

# IUCN Red List Indices (RLI) for European terrestrial vertebrates: mammals, amphibians and reptiles

Technical report



30 June 2010

Financed by the European Environment Agency

## Introduction

The IUCN Red List Index (RLI) measures trends in the overall extinction risk ('conservation status') of sets of species, as an indicator of trends in the status of biodiversity. Extinction is a key measure of biodiversity loss that has resonance with the public and decision makers, and that has clear relevance to ecological processes and ecosystem function.

The RLI uses data from the *IUCN Red List of Threatened Species* (IUCN Red List; <http://www.iucnredlist.org>), widely recognized as the most authoritative, objective and comprehensive approach for evaluating the global conservation status of species and categorizing them according to their risk of extinction (Rodrigues *et al.* 2006). The IUCN Red List uses quantitative criteria based on population size, rate of decline, and area of distribution to assign species to one of seven categories of relative extinction risk, ranging from 'Extinct' to 'Least Concern' (or to a 'Data Deficient' category for species that are very poorly known). The RLI is based on movement of species status through the IUCN Red List Categories, and so requires a good knowledge of these Categories and Criteria for assessment of extinction risk.

The RLI falls under the CBD Biodiversity 2010 Target focal area: *Status and Trends of the Components of Biological Diversity*. It is the only indicator that has been adopted for immediate testing under the CBD headline indicator: *Change in status of threatened species*. The RLI also helps to track progress towards Target 7b under Millennium Development Goal 7 by providing the information required for indicator 7.7 ('proportion of species threatened with extinction'). Subsets of the RLI can also provide a basis for tracking progress under various agreements such as the Ramsar Convention and the Convention on Migratory Species (and its subsidiary agreements), as well as assessing the effectiveness of CITES in reducing the impacts of trade on endangered species. At a regional scale it has also been adopted as an indicator within Europe under the SEBI-2010 process.

## Methodology

The current methodology for calculating the Red List Index was first published in Butchart *et al.* (2007), and is a revision of the original methodology published by Butchart *et al.* (2004). Guidance for calculating the RLI at national and regional levels is outlined in detail in Bubb *et al.* (2009).

## Data Sources

### Mammals

A comprehensive regional assessment of the mammals of Europe was first completed in 2007 (Temple and Terry, 2007), and in 2008 (Schipper *et al.*, 2008), a comprehensive global assessment of all mammals was completed. In the RLI calculations for this report, the RL category assigned as part of the regional European assessment in 2007 was used, unless there was a correction to this category in the global assessments published in 2008. There were eight species endemic to Europe that changed category from 2007 to 2008 that were considered non-genuine changes and hence the 2008 category was used in this analysis (see Table 1).

Order	Family	Species name	Red List Category in 2007	Red List Category in 2008
RODENTIA	CRICETIDAE	<i>Arvicola sapidus</i>	NT	VU
RODENTIA	CRICETIDAE	<i>Dinaromys bogdanovi</i>	NT	VU
RODENTIA	CRICETIDAE	<i>Microtus cabreræ</i>	VU B2ab(ii,iii)c(iv)	NT
RODENTIA	CRICETIDAE	<i>Microtus felteni</i>	LC	DD
RODENTIA	MURIDAE	<i>Acomys minous</i>	LC	DD
RODENTIA	SPALACIDAE	<i>Spalax leucodon</i>	LC	DD
SORICOMORPHA	SORICIDAE	<i>Sorex granarius</i>	DD	LC
SORICOMORPHA	TALPIDAE	<i>Galemys pyrenaicus</i>	NT	VU

**Table 1. Non-genuine category changes between 2007 and 2008 for mammals.**

In 1996 the first comprehensive assessment of all mammals was completed and published in the IUCN Red List in 1996 (Baillie and Groombridge, 1996). Only non-LC species were included in this assessment. During the final review of the global mammal assessments in 2008, the previous Red list category for 1996 was also revisited. There were a significant number of changes to taxonomy and improvements in knowledge between 1996 and 2008 and a number of species changed category as a result. To ensure that only genuine changes in species status are included in calculations of the RLI, the 1996 RL categories were corrected by assuming that the 2008 RL category was also correct in 1996 unless there was information that supported that a genuine change in the species' status had occurred.

