and isolated subpopulations that in many cases qualify as Critically Endangered.

BirdLife International has developed a three-step process for assessing the conservation status (*sensu* Habitats Directive) of species based upon Global and Regional Red List status, along with a series of additional criteria (BirdLife International 2004a,b). A similar approach could be developed for assessing the conservation status of mammals in Europe.

#### 4.8 Red List versus priority for conservation action

Assessment of extinction risk and setting conservation priorities are two related but different processes. Assessment of extinction risk, such as the assignment of IUCN Red List Categories, generally precedes the setting of priorities. The purpose of the Red List categorization is to produce a relative estimate of the likelihood of extinction a taxon or subpopulation. Setting conservation priorities, on the other hand, which normally includes the assessment of extinction risk, also takes into account other factors such as ecological, phylogenetic, historical, or cultural preferences for some taxa over others, as well as the probability of success of conservation actions, availability of funds or personnel, cost-effectiveness, and legal frameworks for conservation of threatened taxa. In the context of regional risk assessments, a number of additional pieces of information are valuable for setting conservation priorities. For example, it is important to consider not only conditions within the region but also the status of the taxon from a global perspective and the proportion of the global population that occurs within the region. Decisions on how these three variables, as well as other factors, are used for establishing conservation priorities is a matter for the regional authorities to determine.

A fin whale *Balaenoptera physalus* surfaces in the Ligurian Sea Cetacean Sanctuary ("Pelagos") in the Mediterranean. Site protection is a key component of effective conservation strategies for both marine and terrestrial mammal species. © Tethys - Simone Panigada





# 5. Conclusions

## 5.1 Methodology – lessons learned

The data set, a summary of which is presented here, represents an essential resource for conservationists, policymakers, and environmental planners throughout the region. It is hoped that by presenting this data set, both regional and international research will be stimulated to provide new data and to improve on the quality of that already given. It is also hoped that, with time, the spatial resolution of the data will be improved. Geographic bias in sampling intensity has been identified as a problem in representing a true regional picture of species distributions and threatened status. The lack of data for Albania is particularly apparent, and in south-eastern Europe as a whole there are a number of threatened, endemic, and range-restricted species of which relatively little is known. As these sampling biases become apparent, such as through this study, it is hoped that researchers will be encouraged to focus their efforts on these lesser known regions and work towards eliminating this bias in sampling. The European Mammal Assessment process highlighted the importance of international cooperation, not only within the European Union but also with other countries in geographical Europe and neighbouring parts of Africa and Asia, to facilitate the transfer of relevant information and the development of coordinated initiatives to protect wide-ranging animals that cross political boundaries.

## 5.2 Application of project outputs

The outputs from this project can be applied at the regional scale by organizations such as IUCN to prioritize sites for inclusion in regional research programmes and for identification of internationally important sites for biodiversity. All the endemic species assessed in this project will be submitted for inclusion in the next (2008) update of the IUCN global Red List ([www.iucnredlist.org](http://www.iucnredlist.org)). Information on the non-endemic species will contribute to global Red List assessments that are being carried out by the IUCN Global Mammal Assessment.

The large amount of data collected during the European Mammal Assessment (and freely available online at <http://ec.europa.eu/environment/nature/conservation/species/ema/>) will be extremely useful for further analyses, which should provide deeper insights into the conservation needs of European mammals and the impacts on their populations of land-use policies and natural resource use. These analyses could include studies at different

geographical or geopolitical scales, or focusing on specific taxonomic or ecological groups.

## 5.3 Future work

The dynamic nature of mammal populations means their numbers can alter rapidly over relatively short periods of time. Regular updates of the status of Europe's mammals are therefore essential; both to assess the effectiveness of conservation efforts and to ensure that the species in most need of attention receive it promptly. The effective integration and long term use of the knowledge generated by this assessment requires that the data be regularly updated through ongoing collaboration with the network of European mammal experts. This assessment should form the basis for strengthening the links between regional decision makers and policy makers on the one hand, and IUCN and its members on the other to ensure that the data sets are maintained and used in the establishment and implementation of conservation priorities.

If the European Mammal Assessment is regularly updated, it will enable the changing status of European mammals to be tracked through time. This is an important action required to show whether European countries and the EU have met their commitments to halt the loss of biodiversity by 2010. Regular updates of the European Mammal Assessment will allow the development of a Red List Index for European mammals, which acts as an indicator for the changing status of species over time (Butchart *et al.* 2004, 2005, 2006, 2007). Currently such indicators exist for birds and amphibians at the global level, and are under development for birds alone at the European regional level (Burfield and Butchart in prep.). The data generated as part of this assessment and any subsequent assessments will serve as a useful contribution to the Streamlining European 2010 Biodiversity Indicators (SEBI2010) initiative, which is developing a set of headline biodiversity indicators for Europe.

## 5.4 Conservation priorities

Quantitative data and analysis of mammal populations and their distributions are the scientific basis for setting priorities for conservation actions at a European scale. Although the IUCN European Mammal Assessment collected this data on a species-by-species basis, IUCN recommends a comprehensive and integrated

conservation strategy that focuses not only on individual species, but also on conservation of sites and the wider environment.

#### **5.4.1 Species conservation**

Species frequently require a combination of conservation responses to ensure their continued survival. These responses include legislation, monitoring, research, management of populations, land acquisition and management, and even captive breeding and benign introductions for some of Europe's most threatened mammal species (e.g., Iberian lynx and European mink). For species threatened across their range, limited or local actions are unlikely to be sufficiently strong or coherent to prevent extinction, and coordinated action is required at the regional level. Under the Bern Convention, Action Plans have been developed for certain priority species (e.g., all large carnivores, European bison, a number of bats, etc.), outlining specific conservation measures that are urgently needed. The implementation of Action Plans is an effective means of improving the status of some of Europe's most threatened mammals, and measures (including financial incentives) to promote the development and implementation of more Action Plans should be taken.

#### **5.4.2 Site conservation**

The protection of sites plays a crucial role in any effective conservation strategy. Several international treaties call for the selection and protection of sites on the basis of their importance for biodiversity. In Europe, the primary mechanism for site protection is the Natura 2000 network of protected areas. This report identifies a number of areas within Europe that are regionally important for mammalian biodiversity and threatened species richness (see Sections 3.4 and 3.5). The spatial distribution data gathered for individual species as part of the IUCN European Mammal Assessment can be used to inform site selection at a finer scale. In particular, it is very important that Natura 2000 sites are rapidly proposed and adopted in the new Member States of Bulgaria and Romania, to protect the unusually high concentrations of threatened mammals that are found in those countries.

#### **5.4.3 Conservation of the wider environment**

Europe is one of the most highly fragmented continents in the world, where human pressure on the landscape over millennia has led to a mosaic of semi-natural habitats. Only about 1% of the surface area of Europe can be considered as wilderness, with the old growth forests of Scandinavia, Poland and Russia representing the last pristine areas. As a response to this extensive habitat modification and fragmentation, conservation planners have developed a number of tools to increase connectivity between core areas of habitat for the movement of species. These methods include planning tools such as ecological networks, which aim to identify core areas, species corridors and mixed land use zones (e.g., buffer zones), integration of ecological concerns into spatial land use planning and broader approaches to increase landscape permeability (Jongman and Pungetti 2004, Crooks and Sanjayan 2006). Providing increased connectivity is a vitally important aspect of mammal conservation in Europe and will provide a key tool to allow species to adapt to current habitat fragmentation and projected future climate change.

#### **5.4.4 Monitoring and research**

Monitoring of endangered wild mammal populations is now a statutory responsibility under EU legislation. However, many European countries have no formal schemes for monitoring even common and widespread species, let alone those that are under threat. A challenge for the future is to improve monitoring and the quality of data, so that the data and analyses presented here can be updated and improved, and conservation action can be given as solid a scientific basis as possible. National mammal population monitoring schemes have been initiated in some EU Member States, for example in the United Kingdom the Tracking Mammals Partnership [www.trackingmammals.org](http://www.trackingmammals.org) has set up a surveillance and monitoring network that aims to deliver distribution and population trend information on all UK mammals. At the regional level, the European Union must report its progress towards the stated aim of halting biodiversity loss by 2010. As outlined in Section 5.3, if the European Mammal Assessment is periodically updated, it will enable the changing status of European mammals to be tracked through time and will provide an indicator of the changing fate of biodiversity to 2010 and beyond.

