

European Red List of Reptiles

Compiled by Neil A. Cox and Helen J. Temple



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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 the European landscapes have been changed by human

activities so that now the continent is covered with a mosaic of natural and semi-natural habitats surrounding urbanized areas. Although bringing higher diversity, this modification has obviously also placed great pressures on our wildlife and natural areas.

In 2001, EU Member States made the commitment to halt the loss of biodiversity within the EU by 2010. The EU Biodiversity Action Plan adopted in 2006 sets out the main targets and activities needed to achieve this commitment. The Mid Term Review of the implementation of the Biodiversity Action Plan published by the Commission in December 2008 demonstrates that, despite some progress made, it is highly unlikely that the 2010 target will be met. Numerous scientific studies show that biodiversity in Europe has been declining rapidly for some time during periods of expansion and intensification of land use. The recent extensive reporting process under Article 17 of the EU Habitats Directive (HD) underlines this fact as most species and habitats protected under the HD are still not under a favourable conservation status.

Red Lists are another important tool to scientifically assess and communicate the status of species. They usefully complement the reporting under the Habitats Directive as they address all species in a specific taxonomic group, not just those protected by the EU nature legislation. They hence give important complementary information about the situation of biodiversity

in Europe. This first assessment of the Red List status of Europe's reptiles has assessed all species of the orders Squamata (lizards and snakes) and Testudines (turtles and tortoises) present in Europe, even though reptiles do not form a proper group of species from an evolutionary perspective (snakes and lizards are probably more closely related to birds than to turtles and tortoises) and the two orders are quite distinct from one another. The assessment has followed the Red List methodology developed by the International Union for the Conservation of Nature (IUCN), which is the most common methodology used throughout the world.

This first assessment of the Red List status of Europe's and the European Union's reptiles shows us that about one fifth of our species are threatened. This compares with 13% of birds, 15% of mammals and 23% of amphibians, the other groups that have been comprehensively assessed in Europe. Almost half the reptilian species in Europe (42%) show declining populations. Unfortunately, the drivers for these declines are mostly still in place. Habitat loss, degradation and fragmentation pose the main threat.

What can we as Europeans do about this? First and foremost, we need to fully implement the existing European legislation. The EU Habitats and Birds Directives are the main pieces of legislation ensuring the protection of Europe's nature. The Natura 2000 network of protected sites and the efforts to conserve and restore biodiversity in the wider countryside are helping to guarantee its future conservation and sustainable use.

I hope that this European Red List for reptiles will add another piece of evidence for the fact that efforts aimed at halting the loss of biodiversity and the implementation of related European legislation need a major boost in the coming years.

Ladislav Miko
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All of IUCN's Red Listing processes rely on the willingness of scientists to contribute and pool their collective knowledge to make the most reliable estimates of species status. Without their enthusiastic commitment to species conservation, this kind of regional overview would not be possible. A list of all participating scientists can be found at the end of this section, and the specific contribution of each scientist is fully acknowledged in each of the detailed individual species assessments (available online at <http://www.iucnredlist.org/europe> and <http://ec.europa.eu/environment/nature/conservation/species/redlist>).

Coordination of the herpetological component of the European Red List was carried out by Neil Cox and Helen Temple (IUCN Species Programme). We received expert advice and assistance from Peter Paul van Dijk of the IUCN Species Survival Commission (SSC) Tortoise and Freshwater Turtle Specialist Group.

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Species accounts and maps were adapted from data compiled under the IUCN Global Reptile Assessment. These data in part originate from two earlier workshops; the IUCN Mediterranean Red Listing Workshop for Freshwater Fishes, Reptiles and Amphibians, held in Málaga (Spain) 13-17 December 2004 (see Cox *et al.* 2006), and the IUCN Global Reptile Assessment (GRA) workshop for the non-Mediterranean Reptiles of the Western Palearctic, held at the 13th Societas Europea Herpetologica Congress in Bonn, 28-30 September 2005.

The European Reptile and Amphibian Assessments and consequently this report were requirements of the framework of a service contract with the European Commission (Service Contract No. 070307/2007/483288/MAR/B2). Additional support to IUCN that contributed to the success of the workshop was provided by the Critical Ecosystem Partnership Fund (CEPF). We thank Tina Schneider and Nina Marshall of CEPF for their much appreciated patience and help. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the European Commission, CEPF, or the International Union for Conservation of Nature (IUCN).