Of the 231 mammals listed in the European regional assessment report (Temple and Terry, 2007), there are 59 that are endemic to the region. For these species the corrected 1996 RL categories from the global assessment were used. For non-endemic species, past and current assessments were reviewed and other literature consulted to see if there was any evidence for a change in the species status between 1996 and 2008. If there was no evidence of a change in status then it was assumed that the RL category in 2008 was also the same in 1996. For a few species it was not straight forward to assign 1996 RL categories and expert opinion was sought to confirm the corrected listing.

### ***Amphibians***

The first comprehensive assessment of all amphibians was completed in 2004 (Stuart, S. *et al.* 2004). During the final review of the assessments, using information current at that time, a retrospective RL category for 1980 was determined. Any changes between the backcast 1980 category and newly assigned 2004 category were genuine changes and the driving threats to these genuine change species were studied in Stuart, *et al.* (2004). The date of 1980 was chosen because it was thought to precede most of the wave of dramatic declines in amphibians.

Some of the data collected for Europe as part of the first assessment of amphibians in 2004 were later reviewed at a workshop in December 2004 which focused on the Mediterranean region (Cox *et al.* 2006). All European species were then reviewed again at the European regional level in 2008 and the methodology and results were published in the European Red List of Amphibians (Temple and Cox, 2009). Hence for some European amphibians there is a RL assessment for 2004, 2006 and 2008. The results published in Temple and Cox (2009) are used in the RLI analysis presented here for 2008.

In this report the RLI for amphibians is calculated between 1980 and 2008 since a backcast assessment of amphibians back to 1980 was completed in 2004. However these backcast assessments were done at a global level. Of the 89 amphibians listed in Temple and Cox (2009), 64 are endemic to Europe and hence the global backcast categories can be used as a starting point for determining the 1980 categories for endemic species. However since 2004 there have been some taxonomic changes as well as new information. Therefore the 1980 RL categories assigned in this report for the purposes of calculating the RLI for Europe are based on information in the current and all previous assessments, as well as the 1980 RL category assigned by Stuart *et al.* (2004). They have also been reviewed by experts in the region.

### ***Reptiles***

Reptiles have not yet been comprehensively assessed at a global level, so they have been one of the first taxonomic groups to be targeted by the Sampled Red List Index project (Collen *et al.* 2008). This project assesses the status of 1,500 randomly selected species at a global level to try and gain insight in to the conservation status of the taxonomic group overall. The results for reptiles are currently being prepared for publication (Collen *et al.* in prep.). It has not yet been possible to calculate the global RLI for reptiles as there have been no past comprehensive assessments as there has been for mammals, and no global backcasting of categories as has been done for amphibians.

A regional assessment of all European reptiles was completed in 2008 and the methodology and results were published in Cox and Temple (2009). Of the 146 species included in the report, 73 of them are endemic to Europe. These regional assessments provide the 2008 data for the calculation of the RLI for reptiles in this report. In order to calculate the RLI for reptiles an assessment of all species was needed at another time period. For consistency, the year of 1996 was chosen as the previous

date to match the same date for mammals. As there was no previous assessment of reptiles, it was necessary to backcast the 1996 assessment for all species. Using current assessments, other literature and consulting with experts, a 1996 backcast category was assigned that assumed there was no change in category unless there was evidence of a genuine change in the species' status. These backcast categories were used in the RLI calculations in this report.

## Inclusion on Annex II and Annex IV of the Habitats Directive

For mammals, reptiles and amphibians there are some differences between the species taxonomy used on the Annexes of the Habitat Directive and the IUCN Red List. For the analyses presented here the taxonomies have been matched and an explanation is given where needed in the relevant column of the spreadsheet.