# References

- Anon. 2007. Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. Available online at: [http://ec.europa.eu/environment/nature\\_conservation/specific\\_articles/art12/index\\_en.htm](http://ec.europa.eu/environment/nature_conservation/specific_articles/art12/index_en.htm)
- Barlow, J. 1999. Trackline detection probability for long diving whales. In: G. W. Garner, *et al.* (eds.), *Marine Mammal Survey and Assessment Methods*, pp. 209–221. Balkema Press, Netherlands, 287pp.
- BirdLife International. 2004a. *Birds in Europe: population estimates, trends, and conservation status*. BirdLife International, Cambridge, UK.
- BirdLife International. 2004b. *Birds in the European Union: a status assessment*. BirdLife International, Wageningen, The Netherlands.
- Boitani, L. 2000. Action plan for the conservation of the wolves (*Canis lupus*) in Europe. *Nature and Environment*, Council of Europe Publishing 113: 1–86.
- Boitani, L. 2003. Wolf conservation and recovery. In: Mech, L.D. and Boitani, L. (eds.) *Wolves: behavior, ecology, and conservation*. Pp. 317–340. University of Chicago Press, Chicago.
- Bonhomme, F., Orth, A., Cucchi, T., Hadjisterkotis, E., Vigne, J.-D. and Auffray, J.-C. 2004. Découverte d'une nouvelle espèce de souris sur l'île de Chypre. *Comptes Rendus Biologies*, 327: 501–507.
- Breitenmoser, U., Breitenmoser-Würsten, C., Okarma, H., Kaphegyi, T., Kaphegyi-Wallmann, U. and Müller, U.M. 2000. Action plan for the conservation of the Eurasian lynx in Europe (*Lynx lynx*). *Nature and Environment*, Council of Europe Publishing 112: 1–69.
- Burfield, I.J. and Butchart, S.H.M. (in prep.) *Regional Red List Indices for European birds*.
- Butchart, S.H.M., Stattersfield, A.J., Bennun, L.A., Shutes, S.M., Akcakaya, H.R. *et al.* 2004. Measuring global trends in the status of biodiversity: Red List Indices for birds. *PLoS Biology* 2: e383.
- Butchart, S.H.M., Stattersfield, A.J., Baillie, J.E.M., Bennun, L.A. and Stuart, S.N. *et al.* 2005. Using Red List Indices to measure progress towards the 2010 target and beyond. *Philosophical Transactions of the Royal Society of London B* 360: 255–268.
- Butchart, S.H.M., Akcakaya, H.R., Kennedy, E. and Hilton-Taylor, C. 2006. Biodiversity indicators based on trends in conservation status: strengths of the IUCN Red List Index. *Conservation Biology* 20: 579–581.
- Butchart, S.H.M., Akcakaya, H.R., Chanson, J., Baillie, J.E.M. and Collen, B. *et al.* 2007. Improvements to the Red List Index. *PLoS ONE* 2(1): e140. doi:10.1371/journal.pone.0000140
- Crooks, K.C. and Sanjayan, M.A. 2006. *Connectivity conservation*. Cambridge University Press, Cambridge, U.K.
- Cucchi, T., Orth, A., Auffray, J.-C., Renaud, S., Fabre, L., Ctalan, J., Hadjisterkotis, E., Bonhomme, F. and Vigne, J.-D. 2006. A new endemic species of the subgenus *Mus* (Rodentia, Mammalia) on the Island of Cyprus. *Zootaxa* 1241: 1–36.
- European Environment Agency. 2005. *The European environment – State and outlook 2005*. European Environment Agency : State of Environment report No 1/2005.
- Fabbri, F. 1966. Per una più equilibrata protezione naturalistica dell'isola di Montecristo. *Natura e Montagna*, 6, 126–135.
- Gentry, A., Clutton-Brock, J. and Groves, P. 1996. Case 3010. Proposed conservation of usage of 15 mammal specific names based on wild species which are antedated by or contemporary with those based on domestic animals. *Bull. Zool. Nomenclature* 53: 28–37.
- Gentry, A., Clutton-Brock, J. and Groves, C.P. 2004. The naming of wild animal species and their domestic derivatives. *Journal of Archaeological Science* 31: 645–651.
- Gippoliti, S. and Amori, G. 2002. Anthropochorous mammal taxa and conservation lists. *Conservation Biology*, 16: 1162–1164.
- Gippoliti, S. and Amori, G. 2004. Mediterranean island mammals: are they a priority for biodiversity conservation? *Biogeographia*, 25, 135–144.
- Gippoliti, S. and Amori, G. 2006. Ancient introductions of mammals in the Mediterranean Basin and their implications for conservation. *Mammal Rev.* 36: 37–48.
- Greuter, W. 1979. Mediterranean conservation as viewed by a plant taxonomist. *Webbia*, 34, 87–99.
- Greuter, W. 2001. Diversity of Mediterranean floras. *Bocconeia* 13: 55–64.
- Groves, C.P. 1989. Feral mammals of the Mediterranean islands: documents of early domestication. In: J. Clutton-Brock (ed.) *The Walking Larder*, pp. 46–58. Unwin-Hyman, London.
- Herfindal, I., Linnell, J.D.C., Odden, J., Nilsen, E.B. and Andersen, R. 2005. Prey density, environmental productivity, and home range size in the Eurasian lynx (*Lynx lynx*). *Journal of Zoology*, London 265: 63–71.
- Hiendleder, S., Mainz, K., Plante, Y. and Lewalski, H. 1998. Analysis of mitochondrial DNA indicates that domestic sheep are derived from two different ancestral maternal sources: no evidence for contributions from

- urial and argali sheep. *Journal of Heredity*, 89: 113–120.
- Hodges, J.K. and Cortes, J. (eds). 2006. *The Barbary Macaque: Biology and Conservation*. Nottingham University Press, Nottingham, UK.
- IUCN. 1994. *IUCN Red List Categories*. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland.
- IUCN. 2001. *IUCN Red List Categories and Criteria: Version 3.1*. IUCN Species Survival Commission. IUCN, Gland, Switzerland.
- IUCN. 2003. *Guidelines for application of IUCN Red List Criteria at Regional Levels: Version 3.0*. IUCN Species Survival Commission. IUCN, Gland, Switzerland.
- IUCN 2007. 2007 IUCN Red List of Threatened Species. <[www.iucnredlist.org](http://www.iucnredlist.org)>.
- Jongman, R.H.G. and Pungetti G. 2004. *Ecological Networks and Greenways: Concept, design, implementation*. Cambridge University Press, Cambridge, U.K.
- Kahila Bar-Gal, G., Smith, P., Tchernov, E., Greenblatt, C., Ducos, P., Gardeisen, A. and Horwitz, L.K. 2002. Genetic evidence of the origin of the agrimi goat (*Capra aegagrus cretica*). *Journal of Zoology* London, 256: 369–377.
- Köppel, C., Jansen, F., Burton, J., Schnittler, M. and Hirneisen, N. 2003. A statistical survey on European red lists. In: H.H. de Jongh, O.S. Bánki, W. Bergmans, and M.J. van der Werff ten Bosch (eds). *The Harmonization of Red Lists for Threatened Species*. Proceedings of an International Seminar in Leiden, 27 and 28 November 2002. The Netherlands Commission for International Nature Protection, Medelingen No.38, Leiden. Pp. 59–75.
- Kotsakis, T. 1990. Insular and non insular vertebrate faunas in the Eastern Mediterranean islands. *Atti Convegni Lincei*, 85, 289–334.
- Landa, A., Lindén, M. and Kojola, I. 2000. Action plan for the conservation of wolverines in Europe (*Gulo gulo*). Council of Europe *Nature and Environment* 115: 1–45.
- Linnell, J.D.C., Andersen, R., Kvam, T., Andrén, H., Liberg, O., Odden, J. and Moa, P. (2001). Home range size and choice of management strategy for lynx in Scandinavia. *Environmental Management* 27(6): 869–879.
- Manceau, V., Després, L., Bouvet, J. and Taberlet, P. 1999. Systematics of the genus *Capra* inferred from Mitochondrial DNA sequence data. *Molecular Phylogenetics and Evolution*, 13, 504–510.
- Mucedda, M., Kiefer, A., Pidinchedda, E. and Veith, M. 2002. A new species of long-eared bat (Chiroptera, Vespertilionidae) from Sardinia (Italy). *Acta Chiropterologica* 4: 121–135.
- Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B. and Kent, J. (2000) Biodiversity hotspots for conservation priorities. *Nature*, 403: 853–858.
- Nilsen, E. B., Herfindal, I. and Linnell, J.D.C. 2005. Can intra-specific variation in carnivore home-range size be explained using remote sensing estimates of environmental productivity? *EcoScience* 12: 68–75.
- Nowak, R.M. 1999. *Walker's Mammals of the World*. The John Hopkins University Press, Baltimore and London.
- Palombo, M.R. 1996. Large Pleistocene mammals of the Mediterranean islands. *Vie et Milieu*, 46: 365–374.
- Rice, D.W. 1998. *Marine Mammals of the World. Systematics and Distribution*. Special Publication Number 4. The Society for Marine Mammalogy, Lawrence, Kansas.
- Simmons, A.H. 1999. *Faunal Extinction in an Island Society: Pygmy Hippopotamus Hunters of Cyprus*. Kluwer Academic, New York.
- Swenson, J.E., Gerstl, N., Dahle, B. and Zedrosser, A. (2000). *Action plan for the conservation of the brown bear (Ursus arctos) in Europe*. Report to the Council of Europe Convention on the Conservation of European Wildlife and Natural Habitats T-PVS (2000) 24: 1–68.
- Thirgood, S., Woodroffe, R. and Rabinowitz, A. 2005. The impact of human-wildlife conflict on human lives and livelihoods. In: Woodroffe, R., Thirgood, S. and Rabinowitz, A. (eds.) *People and Wildlife: conflict or co-existence?* Pp. 13–26. Cambridge University Press, Cambridge.
- Vigne, J.D. 1992. Zooarchaeological and biogeographical history of the mammals of Corsica and Sardinia since the last ice age. *Mammal Review*, 22 87–96.
- Vigne, J.D. 1994. Les transferts anciens de mammifères en Europe occidentale: histoires, mécanismes et implications dans les sciences de l'homme et les sciences de la vie. *Colloq. Hist. Connaissances Zoolog.* 5: 15–37.
- Vigne, J.D., Bailon, S. and Cuisin, J. 1997. Biostratigraphy of amphibians, reptiles, birds and mammals in Corsica and the role of man in the Holocene faunal turnover. *Anthropozoologica*, 25/26, 587–604.
- Vuure, C. van. 2005. *Retracing the Aurochs: History, Morphology and Ecology of an Extinct Wild Ox*. Pensoft Publishers. Sofia-Moscow.
- Wieringa, K. (ed.) 1995. *Environment in the European Union 1995: Report for the Review of the Fifth Environmental Action Programme*. European Environment Agency / EUROSTAT.
- Wilson, D.E. and Reeder, D.M. (eds). 2005. *Mammal Species of the World*. Johns Hopkins University Press, 2,142 pp. Available online at <http://nmnhgoph.si.edu/msw/>.
- Woodroffe, R., Thirgood, S. and Rabinowitz, A. 2005. The impact of human-wildlife conflict on natural systems. In: Woodroffe, R., Thirgood, S. and Rabinowitz, A. (eds.) *People and Wildlife: conflict or co-existence?* Pp. 1–12. Cambridge University Press, Cambridge.