The European Reptile and Amphibian Assessments were entirely dependent on more than 130 experts from over 40 countries in Europe and elsewhere, who generously gave of their time and knowledge. The enthusiasm and commitment of these people has enabled us to generate a comprehensive and detailed picture of reptile and amphibian status and trends in Europe. We record our thanks to the following people who have contributed as assessors for species included within this report and Temple & Cox (2009), asking for forgiveness from anyone whose name is inadvertently omitted or misspelled:

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Expert participants at the Reptiles and Amphibians Red List workshop, September 2008, Antalya, Turkey. Photograph © Ozgur Koc.



Executive summary

Aim

The European Red List is a review of the conservation status of c.6,000 European species (mammals, reptiles, amphibians, freshwater fishes, butterflies, dragonflies, and selected groups of beetles, molluscs, and vascular plants) 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. This Red List publication summarises results for European reptiles.

Scope

All terrestrial and freshwater reptile species native to Europe or naturalised in Europe before AD 1500 are included. 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. The Caucasus region is not included. Red List assessments were made at two regional levels: for geographical Europe, and for the 27 current Member States of the European Union.

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 extinction risk. All assessments followed the *Guidelines for Application of IUCN Red List Criteria at Regional Levels* (IUCN 2003). Regional assessments were carried out at an assessment workshop and through correspondence with relevant experts. More than 130 herpetologists from over 40 countries in Europe and elsewhere actively participated in the assessment and review process for European reptiles and amphibians. Assessments are available on the European Red List website and data portal: <http://ec.europa.eu/environment/nature/conservation/species/redlist> and <http://www.iucnredlist.org/europe>.

Results

Overall, approximately one fifth of reptiles are considered threatened in Europe, with a similar proportion threatened at the EU level. A further 13% of reptiles are considered Near Threatened. By comparison, 23% of European amphibians, 15% of European mammals and 13% of European birds are threatened (BirdLife International 2004a, Temple & Terry 2007, Temple & Cox 2009). No other groups have yet been comprehensively assessed at the European level. More than two-fifths (42%) of reptile species are declining and the same percentage is stable; only 3% are increasing.

The majority of threatened and Near Threatened reptile species are endemic to both Europe and the EU, highlighting the responsibility that European countries have to protect the entire global populations of these species. All Critically Endangered species and the vast majority of Endangered and Vulnerable species are endemic to both Europe and the EU.

Reptile biodiversity increases from north to south in Europe, with the highest species richness being found in the Balkan peninsula. The Iberian, Italian and Balkan peninsulas are all important areas of species richness, as are the Mediterranean and Macaronesian islands. Habitat loss, fragmentation and degradation are the greatest threats to reptiles in Europe. Other major threats include pollution, overharvesting, and deliberate persecution (for snakes especially).

Conclusions

- **Threatened reptiles in Europe require urgent action to improve their status.** While many species already receive some conservation attention, others do not. Priorities identified in this study include addressing threats such as habitat loss, fragmentation and degradation, overexploitation, and deliberate persecution.
- **Species can be saved from extinction and declining population trends can be reversed.** However, this requires a combination of sound research, coordinated action, and substantial continued investment in nature conservation.
- **Sustained investment in species-, site- and landscape-level conservation is needed from all European countries** to ensure that European species are secure in the long term. This needs to be combined with the political will to truly integrate biodiversity conservation into all policy sectors.

Orange-tailed Skink *Eumeces schneideri* (Least Concern). This species occurs in a wide range of arid habitat types, including Mediterranean shrubland, semi-desert and rocky areas. Within Europe this species has been recorded from Cyprus.



1. Background

1.1 The European context

Europe is one of the seven traditional continents of the Earth, although physically and geologically it is the westernmost peninsula of Eurasia. Europe 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). Europe is the world's second-smallest continent in terms of area, covering approximately 10,400,000 square kilometres (4,010,000 square miles) or 2% of the Earth's surface. In terms of human population, it is the third-largest continent (after Asia and Africa) with a population of some 731 million – about 11% of the world's population. Europe is the most urbanised 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. It is the world's largest economy with an estimated GDP in 2008 of 18.9 trillion US dollars (Central Intelligence Agency 2009). Per-capita GDP in many EU states is among the highest in the world, and rates of resource consumption and waste production are correspondingly high – the EU 27's "ecological footprint" has been estimated to exceed the region's biological capacity (the total area of cropland, pasture, forest, and fishing grounds available to produce food, fibre, and timber and absorb waste) by 2.6 times (WWF 2007).