There are some species listed on either Annex II or Annex IV that are either introduced in Europe since 1500 or are of marginal occurrence. These species are listed in the "Notes" tab of the calculation spreadsheet. They are excluded from the RLI calculations presented here.

For some species only one or more subspecies or subpopulations are listed on either Annex II or IV instead of the entire European range or population. In the RLI calculations presented here, these species have been grouped as being included on the Annexes. At first this may seem counterintuitive as only a small proportion of the species may be included therefore it should not be assumed that it is entirely protected, however the decision to only protect a small proportion is usually because it is only these subspecies and subpopulations that are of conservation concern. Hence the Annexes are correct in only prioritising these subspecies or subpopulations. It should be noted however that all of these species are currently listed as Least Concern (LC) even though there are subspecies or subpopulations that are of conservation concern. This affects the value of the RLI for species included on the Annexes, making it appear better because the threatened status of the subspecies and subpopulations is not enough to affect the overall species status of Least Concern.

In the RLI calculations presented here, the most recent version of Annex II and IV is used to separate the species in to two groups based on whether or not they occur on either list (Consolidated version 1. 1. 2007 of the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora). There has been no differentiation between species depending on the date they were added to the Annexes; all species on the most current list are considered as being included in the Annexes for the purposes of these analyses. For most species it is very difficult to pinpoint in time when a change from one Red List category to another has occurred, so even though a date may be known for when a species was included for the first time on an Annex, it is not necessarily going to be possible to determine whether or not a species had changed status before or after this date. When interpreting the results it is therefore useful to keep in mind that some species may have deteriorated or improved in status before being included on the Annex, and hence it cannot be assumed that inclusion on an annex has resulted in the species improvement or deterioration.

## Results

### Mammals

There are 231 mammals listed in the European regional assessment report (Temple and Terry, 2007). Of these 231, there are ten that are considered to have changed status from 1996 to 2008. These genuine changes species are listed in Table 2.

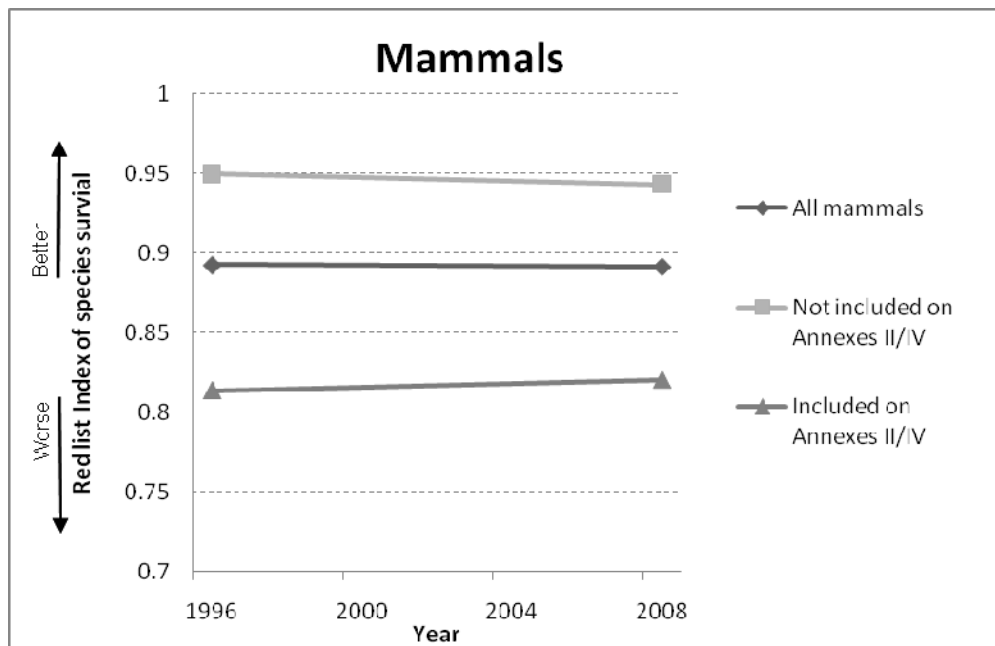
Family	Species name	Endemic to Europe	Regional Red List category backcast to 1996	Regional Red List category in 2008	Included on Annex II?	Included on Annex IV?
FELIDAE	<i>Lynx pardinus</i>	Yes	EN	CR	Yes	Yes
MUSTELIDAE	<i>Vormela peregusna</i>	No	NT	VU	Yes	Yes
URSIDAE	<i>Ursus maritimus</i>	No	LC	VU		