# Appendix 1. Red List status of European mammals

| Order        | Family      | Species                    | IUCN Red List Category (Europe) | IUCN Red List Criteria (Europe) | IUCN Red List Category (EU 25) | IUCN Red List Criteria (EU 25) | Endemic to Europe? (Y/N)* |
|--------------|-------------|----------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|---------------------------|
| ARTIODACTYLA | BOVIDAE     | <i>Bison bonasus</i>       | VU                              | D1                              | VU                             | D1                             | N                         |
| ARTIODACTYLA | BOVIDAE     | <i>Bos primigenius</i>     | EX                              |                                 | EX                             |                                | N                         |
| ARTIODACTYLA | BOVIDAE     | <i>Capra ibex</i>          | LC                              |                                 | LC                             |                                | Y                         |
| ARTIODACTYLA | BOVIDAE     | <i>Capra pyrenaica</i>     | LC                              |                                 | LC                             |                                | Y                         |
| ARTIODACTYLA | BOVIDAE     | <i>Capra hircus</i>        | NA                              |                                 | NA                             |                                | N                         |
| ARTIODACTYLA | BOVIDAE     | <i>Ovis aries</i>          | NA                              |                                 | NA                             |                                | N                         |
| ARTIODACTYLA | BOVIDAE     | <i>Rupicapra pyrenaica</i> | LC                              |                                 | LC                             |                                | Y                         |
| ARTIODACTYLA | BOVIDAE     | <i>Rupicapra rupicapra</i> | LC                              |                                 | LC                             |                                | N                         |
| ARTIODACTYLA | BOVIDAE     | <i>Saiga tatarica</i>      | CR                              | A2a                             | NE                             |                                | N                         |
| ARTIODACTYLA | CERVIDAE    | <i>Alces alces</i>         | LC                              |                                 | LC                             |                                | N                         |
| ARTIODACTYLA | CERVIDAE    | <i>Capreolus pygargus</i>  | LC                              |                                 | NE                             |                                | N                         |
| ARTIODACTYLA | CERVIDAE    | <i>Capreolus capreolus</i> | LC                              |                                 | LC                             |                                | N                         |
| ARTIODACTYLA | CERVIDAE    | <i>Cervus elaphus</i>      | LC                              |                                 | LC                             |                                | N                         |
| ARTIODACTYLA | CERVIDAE    | <i>Dama dama</i>           | LC                              |                                 | LC                             |                                | N                         |
| ARTIODACTYLA | CERVIDAE    | <i>Rangifer tarandus</i>   | LC                              |                                 | LC                             |                                | N                         |
| ARTIODACTYLA | SUIDAE      | <i>Sus scrofa</i>          | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA    | CANIDAE     | <i>Alopex lagopus</i>      | LC                              |                                 | CR                             | D1, C2a(i)                     | N                         |
| CARNIVORA    | CANIDAE     | <i>Canis aureus</i>        | LC                              |                                 | NT                             |                                | N                         |
| CARNIVORA    | CANIDAE     | <i>Canis lupus</i>         | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA    | CANIDAE     | <i>Vulpes vulpes</i>       | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA    | CANIDAE     | <i>Vulpes corsac</i>       | LC                              |                                 | NE                             |                                | N                         |
| CARNIVORA    | FELIDAE     | <i>Felis chaus</i>         | NA                              |                                 | NE                             |                                | N                         |
| CARNIVORA    | FELIDAE     | <i>Felis silvestris</i>    | LC                              |                                 | NT                             |                                | N                         |
| CARNIVORA    | FELIDAE     | <i>Lynx lynx</i>           | LC                              |                                 | NT                             |                                | N                         |
| CARNIVORA    | FELIDAE     | <i>Lynx pardinus</i>       | CR                              | C2a(i)                          | CR                             | C2a(i)                         | Y                         |
| CARNIVORA    | HERPESTIDAE | <i>Herpestes ichneumon</i> | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Gulo gulo</i>           | VU                              | A2cd; C1                        | VU                             | D1                             | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Lutra lutra</i>         | NT                              |                                 | NT                             |                                | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Martes foina</i>        | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Martes martes</i>       | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Martes zibellina</i>    | NA                              |                                 | NE                             |                                | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Meles meles</i>         | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Mustela putorius</i>    | LC                              |                                 | NT                             |                                | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Mustela sibirica</i>    | NA                              |                                 | NE                             |                                | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Mustela nivalis</i>     | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Mustela lutreola</i>    | EN                              | A2ce                            | CR                             | A2ce                           | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Mustela erminea</i>     | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Mustela eversmannii</i> | LC                              |                                 | EN                             | C2a(i)                         | N                         |
| CARNIVORA    | MUSTELIDAE  | <i>Vormela peregusna</i>   | VU                              | A2c                             | NA                             |                                | N                         |
| CARNIVORA    | ODOBENIDAE  | <i>Odobenus rosmarus</i>   | NA                              |                                 | NE                             |                                | N                         |
| CARNIVORA    | PHOCIDAE    | <i>Cystophora cristata</i> | NA                              |                                 | NA                             |                                | N                         |
| CARNIVORA    | PHOCIDAE    | <i>Erignathus barbatus</i> | NA                              |                                 | NA                             |                                | N                         |
| CARNIVORA    | PHOCIDAE    | <i>Halichoerus grypus</i>  | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA    | PHOCIDAE    | <i>Monachus monachus</i>   | CR                              | C2a(ii)                         | CR                             | C2a(ii)                        | N                         |

Appendix 1. Red List status of European mammals, continued

| Order      | Family           | Species                           | IUCN Red List Category (Europe) | IUCN Red List Criteria (Europe) | IUCN Red List Category (EU 25) | IUCN Red List Criteria (EU 25) | Endemic to Europe? (Y/N)* |
|------------|------------------|-----------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|---------------------------|
| CARNIVORA  | PHOCIDAE         | <i>Pagophilus groenlandicus</i>   | NA                              |                                 | NA                             |                                | N                         |
| CARNIVORA  | PHOCIDAE         | <i>Phoca vitulina</i>             | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA  | PHOCIDAE         | <i>Pusa hispida</i>               | LC                              |                                 | LC                             |                                | N                         |
| CARNIVORA  | URSIDAE          | <i>Ursus arctos</i>               | LC                              |                                 | NT                             |                                | N                         |
| CARNIVORA  | URSIDAE          | <i>Ursus maritimus</i>            | VU                              | A3c                             | NE                             |                                | N                         |
| CARNIVORA  | VIVERRIDAE       | <i>Genetta genetta</i>            | LC                              |                                 | LC                             |                                | N                         |
| CETACEA    | BALAEINIDAE      | <i>Balaena mysticetus</i>         | NA                              |                                 | NA                             |                                | N                         |
| CETACEA    | BALAEINIDAE      | <i>Eubalaena glacialis</i>        | CR                              | D                               | CR                             | D                              | N                         |
| CETACEA    | BALAEINOPTERIDAE | <i>Balaenoptera borealis</i>      | EN                              | D                               | EN                             | D                              | N                         |
| CETACEA    | BALAEINOPTERIDAE | <i>Balaenoptera acutorostrata</i> | LC                              |                                 | LC                             |                                | N                         |
| CETACEA    | BALAEINOPTERIDAE | <i>Balaenoptera physalus</i>      | NT                              |                                 | NT                             |                                | N                         |
| CETACEA    | BALAEINOPTERIDAE | <i>Balaenoptera musculus</i>      | EN                              | D                               | EN                             | D                              | N                         |
| CETACEA    | BALAEINOPTERIDAE | <i>Megaptera novaeangliae</i>     | LC                              |                                 | LC                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Delphinus delphis</i>          | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Globicephala melas</i>         | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Grampus griseus</i>            | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Lagenodelphis hosei</i>        | NA                              |                                 | NA                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Lagenorhynchus acutus</i>      | LC                              |                                 | LC                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Lagenorhynchus albirostris</i> | LC                              |                                 | LC                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Orcinus orca</i>               | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Peponocephala electra</i>      | NA                              |                                 | NA                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Pseudorca crassidens</i>       | NA                              |                                 | NA                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Sousa chinensis</i>            | NA                              |                                 | NA                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Stenella coeruleoalba</i>      | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Steno bredanensis</i>          | NA                              |                                 | NA                             |                                | N                         |
| CETACEA    | DELPHINIDAE      | <i>Tursiops truncatus</i>         | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | ESCHRICHTIIDAE   | <i>Eschrichtius robustus</i>      | RE                              |                                 | RE                             |                                | N                         |
| CETACEA    | MONODONTIDAE     | <i>Delphinapterus leucas</i>      | NA                              |                                 | NA                             |                                | N                         |
| CETACEA    | MONODONTIDAE     | <i>Monodon monoceros</i>          | NA                              |                                 | NA                             |                                | N                         |
| CETACEA    | PHOCOENIDAE      | <i>Phocoena phocoena</i>          | VU                              | A2cde                           | VU                             | A2cde                          | N                         |
| CETACEA    | PHYSETERIDAE     | <i>Kogia breviceps</i>            | NA                              |                                 | NA                             |                                | N                         |
| CETACEA    | PHYSETERIDAE     | <i>Kogia sima</i>                 | NA                              |                                 | NA                             |                                | N                         |
| CETACEA    | PHYSETERIDAE     | <i>Physeter catodon</i>           | VU                              | A1d                             | VU                             | A1d                            | N                         |
| CETACEA    | ZIPHIIDAE        | <i>Hyperoodon ampullatus</i>      | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | ZIPHIIDAE        | <i>Mesoplodon europaeus</i>       | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | ZIPHIIDAE        | <i>Mesoplodon densirostris</i>    | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | ZIPHIIDAE        | <i>Mesoplodon bidens</i>          | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | ZIPHIIDAE        | <i>Mesoplodon mirus</i>           | DD                              |                                 | DD                             |                                | N                         |
| CETACEA    | ZIPHIIDAE        | <i>Ziphius cavirostris</i>        | DD                              |                                 | DD                             |                                | N                         |
| CHIROPTERA | MOLOSSIDAE       | <i>Tadarida teniotis</i>          | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA | RHINOLOPHIDAE    | <i>Rhinolophus ferrumequinum</i>  | NT                              |                                 | NT                             |                                | N                         |
| CHIROPTERA | RHINOLOPHIDAE    | <i>Rhinolophus hipposideros</i>   | NT                              |                                 | NT                             |                                | N                         |
| CHIROPTERA | RHINOLOPHIDAE    | <i>Rhinolophus mehelyi</i>        | VU                              | A4c                             | VU                             | A4c                            | N                         |
| CHIROPTERA | RHINOLOPHIDAE    | <i>Rhinolophus euryale</i>        | VU                              | A2c                             | VU                             | A2c                            | N                         |
| CHIROPTERA | RHINOLOPHIDAE    | <i>Rhinolophus blasii</i>         | VU                              | A4c                             | DD                             |                                | N                         |
| CHIROPTERA | VESPERTILIONIDAE | <i>Barbastella barbastellus</i>   | VU                              | A3c+4c                          | VU                             | A3c+4c                         | N                         |
| CHIROPTERA | VESPERTILIONIDAE | <i>Eptesicus nilssonii</i>        | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA | VESPERTILIONIDAE | <i>Eptesicus serotinus</i>        | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA | VESPERTILIONIDAE | <i>Hypsugo savii</i>              | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA | VESPERTILIONIDAE | <i>Miniopterus schreibersii</i>   | NT                              |                                 | NT                             |                                | N                         |