The EU's 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 – an area containing a great diversity of landscapes and habitats and a wealth of flora and fauna. European biodiversity includes 488 species of birds (IUCN 2008), 260 species of mammals (Temple & Terry 2007, 2009), 151 species of reptiles, 85 species of amphibians, 546 species of freshwater fishes (Kottelat & Freyhof 2007), 20–25,000 species of vascular plants¹ and well over 100,000 species of invertebrates (Fauna Europaea 2004). Mediterranean Europe is particularly rich in plant and animal species and has been recognised as a global "biodiversity hotspot" (Mittermeier *et al.* 2004, Cuttelod *et al.* 2008).

Europe has arguably the most highly fragmented landscape of all continents, and only a tiny fraction of its land surface can be considered as wilderness. For centuries most of Europe's land has been used by humans to produce food, timber and fuel and provide living space, and currently in western Europe more than 80% of land is under some form of direct management (European Environment Agency 2007). Consequently European species are to a large extent dependent upon semi-natural habitats created

and maintained by human activity, particularly traditional, non-intensive forms of land management. These habitats are under pressure from agricultural intensification, urban sprawl, infrastructure development, land abandonment, acidification, eutrophication and desertification. Many species are directly affected by overexploitation, persecution, and impacts of alien invasive species, and climate change is set to become an increasingly serious threat in the future. Europe is a huge, diverse region and the relative importance of different threats varies widely across its biogeographic regions and countries. Although considerable efforts have been made to protect and conserve European habitats and species (e.g. see Sections 4.3, 4.4, 4.5), biodiversity decline and the associated loss of vital ecosystem services (such as water purification, crop pollination, and carbon sequestration) continues to be a major concern in the region.

1.2 European reptiles: diversity and endemism

Within Europe two orders of reptiles are recognised, Squamata (lizards, worm lizards and snakes) and Testudines (tortoises and turtles). The great majority of terrestrial European reptiles are members of the Squamata (143 species), and this order is typically divided by taxonomists between the suborders of Sauria (lizards; 101 European species), Amphisbaenia (worm lizards; two species) and Ophidia (snakes; 42 species). There are far fewer members of non-marine Testudines in Europe with only eight species of tortoise and freshwater turtle recorded. Almost half of the reptiles of Europe are endemic to the region, but endemism is especially high in the amphisbaenians, the tortoises, the lizard family Lacertidae and the vipers. Table 1 provides more detail. The most diverse reptile families in the region are the Lacertidae (wall lizards and relatives; 65 species) and the Colubridae (colubrid snakes; 28 species). The Lacertidae is the most species rich family focused on Europe; all other families reach their greatest diversity and species richness outside of Europe. Important evolutionary radiations in the region include the lizard genera *Podarcis* (20 species and largely confined to Europe) and *Gallotia* (eight species, entirely endemic to the Canary Islands). Until relatively recently many European lizards were included within the widespread genus *Lacerta*, however recent taxonomic studies have now allocated a number of these species to endemic European genera (including *Dalmatolacerta*, *Dinarolacerta*, *Hellenolacerta* and *Iberolacerta*) (see Arnold *et al.* 2007 for discussion). Many of the snake genera recorded from Europe are widespread and represented outside the region; the snake genus *Hierophis* is notable with three species endemic to the region. Although there are few tortoise and freshwater turtle species in Europe three of the eight species (*Emys trinacris*, *Testudo hermanni* and *T. marginata*) are regionally endemic.

¹ Source: Euro+Med PlantBase, <http://www.emplantbase.org/home.html>

Much is left to learn about the reptiles of Europe, even though they are relatively well known by comparison with other species groups. Within the past few years alone several new species have been described, or identified as truly distinct species. These include the lizards *Podarcis levendis* (Lymberakis *et al.*,

2008), *Podarcis cretensis* (Lymberakis *et al.*, 2008), *Iberolacerta galani* (Arribas *et al.*, 2006), *Psammodromus jeanneae* (Busack *et al.*, 2006), *Psammodromus manuelae* (Busack *et al.*, 2006) and *Phoenicolacerta troodica* (Arnold *et al.*, 2007), and the freshwater turtle *Emys trinacris* (Fritz *et al.*, 2005).