BALAENOPTERIDAE	<i>Megaptera novaeangliae</i>	No	VU	LC		Yes
BOVIDAE	<i>Bison bonasus</i>	No	EN	VU	Yes	Yes
BOVIDAE	<i>Capra pyrenaica</i>	Yes	NT	LC	Only <i>C.p. pyrenaica</i>	Only <i>C.p. pyrenaica</i>
BOVIDAE	<i>Saiga tatarica</i>	No	VU	CR		
VESPERTILIONIDAE	<i>Myotis emarginatus</i>	No	NT	LC	Yes	Yes
CRICETIDAE	<i>Arvicola sapidus</i>	Yes	NT	VU		
SCIURIDAE	<i>Spermophilus suslicus</i>	Yes	VU	NT	Yes	Yes

**Table 2. European mammals that have undergone a genuine change in status from 1996 to 2008.**

Six of the ten mammals in Table 2 are currently listed on Annex II and/or IV. For this analysis, *Capra pyrenaica* is not considered as being included on either Annex, as only the subspecies *Capra pyrenaica pyrenaica* is included on the Annexes and this subspecies became extinct in 2000. The situation of *C. p. pyrenaica*, once abundant in the French and Spanish Pyrenees, has been critical since the beginning of the 20th century (Cabrera, 1914), with only one population of about 100 individuals remaining in Spain (Perez et al. 2002). At the end of the 1980's the population size was estimated at 6-14 individuals (García-González, 1990; Perez et al. 2002), with the death of the last male occurring in 1991 and of the last female in 2000. Therefore, in 1996, the starting date of our study, no conservation actions could have saved it and it was actually virtually already extinct. The protection granted by the Annexes was for that reason not really relevant over the period of time considered.

Interestingly four of these six mammals have genuinely improved in status, and this result is reflected in the RLI shown in Figure 1. For all European mammals, the RLI has only declined slightly from 1996 to 2008, but when disaggregated, species not included on the Annexes have declined more steeply, and species included on the Annexes have actually improved. The RLI value which is a measure of the average threat status of species, is closer to 1.0 for species not included on the Annexes than for those that are included (0.94 versus 0.82), indicating that the species included on the Annexes are more likely to be threatened than those that are not included.



**Figure 1. European RLI for mammals.**

### Amphibians

There are 89 amphibians listed in Temple and Cox (2009) as occurring in Europe. Six of these species are only of marginal occurrence (less than 1% of their range is within Europe), or are introduced to the region so are not included in the assessment. Of the 83 species that are included in the RLI calculations, 14 are considered to have changed in status from 1980 to 2008. These genuine change species are listed in Table 3.