Appendix 1. Red List status of European mammals, continued

| Order          | Family           | Species                          | IUCN Red List Category (Europe) | IUCN Red List Criteria (Europe) | IUCN Red List Category (EU 25) | IUCN Red List Criteria (EU 25) | Endemic to Europe? (Y/N)* |
|----------------|------------------|----------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|---------------------------|
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis nattereri</i>          | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis blythii</i>            | NT                              |                                 | NT                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis myotis</i>             | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis brandtii</i>           | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis capaccinii</i>         | VU                              | A4bce                           | VU                             | A4bce                          | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis dasycneme</i>          | NT                              |                                 | NT                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis daubentonii</i>        | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis emarginatus</i>        | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis punicus</i>            | NT                              |                                 | NT                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis mystacinus</i>         | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis bechsteinii</i>        | VU                              | A4c                             | VU                             | A4c                            | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis alcathoe</i>           | DD                              |                                 | DD                             |                                | Y                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Myotis aurascens</i>          | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Nyctalus lasiopterus</i>      | DD                              |                                 | DD                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Nyctalus azoreum</i>          | EN                              | B1ab(iii)                       | EN                             | B1ab(iii)                      | Y                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Nyctalus noctula</i>          | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Nyctalus leisleri</i>         | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Pipistrellus pipistrellus</i> | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Pipistrellus nathusii</i>     | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Pipistrellus maderensis</i>   | EN                              | B1ab(iii,v)                     | EN                             | B1ab(iii,v)                    | Y                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Pipistrellus kuhlii</i>       | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Pipistrellus pygmaeus</i>     | LC                              |                                 | LC                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Plecotus kolombatovici</i>    | NT                              |                                 | NT                             |                                | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Plecotus auritus</i>          | LC                              |                                 | LC                             |                                | Y                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Plecotus austriacus</i>       | LC                              |                                 | LC                             |                                | Y                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Plecotus macbullaris</i>      | NT                              |                                 | VU                             | B2ab(iii)                      | N                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Plecotus sardus</i>           | VU                              | B2ab(iii)                       | VU                             | B2ab(iii)                      | Y                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Plecotus teneriffae</i>       | EN                              | B1ab(iii,v)                     | EN                             | B1ab(iii,v)                    | Y                         |
| CHIROPTERA     | VESPERTILIONIDAE | <i>Vespertilio murinus</i>       | LC                              |                                 | LC                             |                                | N                         |
| ERINACEOMORPHA | ERINACEIDAE      | <i>Atelerix algirus</i>          | LC                              |                                 | LC                             |                                | N                         |
| ERINACEOMORPHA | ERINACEIDAE      | <i>Erinaceus europaeus</i>       | LC                              |                                 | LC                             |                                | Y                         |
| ERINACEOMORPHA | ERINACEIDAE      | <i>Erinaceus roumanicus</i>      | LC                              |                                 | LC                             |                                | N                         |
| ERINACEOMORPHA | ERINACEIDAE      | <i>Hemiechinus auritus</i>       | LC                              |                                 | NE                             |                                | N                         |
| LAGOMORPHA     | LEPORIDAE        | <i>Lepus corsicanus</i>          | VU                              | A2bcde+3bcde                    | VU                             | A2bcde+3bcde                   | Y                         |
| LAGOMORPHA     | LEPORIDAE        | <i>Lepus granatensis</i>         | LC                              |                                 | LC                             |                                | Y                         |
| LAGOMORPHA     | LEPORIDAE        | <i>Lepus europaeus</i>           | LC                              |                                 | LC                             |                                | N                         |
| LAGOMORPHA     | LEPORIDAE        | <i>Lepus capensis</i>            | LC                              |                                 | LC                             |                                | N                         |
| LAGOMORPHA     | LEPORIDAE        | <i>Lepus castroviejoii</i>       | VU                              | B1ab(iii,v)                     | VU                             | B1ab(iii,v)                    | Y                         |
| LAGOMORPHA     | LEPORIDAE        | <i>Lepus timidus</i>             | LC                              |                                 | LC                             |                                | N                         |
| LAGOMORPHA     | LEPORIDAE        | <i>Oryctolagus cuniculus</i>     | NT                              |                                 | NT                             |                                | N                         |
| LAGOMORPHA     | PROLAGIDAE       | <i>Prolagus sardus</i>           | EX                              |                                 | EX                             |                                | Y                         |
| PRIMATES       | CERCOPITHECIDAE  | <i>Macaca sylvanus</i>           | NA                              |                                 | NA                             |                                | N                         |
| RODENTIA       | CASTORIDAE       | <i>Castor fiber</i>              | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA       | CRICETIDAE       | <i>Allocricetulus eversmanni</i> | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA       | CRICETIDAE       | <i>Arvicola amphibius</i>        | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA       | CRICETIDAE       | <i>Arvicola sapidus</i>          | NT                              |                                 | NT                             |                                | Y                         |
| RODENTIA       | CRICETIDAE       | <i>Chionomys nivalis</i>         | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA       | CRICETIDAE       | <i>Cricetulus migratorius</i>    | LC                              |                                 | NA                             |                                | N                         |
| RODENTIA       | CRICETIDAE       | <i>Cricetus cricetus</i>         | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA       | CRICETIDAE       | <i>Dicrostonyx torquatus</i>     | LC                              |                                 | NE                             |                                | N                         |

Appendix 1. Red List status of European mammals, continued

| Order    | Family      | Species                          | IUCN Red List Category (Europe) | IUCN Red List Criteria (Europe) | IUCN Red List Category (EU 25) | IUCN Red List Criteria (EU 25) | Endemic to Europe? (Y/N)* |
|----------|-------------|----------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|---------------------------|
| RODENTIA | CRICETIDAE  | <i>Dinaromys bogdanovi</i>       | NT                              |                                 | DD                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Ellobius talpinus</i>         | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Lagurus lagurus</i>           | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Lemmus lemmus</i>             | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Lemmus sibiricus</i>          | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Meriones tamariscinus</i>     | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Meriones meridianus</i>       | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Mesocricetus newtoni</i>      | NT                              |                                 | NE                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus duodecimcostatus</i> | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus tatricus</i>         | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus lusitanicus</i>      | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus multiplex</i>        | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus arvalis</i>          | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Microtus thomasi</i>          | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus guentheri</i>        | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Microtus felteni</i>          | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus bavaricus</i>        | CR                              | B1ab(iii)+2ab(iii)              | CR                             | B1ab(iii)+2ab(iii)             | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus oeconomus</i>        | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Microtus cabrae</i>           | VU                              | B2ab(ii,iii)c(iv)               | VU                             | B2ab(ii,iii)c(iv)              | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus savii</i>            | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus levis</i>            | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Microtus agrestis</i>         | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Microtus gregalis</i>         | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Microtus liechtensteini</i>   | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus gerbei</i>           | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus subterraneus</i>     | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Microtus socialis</i>         | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Microtus brachycercus</i>     | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | CRICETIDAE  | <i>Microtus middendorffii</i>    | NA                              |                                 | NE                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Myodes rutilus</i>            | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Myodes rufocanus</i>          | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Myodes glareolus</i>          | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | CRICETIDAE  | <i>Myopus schisticolor</i>       | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | DIPODIDAE   | <i>Allactaga major</i>           | NT                              |                                 | NE                             |                                | N                         |
| RODENTIA | DIPODIDAE   | <i>Allactaga elater</i>          | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | DIPODIDAE   | <i>Dipus sagitta</i>             | NA                              |                                 | NE                             |                                | N                         |
| RODENTIA | DIPODIDAE   | <i>Pygeretmus pumilio</i>        | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | DIPODIDAE   | <i>Sicista severtzovi</i>        | LC                              |                                 | NE                             |                                | Y                         |
| RODENTIA | DIPODIDAE   | <i>Sicista subtilis</i>          | NT                              |                                 | VU                             | B1ab(iii)                      | N                         |
| RODENTIA | DIPODIDAE   | <i>Sicista betulina</i>          | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | DIPODIDAE   | <i>Sicista strandi</i>           | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | DIPODIDAE   | <i>Stylodipus telum</i>          | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA | GLIRIDAE    | <i>Dryomys nitedula</i>          | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | GLIRIDAE    | <i>Eliomys quercinus</i>         | NT                              |                                 | NT                             |                                | Y                         |
| RODENTIA | GLIRIDAE    | <i>Glis glis</i>                 | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | GLIRIDAE    | <i>Muscardinus avellanarius</i>  | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | GLIRIDAE    | <i>Myomimus roachi</i>           | EN                              | B1ab(ii,iii)                    | DD                             |                                | N                         |
| RODENTIA | HYSTRICIDAE | <i>Hystrix cristata</i>          | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA | MURIDAE     | <i>Acomys minous</i>             | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA | MURIDAE     | <i>Apodemus alpicola</i>         | LC                              |                                 | LC                             |                                | Y                         |