Table 1. Diversity and endemism in terrestrial and freshwater reptile orders and families in Europe²

Class	Order	Family	Europe		EU 27	
			Number of species	Number of endemic species (% endemic)	Number of species	Number of endemic species (% endemic)
Reptilia	Squamata	Agamidae	4	0 (0%)	1	0 (0%)
		Amphisbaenidae	2	1 (50%)	2	1 (50%)
		Anguidae	3	1 (33.3%)	3	1 (33.3%)
		Boidae	2	0 (0%)	1	0 (0%)
		Chamaeleonidae	2	0 (0%)	2	0 (0%)
		Colubridae	28	6 (21.4%)	27	3 (11.1%)
		Gekkonidae	11	4 (36.4%)	9	4 (44.4%)
		Lacertidae	65	48 (73.8%)	63	41 (65.1%)
		Scincidae	14	5 (35.7%)	14	5 (35.7%)
		Trogonophidae	0	0 (0%)	1	0 (0%)
		Typhlopidae	1	0 (0%)	1	0 (0%)
		Viperidae	11	5 (45.5%)	9	2 (22.2%)
		Testudines	Emydidae	2	1 (50%)	2
	Geoemydidae		2	0 (0%)	2	0 (0%)
	Testudinidae		3	2 (66.7%)	3	2 (66.7%)
	Trionychidae		1	0 (0%)	1	0 (0%)
Total			151	73 (48.3%)	141	60 (42.6%)

² This table includes species that are native or naturalised since before AD 1500; species introduced after this date are not included. Species of marginal occurrence in Europe and/or the EU are included.

The Spur-thighed Tortoise *Testudo graeca* is considered to be Vulnerable (VU) at the European and EU level as it has declined by more than 30% over the last three generations (equivalent to 75 years in this long-lived species). Habitat degradation and loss, and past collection of animals for the pet trade have been major factors causing population depletion. Photograph © Roberto Sindaco.



1.3 Threatened status of species

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; IUCN 2008). 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 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 regional assessment has four main objectives:

- To contribute to regional conservation planning through provision of a baseline dataset reporting the status of European reptiles.

- To identify those geographic areas and habitats needing to be conserved to prevent extinctions and to ensure that European reptiles reach 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 reptile conservation in Europe, so that the assessment information can be kept current, and expertise can be targeted to address the highest conservation priorities.

The assessment provides three main outputs:

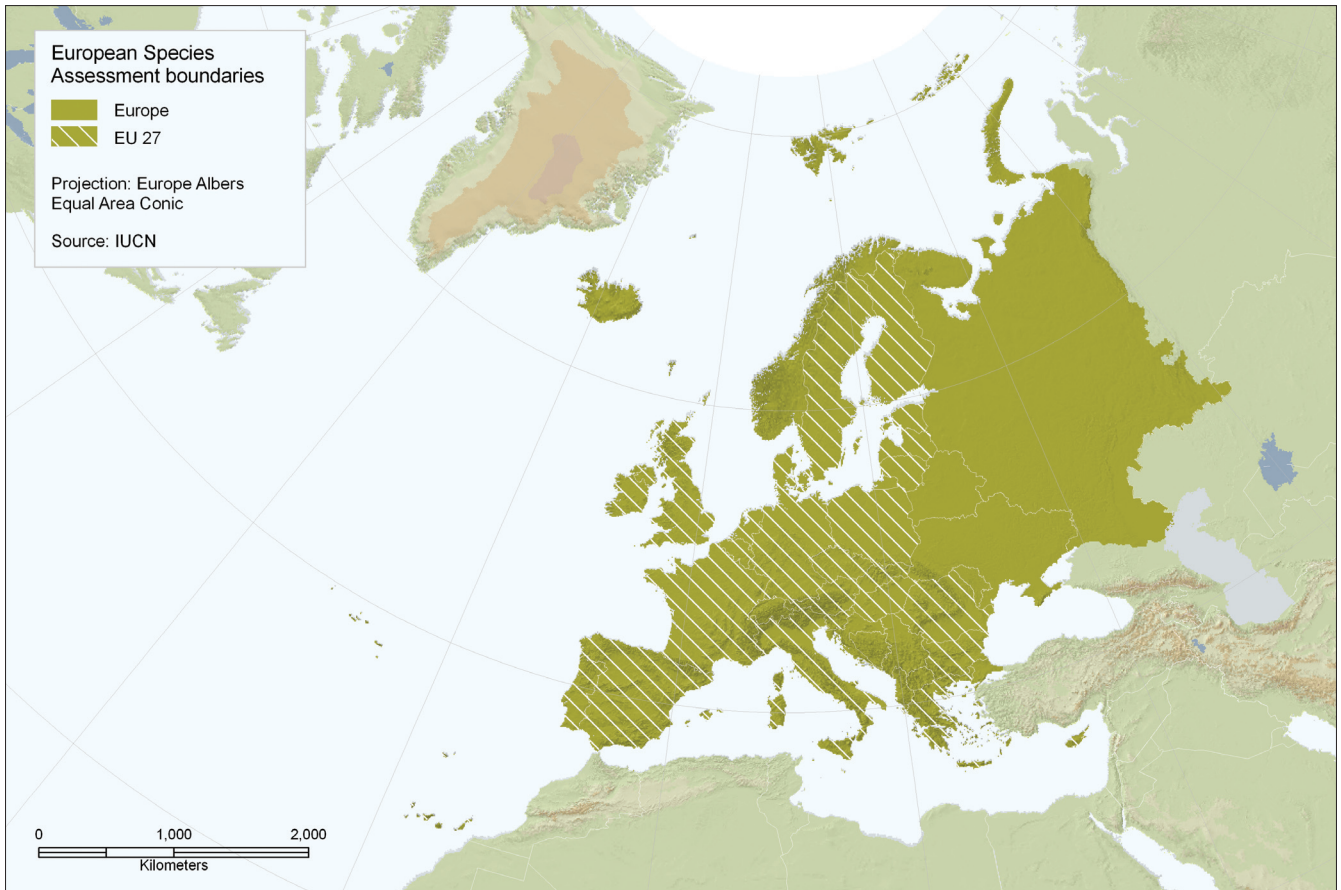
- This summary report on the status of European reptiles.
- A freely available database holding the baseline data for monitoring the status and distribution of European reptiles.
- A website and data portal (<http://ec.europa.eu/environment/nature/conservation/species/redlist> and <http://www.iucnredlist.org/europe>) showcasing this data in the form of species factsheets for all European reptiles, along with background and other interpretative material.

The data presented in this report 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.

European Glass Lizard *Pseudopus apodus* (Least Concern). This widespread species ranges eastwards from the Balkan region of Europe to Turkey, the Caucasus region, Central Asia and the Levant. There are no major threats to this species at present, although legless lizards are sometimes killed as they are mistaken for snakes. Photograph © Roberto Sindaco.



Figure 1. Regional assessments were made for two areas – continental Europe and the EU 27



Sand Lizard *Lacerta agilis* (Least Concern). This species faces a number of threats including habitat loss through urbanization, conversion to intensive agricultural use (especially the loss of hedgerows and other suitable habitats), coastal and alpine tourism development and the loss of traditional forestry practices. Open habitats, which this species requires, are being overgrown with vegetation. It is a threatened species in much of the northwest of its range, including the United Kingdom, Scandinavia and northern Germany. Photograph © Roberto Sindaco.



2. Assessment Methodology

2.1 Global and regional assessment

The present study was an assessment of the global and regional conservation status of reptile species occurring in geographical Europe and the EU 27 (excluding the highly migratory and globally widespread marine turtles). Global assessments of reptile species not endemic to Europe will remain provisional, until the species is assessed across its entire range through the ongoing IUCN Global Reptile Assessment. In the case of tortoises and freshwater turtles, only populations in Europe were provisionally assessed, with data on populations and status both inside and outside the region still being compiled.

2.2 Geographic scope

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 globally and at two regional levels: 1) for geographical Europe (limits described above); and 2) for the area of the 27 Member States of the European Union.