Family	Genus	Species	Endemic to Europe	Regional Red List category backcast to 1980	Regional Red List category in 2008	Included on Annex II?	Included on Annex IV?
ALYTIDAE	Alytes	cisternasii	Yes	LC	NT		Yes
ALYTIDAE	Alytes	dickhilleni	Yes	NT	VU		As part of <i>Alytes obstetricans</i>
ALYTIDAE	Alytes	muletensis	Yes	CR	VU	Yes	Yes
ALYTIDAE	Discoglossus	jeanneae	Yes	LC	NT	Yes	Yes
BOMBINATORIDAE	Bombina	pachypus	Yes	LC	EN	As part of <i>Bombina variegata</i>	As part of <i>Bombina variegata</i>
PELOBATIDAE	Pelobates	cultripes	Yes	LC	NT		Yes
PLETHODONTIDAE	Speleomantes	supramontis	Yes	NT	EN	Yes	Yes
RANIDAE	Pelophylax	cerigensis	Yes	EN	CR		
RANIDAE	Pelophylax	grafi	Yes	LC	NT		
RANIDAE	Pelophylax	shqipericus	Yes	NT	EN		
RANIDAE	Rana	iberica	Yes	LC	NT		Yes
RANIDAE	Rana	latastei	Yes	NT	VU	Yes	Yes
SALAMANDRIDAE	Pleurodeles	waltl	No	LC	NT		
SALAMANDRIDAE	Triturus	pygmaeus	Yes	LC	NT		

**Table 3. European amphibians that have undergone a genuine change in status from 1980 to 2008.**

All of these genuine changes for amphibians have been deteriorations in status except for *Alytes muletensis* which is listed on both Annex II and IV and has received substantial conservation effort. The overwhelming trend for all amphibians is a decline in status, regardless of whether or not they are included in the Annexes. The value of the RLI shows that species included on the Annexes are more likely to be threatened than those that are not included.

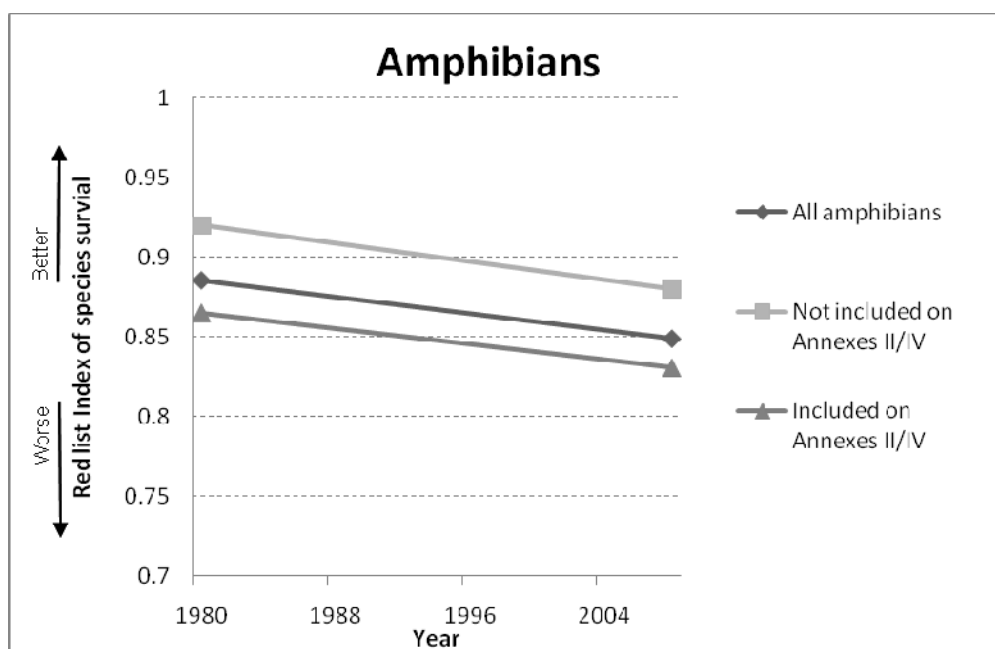


Figure 2. European RLI for amphibians.

### Reptiles

There are 156 reptiles listed in Cox and Temple (2009) as occurring in Europe. Seventeen of these species are not included in the assessment because they are either introduced to Europe, have a marginal range in Europe (less than 1% of their global range), or its presence in Europe is unconfirmed. Of the 139 species that are assessed and included in the calculation of the RLI, there is only one species that has been identified that is considered to have changed in status from 1996 to 2008. This genuine change species is listed in Table 4.