Appendix 1. Red List status of European mammals, continued

| Order        | Family     | Species                        | IUCN Red List Category (Europe) | IUCN Red List Criteria (Europe) | IUCN Red List Category (EU 25) | IUCN Red List Criteria (EU 25) | Endemic to Europe? (Y/N)* |
|--------------|------------|--------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|---------------------------|
| RODENTIA     | MURIDAE    | <i>Apodemus mystacinus</i>     | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | MURIDAE    | <i>Apodemus uralensis</i>      | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | MURIDAE    | <i>Apodemus epimelas</i>       | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA     | MURIDAE    | <i>Apodemus agrarius</i>       | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | MURIDAE    | <i>Apodemus sylvaticus</i>     | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | MURIDAE    | <i>Apodemus flavicollis</i>    | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | MURIDAE    | <i>Micromys minutus</i>        | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | MURIDAE    | <i>Mus macedonicus</i>         | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | MURIDAE    | <i>Mus cypriacus</i>           | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | MURIDAE    | <i>Mus musculus</i>            | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | MURIDAE    | <i>Mus spretus</i>             | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | MURIDAE    | <i>Mus spicilegus</i>          | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA     | MURIDAE    | <i>Rattus rattus</i>           | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | SCIURIDAE  | <i>Marmota marmota</i>         | LC                              |                                 | LC                             |                                | Y                         |
| RODENTIA     | SCIURIDAE  | <i>Marmota bobak</i>           | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA     | SCIURIDAE  | <i>Pteromys volans</i>         | DD                              |                                 | NT                             |                                | N                         |
| RODENTIA     | SCIURIDAE  | <i>Sciurus vulgaris</i>        | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | SCIURIDAE  | <i>Spermophilus citellus</i>   | VU                              | A2bc                            | VU                             | A2bc                           | Y                         |
| RODENTIA     | SCIURIDAE  | <i>Spermophilus suslicus</i>   | NT                              |                                 | NA                             |                                | Y                         |
| RODENTIA     | SCIURIDAE  | <i>Spermophilus pygmaeus</i>   | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA     | SCIURIDAE  | <i>Spermophilus major</i>      | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA     | SCIURIDAE  | <i>Spermophilus fulvus</i>     | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA     | SCIURIDAE  | <i>Tamias sibiricus</i>        | LC                              |                                 | NE                             |                                | N                         |
| RODENTIA     | SPALACIDAE | <i>Spalax giganteus</i>        | VU                              | B2ab(iii)                       | NE                             |                                | Y                         |
| RODENTIA     | SPALACIDAE | <i>Spalax leucodon</i>         | LC                              |                                 | LC                             |                                | N                         |
| RODENTIA     | SPALACIDAE | <i>Spalax zemni</i>            | VU                              | B2ab(ii,iii)                    | NE                             |                                | Y                         |
| RODENTIA     | SPALACIDAE | <i>Spalax microphthalmus</i>   | LC                              |                                 | NE                             |                                | Y                         |
| RODENTIA     | SPALACIDAE | <i>Spalax graecus</i>          | NT                              | D2                              | NE                             |                                | Y                         |
| RODENTIA     | SPALACIDAE | <i>Spalax arenarius</i>        | EN                              | B1ab(ii,iii)+<br>2ab(ii,iii)    | NE                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Crocidura russula</i>       | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Crocidura ichnusae</i>      | DD                              |                                 | DD                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Crocidura canariensis</i>   | EN                              | B1ab(ii,iii)                    | EN                             | B1ab(ii,iii)                   | Y                         |
| SORICOMORPHA | SORICIDAE  | <i>Crocidura zimmermanni</i>   | VU                              | B1ab(i,ii,v)+<br>2ab(i,ii,v)    | VU                             | B1ab(i,ii,v)+<br>2ab(i,ii,v)   | Y                         |
| SORICOMORPHA | SORICIDAE  | <i>Crocidura leucodon</i>      | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Crocidura sicula</i>        | LC                              |                                 | LC                             |                                | Y                         |
| SORICOMORPHA | SORICIDAE  | <i>Crocidura suaveolens</i>    | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Diplomesodon pulchellum</i> | NA                              |                                 | NE                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Neomys anomalus</i>         | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Neomys fodiens</i>          | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Sorex caecutiens</i>        | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Sorex coronatus</i>         | LC                              |                                 | LC                             |                                | Y                         |
| SORICOMORPHA | SORICIDAE  | <i>Sorex tundrensis</i>        | LC                              |                                 | NE                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Sorex alpinus</i>           | NT                              |                                 | NT                             |                                | Y                         |
| SORICOMORPHA | SORICIDAE  | <i>Sorex samniticus</i>        | LC                              |                                 | LC                             |                                | Y                         |
| SORICOMORPHA | SORICIDAE  | <i>Sorex isodon</i>            | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Sorex minutissimus</i>      | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Sorex minutus</i>           | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | SORICIDAE  | <i>Sorex araneus</i>           | LC                              |                                 | LC                             |                                | N                         |

Appendix 1. Red List status of European mammals, continued.

| Order        | Family    | Species                   | IUCN Red List Category (Europe) | IUCN Red List Criteria (Europe) | IUCN Red List Category (EU 25) | IUCN Red List Criteria (EU 25) | Endemic to Europe? (Y/N)* |
|--------------|-----------|---------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|---------------------------|
| SORICOMORPHA | SORICIDAE | <i>Sorex granarius</i>    | DD                              |                                 | DD                             |                                | Y                         |
| SORICOMORPHA | SORICIDAE | <i>Sorex antinorii</i>    | DD                              |                                 | DD                             |                                | Y                         |
| SORICOMORPHA | SORICIDAE | <i>Sorex arunchi</i>      | DD                              |                                 | DD                             |                                | Y                         |
| SORICOMORPHA | SORICIDAE | <i>Suncus etruscus</i>    | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | TALPIDAE  | <i>Desmana moschata</i>   | VU                              | A2bc+4bc                        | NE                             |                                | N                         |
| SORICOMORPHA | TALPIDAE  | <i>Galemys pyrenaicus</i> | NT                              |                                 | NT                             |                                | Y                         |
| SORICOMORPHA | TALPIDAE  | <i>Talpa romana</i>       | LC                              |                                 | LC                             |                                | Y                         |
| SORICOMORPHA | TALPIDAE  | <i>Talpa stankovici</i>   | LC                              |                                 | LC                             |                                | Y                         |
| SORICOMORPHA | TALPIDAE  | <i>Talpa occidentalis</i> | LC                              |                                 | LC                             |                                | Y                         |
| SORICOMORPHA | TALPIDAE  | <i>Talpa caeca</i>        | LC                              |                                 | LC                             |                                | Y                         |
| SORICOMORPHA | TALPIDAE  | <i>Talpa europaea</i>     | LC                              |                                 | LC                             |                                | N                         |
| SORICOMORPHA | TALPIDAE  | <i>Talpa levantis</i>     | LC                              |                                 | NE                             |                                | N                         |

\*Refers to whether or not a species is endemic to the European region as defined by the EMA.

# Appendix 2. Species assessed as Not Applicable (NA) according to IUCN Regional Red Listing guidelines

| Order        | Genus                 | Species              | Status | Justification   |
|--------------|-----------------------|----------------------|--------|---|
| Artiodactyla | <i>Ovis</i>           | <i>aries</i>         | NA     | Descended from ancient domestic animals                 |
| Artiodactyla | <i>Capra</i>          | <i>hircus</i>        | NA     | Descended from ancient domestic animals                 |
| Artiodactyla | <i>Ovibos</i>         | <i>moschatus</i>     | NA     | Went extinct c.4,000 B.P., reintroduced after 1500 A.D. |
| Artiodactyla | <i>Ammotragus</i>     | <i>lervia</i>        | NA     | Introduced after 1500 A.D.                              |
| Artiodactyla | <i>Axis</i>           | <i>axis</i>          | NA     | Introduced after 1500 A.D.                              |
| Artiodactyla | <i>Cervus</i>         | <i>nippon</i>        | NA     | Introduced after 1500 A.D.                              |
| Artiodactyla | <i>Hydropotes</i>     | <i>inermis</i>       | NA     | Introduced after 1500 A.D.                              |
| Artiodactyla | <i>Muntiacus</i>      | <i>reevesi</i>       | NA     | Introduced after 1500 A.D.                              |
| Artiodactyla | <i>Odocoileus</i>     | <i>virginianus</i>   | NA     | Introduced after 1500 A.D.                              |
| Carnivora    | <i>Herpestes</i>      | <i>auropunctatus</i> | NA     | Introduced after 1500 A.D.                              |
| Carnivora    | <i>Neovison</i>       | <i>vison</i>         | NA     | Introduced after 1500 A.D.                              |
| Carnivora    | <i>Nyctereutes</i>    | <i>procyonoides</i>  | NA     | Introduced after 1500 A.D.                              |
| Carnivora    | <i>Procyon</i>        | <i>lotor</i>         | NA     | Introduced after 1500 A.D.                              |
| Lagomorpha   | <i>Sylvilagus</i>     | <i>floridanus</i>    | NA     | Introduced after 1500 A.D.                              |
| Marsupialia  | <i>Macropus</i>       | <i>rufogriseus</i>   | NA     | Introduced after 1500 A.D.                              |
| Primates     | <i>Macaca</i>         | <i>sylvanus</i>      | NA     | Introduced after 1500 A.D.                              |
| Rodentia     | <i>Atlantoxerus</i>   | <i>getulus</i>       | NA     | Introduced after 1500 A.D.                              |
| Rodentia     | <i>Callosciurus</i>   | <i>erythraeus</i>    | NA     | Introduced after 1500 A.D.                              |
| Rodentia     | <i>Callosciurus</i>   | <i>finlaysonii</i>   | NA     | Introduced after 1500 A.D.                              |
| Rodentia     | <i>Castor</i>         | <i>canadensis</i>    | NA     | Introduced after 1500 A.D.                              |
| Rodentia     | <i>Myocastor</i>      | <i>coypus</i>        | NA     | Introduced after 1500 A.D.                              |
| Rodentia     | <i>Ondatra</i>        | <i>zibethicus</i>    | NA     | Introduced after 1500 A.D.                              |
| Rodentia     | <i>Rattus</i>         | <i>norvegicus</i>    | NA     | Introduced after 1500 A.D.                              |
| Rodentia     | <i>Sciurus</i>        | <i>carolinensis</i>  | NA     | Introduced after 1500 A.D.                              |
| Carnivora    | <i>Cystophora</i>     | <i>cristata</i>      | NA     | Marginal occurrence in Europe*                          |
| Carnivora    | <i>Erignathus</i>     | <i>barbatus</i>      | NA     | Marginal occurrence in Europe*                          |
| Carnivora    | <i>Felis</i>          | <i>chaus</i>         | NA     | Marginal occurrence in Europe*                          |
| Carnivora    | <i>Martes</i>         | <i>zibellina</i>     | NA     | Marginal occurrence in Europe*                          |
| Carnivora    | <i>Mustela</i>        | <i>sibirica</i>      | NA     | Marginal occurrence in Europe*                          |
| Carnivora    | <i>Odobenus</i>       | <i>rosmarus</i>      | NA     | Marginal occurrence in Europe*                          |
| Carnivora    | <i>Pagophilus</i>     | <i>groenlandicus</i> | NA     | Marginal occurrence in Europe*                          |
| Cetacea      | <i>Balaena</i>        | <i>mysticetus</i>    | NA     | Marginal occurrence in Europe*                          |
| Cetacea      | <i>Delphinapterus</i> | <i>leucas</i>        | NA     | Marginal occurrence in Europe*                          |
| Cetacea      | <i>Kogia</i>          | <i>breviceps</i>     | NA     | Marginal occurrence in Europe*                          |
| Cetacea      | <i>Kogia</i>          | <i>sima</i>          | NA     | Marginal occurrence in Europe*                          |
| Cetacea      | <i>Lagenodelphis</i>  | <i>hosei</i>         | NA     | Marginal occurrence in Europe*                          |
| Cetacea      | <i>Monodon</i>        | <i>monoceros</i>     | NA     | Marginal occurrence in Europe*                          |
| Cetacea      | <i>Peponocephala</i>  | <i>electra</i>       | NA     | Marginal occurrence in Europe*                          |
| Cetacea      | <i>Pseudorca</i>      | <i>crassidens</i>    | NA     | Marginal occurrence in Europe*                          |
| Cetacea      | <i>Sousa</i>          | <i>chinensis</i>     | NA     | Marginal occurrence in Europe*                          |
| Cetacea      | <i>Steno</i>          | <i>bredanensis</i>   | NA     | Marginal occurrence in Europe*                          |
| Chiroptera   | <i>Eptesicus</i>      | <i>bottae</i>        | NA     | Marginal occurrence in Europe*                          |
| Chiroptera   | <i>Rousettus</i>      | <i>aegyptiacus</i>   | NA     | Marginal occurrence in Europe*                          |

*Appendix 2. Species assessed as Not Applicable (NA) according to IUCN Regional Red Listing guidelines, continued*

| Order          | Genus               | Species              | Status | Justification                  |
|----------------|---------------------|----------------------|--------|--------------------------------|
| Erinaceomorpha | <i>Erinaceus</i>    | <i>concolor</i>      | NA     | Marginal occurrence in Europe* |
| Rodentia       | <i>Apodemus</i>     | <i>witherbyi</i>     | NA     | Marginal occurrence in Europe* |
| Rodentia       | <i>Dipus</i>        | <i>sagitta</i>       | NA     | Marginal occurrence in Europe* |
| Rodentia       | <i>Meriones</i>     | <i>tristrami</i>     | NA     | Marginal occurrence in Europe* |
| Rodentia       | <i>Microtus</i>     | <i>middendorffii</i> | NA     | Marginal occurrence in Europe* |
| Rodentia       | <i>Sciurus</i>      | <i>anomalus</i>      | NA     | Marginal occurrence in Europe* |
| Rodentia       | <i>Spalax</i>       | <i>nehringi</i>      | NA     | Marginal occurrence in Europe* |
| Soricomorpha   | <i>Diplomesodon</i> | <i>pulchellum</i>    | NA     | Marginal occurrence in Europe* |

\* Species were considered to be of marginal occurrence if it was estimated that less than 1% of their global population occurs in Europe. In the absence of population data, terrestrial species were considered of marginal occurrence if less than 1% of their range lies within Europe. This range-based rule was not strictly held to for marine species, as some very widespread marine species (e.g., the killer whale *Orcinus orca*) have less than 1% of their global range in the EMA study area, and probably less than 1% of their global population in that same area, but are nevertheless widespread, regularly recorded and typical components of the European marine fauna.



# Appendix 3. Species listed on Annexes II, IV and V of the Habitats Directive

| Taxon or taxa   | Annex |    |   | Geographic restrictions?  |
|---|-------|----|---|---|
|   | II    | IV | V |   |
| ERINACEOMORPHA  |       |    |   |   |
| <i>Erinaceus algirus</i>  |       | X  |   |   |
| SORICOMORPHA  |       |    |   |   |
| <i>Crocidura canariensis</i>  |       | X  |   |   |
| <i>Crocidura sicula</i>   |       | X  |   |   |
| <i>Galemys pyrenaicus</i>   | X     | X  |   |   |
| CHIROPTERA  |       |    |   |   |
| <i>Rhinolophus blasii</i>   | X     | X  |   |   |
| <i>Rhinolophus euryale</i>  | X     | X  |   |   |
| <i>Rhinolophus ferrumequinum</i>  | X     | X  |   |   |
| <i>Rhinolophus hipposideros</i>   | X     | X  |   |   |
| <i>Rhinolophus mehelyi</i>  | X     | X  |   |   |
| <i>Barbastella barbastellus</i>   | X     | X  |   |   |
| <i>Miniopterus schreibersi</i>  | X     | X  |   |   |
| <i>Myotis bechsteini</i>  | X     | X  |   |   |
| <i>Myotis blythii</i>   | X     | X  |   |   |
| <i>Myotis capaccinii</i>  | X     | X  |   |   |
| <i>Myotis dasycneme</i>   | X     | X  |   |   |
| <i>Myotis emarginatus</i>   | X     | X  |   |   |
| <i>Myotis myotis</i>  | X     | X  |   |   |
| <b>All Microchiroptera except the above</b>                                       |       | X  |   |   |
| <i>Rousettus aegyptiacus</i>  | X     | X  |   |   |
| RODENTIA  |       |    |   |   |
| <b>Gliridae: All species except <i>Glis glis</i> and <i>Eliomys quercinus</i></b> |       | X  |   |   |
| <i>Myomimus roachi</i>  | X     | X  |   |   |
| * <i>Marmota marmota latirostris</i>  | X     | X  |   |   |
| * <i>Pteromys volans (Sciuropterus ruscicus)</i>                                  | X     | X  |   |   |
| <i>Spermophilus citellus (Citellus citellus)</i>                                  | X     | X  |   |   |
| * <i>Spermophilus suslicus (Citellus suslicus)</i>                                | X     | X  |   |   |
| <i>Sciurus anomalus</i>   |       | X  |   |   |
| <i>Castor fiber</i>   | X     | X  | X | <b>Annex II:</b> except the Estonian, Latvian, Lithuanian, Finnish and Swedish populations<br><b>Annex IV:</b> except the Estonian, Latvian, Lithuanian, Polish, Finnish and Swedish, populations<br><b>Annex V:</b> Finnish, Swedish, Latvian, Lithuanian, Estonian and Polish populations |
| <i>Cricetus cricetus</i>  |       | X  | X | <b>Annex IV:</b> except the Hungarian populations<br><b>Annex V:</b> Hungarian populations  |
| <i>Mesocricetus newtoni</i>   | X     | X  |   |   |
| <i>Microtus cabrerae</i>  | X     | X  |   |   |
| * <i>Microtus oeconomus arenicola</i>   | X     | X  |   |   |
| * <i>Microtus oeconomus mehelyi</i>   | X     | X  |   |   |
| <i>Microtus tataricus</i>   | X     | X  |   |   |
| <i>Sicista betulina</i>   |       | X  |   |   |
| <i>Sicista subtilis</i>   | X     | X  |   |   |

| Taxon or taxa                    | Annex |    |   | Geographic restrictions?  |
|----------------------------------|-------|----|---|---|
|                                  | II    | IV | V |   |
| <i>Hystrix cristata</i>          |       | X  |   |   |
| CARNIVORA                        |       |    |   |   |
| * <i>Alopex lagopus</i>          | X     | X  |   |   |
| <i>Canis aureus</i>              |       |    | X |   |
| * <i>Canis lupus</i>             | X     | X  | X | <b>Annex II:</b> except the Estonian population; Greek populations: only south of the 39th parallel; Spanish populations: only those south of the Duero; Latvian, Lithuanian and Finnish populations<br><b>Annex IV:</b> except the Greek populations north of the 39th parallel; Estonian populations, Spanish populations north of the Duero; Latvian, Lithuanian, Polish, Slovak, Bulgarian populations and Finnish populations within the reindeer management area as defined in paragraph 2 of the Finnish Act No 848/90 of 14 September 1990 on reindeer management<br><b>Annex V:</b> Spanish populations north of the Duero, Greek populations north of the 39th parallel, Finnish populations within the reindeer management area as defined in paragraph 2 of the Finnish Act No 848/90 of 14 September 1990 on reindeer management, Latvian, Lithuanian, Estonian, Polish and Slovak populations |
| * <i>Ursus arctos</i>            | X     | X  |   | <b>Annex II:</b> except the Estonian, Finnish, and Swedish populations  |
| * <i>Gulo gulo</i>               | X     |    |   |   |
| <i>Lutra lutra</i>               | X     | X  |   |   |
| <i>Martes martes</i>             |       |    | X |   |
| <i>Mustela eversmanii</i>        | X     | X  |   |   |
| <i>Mustela putorius</i>          |       |    | X |   |
| * <i>Mustela lutreola</i>        | X     | X  |   |   |
| <i>Vormela peregusna</i>         | X     | X  |   |   |
| <i>Felis silvestris</i>          |       | X  |   |   |
| <i>Lynx lynx</i>                 | X     | X  | X | <b>Annex II:</b> except the Estonian, Latvian and Finnish populations<br><b>Annex IV:</b> except the Estonian population<br><b>Annex V:</b> Estonian population   |
| * <i>Lynx pardinus</i>           | X     | X  |   |   |
| <i>Halichoerus grypus</i>        | X     |    | X |   |
| * <i>Monachus monachus</i>       | X     | X  |   |   |
| <i>Phoca hispida botnica</i>     | X     |    | X |   |
| * <i>Phoca hispida saimensis</i> | X     | X  |   |   |
| <i>Phoca vitulina</i>            | X     |    | X |   |
| <b>All other Phocidae</b>        |       |    | X |   |
| <i>Genetta genetta</i>           |       |    | X |   |
| <i>Herpestes ichneumon</i>       |       |    | X |   |
| LAGOMORPHA                       |       |    |   |   |
| <i>Lepus timidus</i>             |       |    | X |   |