Family	Genus	Species	Endemic to Europe	Regional Red List category backcast to 1996	Regional Red List category in 2008	Included on Annex II?	Included on Annex IV?
LACERTIDAE	Iberolacerta	galani	Yes	LC	NT	As part of <i>Lacerta monticola</i>	As part of <i>Lacerta monticola</i>

Table 4. European reptiles that have undergone a genuine change in status from 1996 to 2008.

The one species that has genuinely changed status is included on the Annex II and IV. Overall the status of reptiles in Europe is relatively stable at present, with only one decline. The value of the RLI shows that species included on the Annexes are more likely to be threatened than those that are not included.

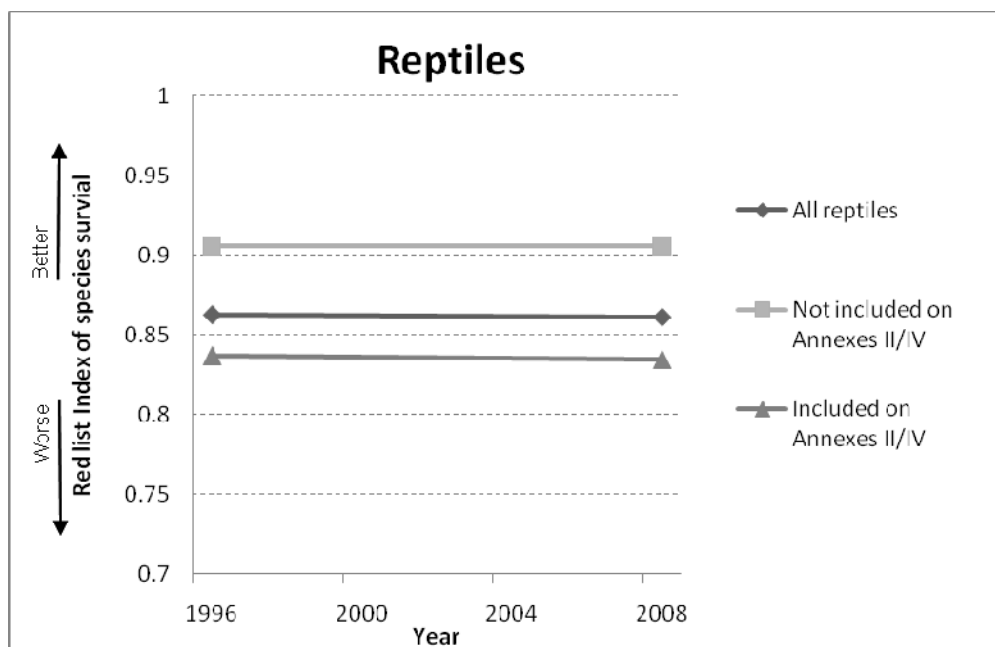


Figure 3. European RLI for reptiles.

## Conclusions

The results presented here are based on the assessment of all mammals, amphibians and reptiles at the European level. Genuine changes in their conservation status occurred during the period studied, allowing us to draw trends. The conservation status of amphibians shows a strong decline over time, regardless of their listing on the Habitat Directive Annexes, with the noticeable exception of the Mallorcan midwife toad *Alytes muletensis*; whereas the Reptiles are relatively stable (only one genuine negative change). The situation of the European mammals is more contrasted, as the overall trend is slightly decreasing, but when looking at the species included in the Annexes, their status is actually improving. This contrasted results show that conservation measures have successfully tackled the main threat factors for several species, especially in large charismatic species, such as the mammals, but that the aim of halting biodiversity loss has not been achieved. As a general remark, the species included on the Annexes are more likely to be threatened than those that are not included. About half a dozen species, most of them included on the Annexes, have shown an improvement in their conservation status, mainly in response to considerable conservation efforts.

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