| Taxon or taxa   | Annex |    |   | Geographic restrictions? |
|---|-------|----|---|--------------------------|
|   | II    | IV | V |                          |
| ARTIODACTYLA  |       |    |   |                          |
| * <i>Cervus elaphus corsicanus</i>  | X     | X  |   |                          |
| <i>Rangifer tarandus fennicus</i>   | X     |    |   |                          |
| * <i>Bison bonasus</i>  | X     | X  |   |                          |
| <i>Capra aegagrus</i> (natural populations)   | X     | X  |   |                          |
| <i>Capra ibex</i>   |       |    | X |                          |
| <i>Capra pyrenaica</i> (except <i>Capra pyrenaica pyrenaica</i> )   |       |    | X |                          |
| * <i>Capra pyrenaica pyrenaica</i>  | X     | X  |   |                          |
| <i>Ovis gmelini musimon</i> ( <i>Ovis ammon musimon</i> )<br>(natural populations – Corsica and Sardinia)   | X     | X  |   |                          |
| <i>Ovis orientalis ophion</i> ( <i>Ovis gmelini ophion</i> )  | X     | X  |   |                          |
| * <i>Rupicapra pyrenaica ornata</i> ( <i>Rupicapra rupicapra ornata</i> )   | X     | X  |   |                          |
| <i>Rupicapra rupicapra</i> (except <i>Rupicapra rupicapra balcanica</i> ,<br><i>Rupicapra rupicapra ornata</i> and <i>Rupicapra rupicapra tatrica</i> ) |       |    | X |                          |
| <i>Rupicapra rupicapra balcanica</i>  | X     | X  |   |                          |
| * <i>Rupicapra rupicapra tatrica</i>  | X     | X  |   |                          |
| CETACEA   |       |    |   |                          |
| <i>Phocoena phocoena</i>  | X     | X  |   |                          |
| <i>Tursiops truncatus</i>   | X     | X  |   |                          |
| <b>All other Cetacea</b>  |       | X  |   |                          |

# Appendix 4. Example species summary and distribution map

The species summary gives all the information collated (for each species) during this assessment, including a distribution map. You can search for and download all

the summaries and distribution maps from the European Mammal Assessment website: <http://ec.europa.eu/environment/nature/conservation/species/ema/>.

|  |  |  |
|--|--|--|
| <u>Apodemus sylvaticus</u>   |  | <b>LC</b>  |
| Taxonomic Authority: (Linnaeus, 1758)  |  |  |
| <input type="checkbox"/> Global Assessment   | <input checked="" type="checkbox"/> Regional Assessment  | Region: Europe <input type="checkbox"/> Endemic to region  |
| <u>No synonyms available</u>   |  | <u>Common names</u>  |
|  |  | LONG-TAILED FIELD MOUSE English<br>MULOT SYLVESTRE French<br>RATÓN DE CAMPO Spanish; Castilian<br>WOOD MOUSE English |
| <u>Upper Level Taxonomy</u>  |  |  |
| Kingdom: ANIMALIA  | Phylum: CHORDATA   |  |
| Class: MAMMALIA  | Order: RODENTIA  |  |
| Family: MURIDAE  |  |  |
| <u>Lower Level Taxonomy</u>  |  |  |
| Rank:  | Infra- rank name:  | Plant Hybrid   |
| Subpopulation:   | Authority:   |  |
| <u>General Information</u>   |  |  |
| <u>Distribution</u>  |  |  |
| The wood mouse has a large range that extends throughout Europe (with the exception of Finland and northern parts of Scandinavia, the Baltic and Russia) and parts of North Africa (Panteleyev 1998, Montgomery 1999, Wilson and Reeder 2005). It is present on the majority of offshore islands including the British Isles and Iceland. It occurs from sea level to 2,000 m. |  |  |
| <u>Range Size</u>  | <u>Elevation</u>   | <u>Biogeographic Realm</u>   |
| Area of Occupancy:   | Upper limit: 2,000   | <input type="checkbox"/> Afrotropical  |
| Extent of Occurrence: >20,000  | Lower limit: 0   | <input type="checkbox"/> Antarctic   |
| Map Status: done   | <u>Depth</u>   | <input type="checkbox"/> Australasian  |
|  | Upper limit:   | <input type="checkbox"/> Neotropical   |
|  | Lower limit:   | <input type="checkbox"/> Oceanian  |
|  | <u>Depth Zones</u>   | <input type="checkbox"/> Palearctic  |
|  | <input type="checkbox"/> Shallow photic <input type="checkbox"/> Bathyl <input type="checkbox"/> Hadal | <input type="checkbox"/> Indomalayan   |
|  | <input type="checkbox"/> Photic <input type="checkbox"/> Abyssal                                       | <input type="checkbox"/> Nearctic  |
| <u>Population</u>  |  |  |
| It is widespread and abundant throughout much of its range, and populations appear to be stable. Population density may fluctuate more than tenfold between years of maximum and minimum abundance, but there are no regular cycles (Montgomery 1999).   |  |  |
| <u>Total Population Size</u>   |  |  |
| Minimum Population Size:   | Maximum Population Size:   |  |



### Habitat and Ecology

It is a very adaptable species, inhabiting a wide variety of semi-natural habitats including all types of woodland, moorland, steppe, arid Mediterranean shrubland, and sand dunes. It is also found in many man-made habitats including suburban and urban parks, gardens and wasteland, pastures and arable fields, and forestry plantations. It has an omnivorous diet including seeds and invertebrates. Although it can cause occasional damage, it is not generally considered an agricultural pest (Montgomery 1999).

#### System

#### Movement pattern

#### Crop Wild Relative

Terrestrial  Marine  Freshwater  Congregatory  Migratory  Is the species a wild relative of a crop?

### Threats

There are no major threats to this species, although pollution by lead and agrochemicals may have localized negative impacts.

|         | Past                                | Present                             | Future                              |
|---------|-------------------------------------|-------------------------------------|-------------------------------------|
| 13 None | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

### Conservation Measures

It occurs in protected areas within its range. No specific conservation actions are needed.

|                                  | In Place                            | Needed                   |
|----------------------------------|-------------------------------------|--------------------------|
| 4 Habitat and site-based actions | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4.4 Protected areas              | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4.4.2 Establishment              | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Countries of Occurrence

|                                | Native Presence Confirmed           | Native Presence Possible | Extinct                  | Possibly Extinct         | Re-introduced            | Possibly Reintroduced    | Introduced               | Introduced               | Vagrant                  | Possibly Vagrant         |
|--------------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Albania                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Algeria                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Andorra                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Austria                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Belarus                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Belgium                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Bosnia and Herzegovina         | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Bulgaria                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Croatia                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Czech Republic                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Denmark                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| France                         | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Germany                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Greece                         | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hungary                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Iceland                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Ireland                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Italy                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Liechtenstein                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Lithuania                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Luxembourg                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Macedonia, the former Yugoslav | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Republic of Moldova            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Monaco                         | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Morocco                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Native                | Native                   |                          | Possibly Extinct         | Possibly Re-introduced   |                          | Possibly Introduced      | Possibly Introduced      | Possibly Vagrant         | Possibly Vagrant         |
|-----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                       | Presence Confirmed       | Presence Possible        |                          | Extinct                  | Re-introduced            |                          |                          |                          |                          |
| Netherlands           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Norway                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Poland                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Portugal              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Romania               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Russian Federation    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Serbia and Montenegro | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Slovakia              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| General Habitats                                      | Score | Description |
|---|-------|-------------|
| 1 Forest  | 1     | Suitable    |
| 1.4 Forest - Temperate                                | 1     | Suitable    |
| 3 Shrubland   | 1     | Suitable    |
| 3.4 Shrubland - Temperate                             | 1     | Suitable    |
| 3.8 Shrubland - Mediterranean-type Shrubby Vegetation | 1     | Suitable    |
| 4 Grassland   | 1     | Suitable    |
| 4.4 Grassland - Temperate                             | 1     | Suitable    |
| 13 Marine Coastal/Supratidal                          | 1     | Suitable    |
| 13.3 Marine Coastal/Supratidal - Coastal Sand Dunes   | 1     | Suitable    |
| 14 Artificial/Terrestrial                             | 1     | Suitable    |
| 14.1 Artificial/Terrestrial - Arable Land             | 1     | Suitable    |
| 14.2 Artificial/Terrestrial - Pastureland             | 1     | Suitable    |
| 14.3 Artificial/Terrestrial - Plantations             | 1     | Suitable    |
| 14.4 Artificial/Terrestrial - Rural Gardens           | 1     | Suitable    |
| 14.5 Artificial/Terrestrial - Urban Areas             | 1     | Suitable    |

### Species Utilization

Species is not utilized at all

### IUCN Red Listing

Red List Assessment: (using 2001 IUCN system) Least Concern (LC)

Threat category adjusted from Global to Regional status: No Change in Category

Red List Criteria:

Date Last Seen (only for EX, EW or Possibly EX species):

Is the species Possibly Extinct?  Possibly Extinct Candidate?

### Rationale for the Red List Assessment

This species is widespread and abundant across its large range. There are no major threats and no suspicion of declines. Consequently it is assessed as Least Concern.

Reason(s) for Change in Red List Category from the Previous Assessment:

- Genuine Change
  - Genuine (recent)
  - Genuine (since first assessment)
- Nongenuine Change
  - New information
    - Taxonomy
    - Criteria Revision
    - Other
  - Knowledge of Criteria
  - Incorrect data used previously
- No Change
  - Same category and criteria
  - Same category but change in criteria

Current Population Trend: Stable

Date of Assessment: 21/05/2006

Name(s) of the Assessor(s): Boris Kryštufek, Holger Meinig, Vladimir Vohralík, Rimvydas Juškaitis, Heikki Henttonen, Igor Zagorodnyuk

Evaluator(s): Caroline Pollock and Helen Temple

Notes: 2004 global assessment: LC (Schlitter, D. & Van der Straeten, E. (GMA Africa Workshop))

| Criterion A  | Criterion B   | Criterion C  | Criterion D                 |
|--|---|--|-----------------------------|
| A1a <input type="checkbox"/> A1b <input type="checkbox"/> A1c <input type="checkbox"/> A1d <input type="checkbox"/> A1e <input type="checkbox"/> | B1a <input type="checkbox"/>  | C1 <input type="checkbox"/>                                      | D <input type="checkbox"/>  |
| A2a <input type="checkbox"/> A2b <input type="checkbox"/> A2c <input type="checkbox"/> A2d <input type="checkbox"/> A2e <input type="checkbox"/> | B1b(i) <input type="checkbox"/> B1b(ii) <input type="checkbox"/> B1b(iii) <input type="checkbox"/> B1b(iv) <input type="checkbox"/> B1b(v) <input type="checkbox"/> | C2a(i) <input type="checkbox"/> C2a(ii) <input type="checkbox"/> | D1 <input type="checkbox"/> |
| A3b <input type="checkbox"/> A3c <input type="checkbox"/> A3d <input type="checkbox"/> A3e <input type="checkbox"/>                              | B1c(i) <input type="checkbox"/> B1c(ii) <input type="checkbox"/> B1c(iii) <input type="checkbox"/> B1c(iv) <input type="checkbox"/>                                 | C2b <input type="checkbox"/>                                     | D2 <input type="checkbox"/> |
| A4a <input type="checkbox"/> A4b <input type="checkbox"/> A4c <input type="checkbox"/> A4d <input type="checkbox"/> A4e <input type="checkbox"/> | B2a <input type="checkbox"/>  |  |                             |
|  | B2b(i) <input type="checkbox"/> B2b(ii) <input type="checkbox"/> B2b(iii) <input type="checkbox"/> B2b(iv) <input type="checkbox"/> B2b(v) <input type="checkbox"/> | <b>Criterion E</b>   |                             |
|  | B2c(i) <input type="checkbox"/> B2c(ii) <input type="checkbox"/> B2c(iii) <input type="checkbox"/> B2c(iv) <input type="checkbox"/>                                 | E <input type="checkbox"/>                                       |                             |

Generation Length:

% population decline in the past:

Time period over which the past decline has been measured for applying Criterion A or C1 (in years or generations):

% population decline in the future:

Time period over which the future decline has been measured for applying Criterion A or C1 (in years or generations):

Number of Locations:

Severely Fragmented:

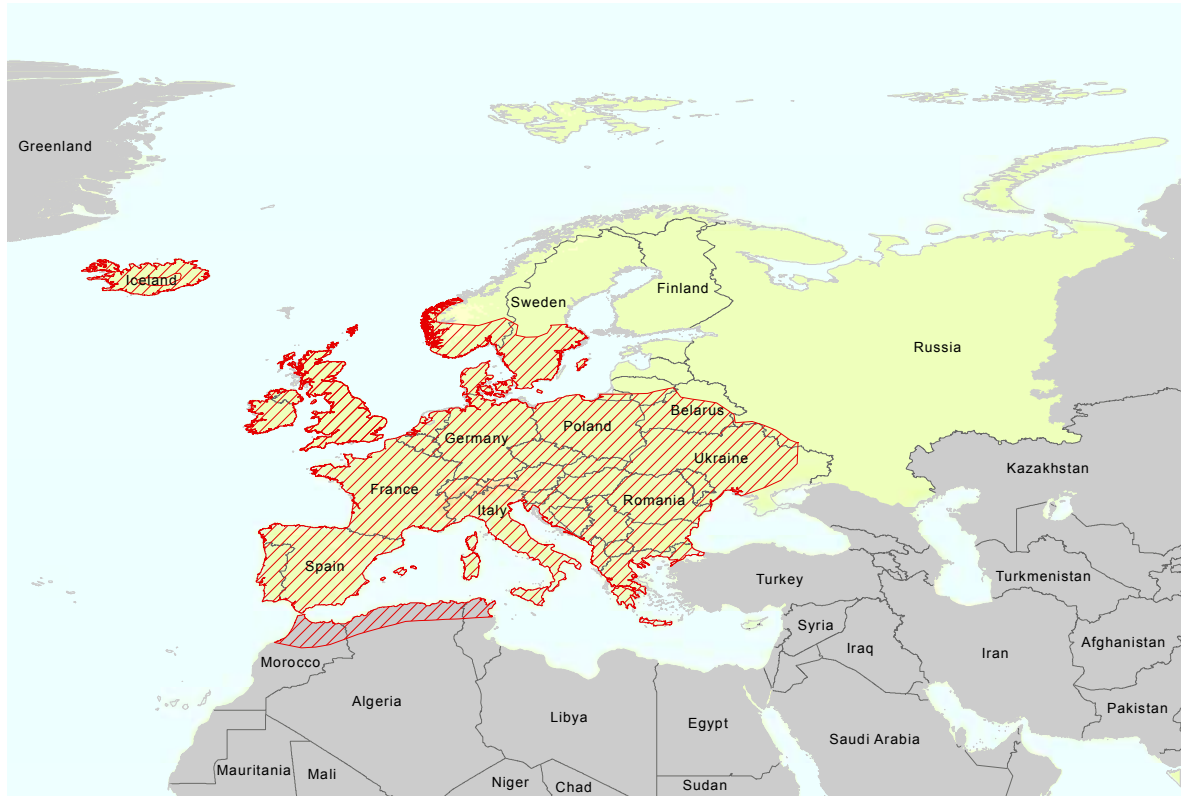
Number of Mature Individuals:

#### Bibliography

Montgomery, W.I. 1999, *Apodemus sylvaticus*. In: A.J. Mitchell-Jones, G. Amori, W. Bogdanowicz, B. Kryštufek, P.J.H. Reijnders, F. Spitzenberger, M. Stubbe, J.B.M. Thissen, V. Vohralík, and J. Zima (eds), *The Atlas of European Mammals*. Academic Press, London.

Panteleyev, P.A. 1998, *The Rodents of the Palaearctic Composition and Areas*. Moscow, Pensoft.







Wilson, D.E. and Reeder, D.M. (eds), 2005, *Mammal Species of the World*. Johns Hopkins University Press, Baltimore.








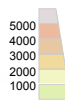
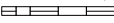
*Apodemus sylvaticus*

total range area = 5,215,306 kms

range type

-  Native Extant
-  Introduced
-  Native Reintroduced
-  Probably Extinct
-  Native - Possibly Present
-  Prehistorically Introduced



-  EMA boundary
-  national boundaries
-  n/a subnational boundaries
-  lakes, rivers, canals
-  salt pans, intermittent rivers
- elevation meters
- 
- 0 1,080 km
- 
- map created 04-30-2007





European Commission

The World Conservation Union (IUCN)

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*Delphinus delphis* © Tethys - Giovanni Bearzi



## IUCN Red List of Threatened Species™ – Regional Assessments

1. *The Status and Distribution of Freshwater Fish Endemic to the Mediterranean Basin.*  
Compiled by Kevin G. Smith and William R.T. Darwall, 2006.
2. *The Status and Distribution of Reptiles and Amphibians of the Mediterranean Basin.*  
Compiled by Neil Cox, Janice Chanson and Simon Stuart, 2006.
3. *The Status and Distribution of European mammals.* Compiled by Helen J. Temple and Andrew Terry, 2007.

## IUCN – The Species Survival Commission

The Species Survival Commission (SSC) is the largest of IUCN's six volunteer commissions with a global membership of 8,000 experts. SSC advises IUCN and its members on the wide range of technical and scientific aspects of species conservation and is dedicated to securing a future for biodiversity. SSC has significant input into the international agreements dealing with biodiversity conservation.  
[www.iucn.org/themes/ssc](http://www.iucn.org/themes/ssc)

## IUCN – Species Programme

The IUCN Species Programme supports the activities of the IUCN Species Survival Commission and individual Specialist Groups, as well as implementing global species conservation initiatives. It is an integral part of the IUCN Secretariat and is managed from IUCN's international headquarters in Gland, Switzerland. The Species Programme includes a number of technical units covering Species Trade and Use, Red List, Freshwater Biodiversity Assessment, (all located in Cambridge, UK), and the Global Biodiversity Assessment Initiative (located in Washington DC, USA).  
[www.iucn.org/themes/ssc](http://www.iucn.org/themes/ssc)

## IUCN – Regional Office for Europe

The Regional Office for Europe (ROfE) is the Permanent Representation of the World Conservation Union (IUCN) in Brussels. Through its Programme Offices in Belgrade, Moscow, Tbilisi and Tilburg and in cooperation with more than 350 European members and other parts of the IUCN constituency, the Regional Office for Europe implements the IUCN European Programme. The Programme area covers 53 countries and stretches from Greenland in the west to Kamchatka in the east.  
[www.iucneurope.org](http://www.iucneurope.org)

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