2.3 Taxonomic scope

All terrestrial and freshwater reptile species native to Europe or naturalised in Europe before AD 1500 were included in the assessment. Species introduced to Europe by man after AD 1500 were considered by the assessment, but were classed as Not Applicable. Similarly, species that are of marginal occurrence in Europe were classed as Not Applicable. Reptile taxonomy largely follows the TIGR Reptile Database compiled by Peter Uetz and made available on the World Wide Web at: <http://www.reptile-database.org/>, although it departs from this in a few circumstances. For Testudines, the taxonomy presented by Fritz & Havas (2007) was followed. Distinct subpopulations and subspecies of reptiles within Europe were not individually assessed as part of this project.

2.4 Preliminary assessments

For every reptile species native to Europe or naturalised before 1500 A.D, the following data were compiled.

- Species' taxonomic classification
- Geographic range (including a distribution map)

- Red List Category and Criteria
- Population information
- Habitat preferences
- Major threats
- Conservation measures (in place, and needed)
- Species utilization
- Other general information
- Key literature references

These data were based on initial information gathered as part of the IUCN Global Reptile Assessment (IUCN, CI and NatureServe). Much of this previous material originated during an earlier review of the conservation status of reptiles and amphibians in the Mediterranean basin (Cox *et al.* 2006) and from the IUCN Global Reptile Assessment workshop for the non-Mediterranean Reptiles of the Western Palearctic, held at the 13th Societas Europea Herpetologica Congress in Bonn, 28th-30th September 2005. All species had their global status assessed according to the *2001 IUCN Red List Categories and Criteria: Version 3.1* (http://www.iucnredlist.org/info/categories_criteria2001).

Preliminary species summary reports, distribution maps and global assessments were distributed to all the participants before the workshop to allow them to review the data presented and prepare any changes to the data.

Assessments of the tortoises and freshwater turtles were based on information compiled by Peter Paul van Dijk of CI's Center for Applied Biodiversity Science as part of the earlier Mediterranean review. The provisional global and regional assessments were not reviewed at the workshop, but were provided by the pertinent Red List Authority (the IUCN Tortoise and Freshwater Turtle Specialist Group), and these evaluations must also be considered provisional at the time this report went to press.

2.5 Review workshop (2008) and evaluation of results

Expert herpetologists for Europe were invited to attend a five-day regional review workshop, held in conjunction with an IUCN review of reptile and amphibian species of the Wider Caucasus, at the Grida City Hotel in Antalya, Turkey in September 2008.

Focused working groups were organised to efficiently review identified geographical sets of species (e.g., Iberian reptiles). New information was added to the species summaries and maps, and corrections to existing data were made. Preliminary Red List Assessments for each species were then made at the global, European and EU 27 levels.

Facilitating staff from the IUCN Red List Unit and the IUCN/SSC-CI/CABS Biodiversity Assessment Unit 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. Following the review workshop, the data were edited, and outstanding questions were resolved through communications

with the workshop participants. The post-workshop draft assessments were also made available on an FTP site to allow the participating scientists to make any final edits and corrections.

The resulting finalised IUCN Red List assessments are a product of scientific consensus concerning species status and are backed by relevant literature and data sources.

Reviewing species assessments at the 2008 Reptiles and Amphibians workshop. Photograph © Ana Nieto



The European Pond Turtle *Emys orbicularis* is regarded as Near Threatened in Europe and Vulnerable in the EU as a result of significant long-term population declines. Habitat loss caused by urbanisation, road construction, wetland drainage, and overexploitation of water resources is responsible for the species' decline. The European Pond Turtle is sensitive to water pollution and is also vulnerable to competition for food, basking and nesting sites from the non-native terrapin *Trachemys scripta*, a species which has become widely established in Europe as a result of its popularity as a pet. Photograph © Roberto Sindaco.



3. Results

3.1 Threatened status of reptiles

The status of reptiles was assessed at two regional levels: geographical Europe, and the EU 27. At the European regional level, 19.4% of reptiles are threatened, with 4.3% Critically Endangered, 7.9% Endangered, and 7.1% Vulnerable. Within the EU 27 the pattern is similar: 21.1% of reptiles are threatened, with a similar breakdown between the three threatened categories (see Table 2 and Figures 2 and 3).

Overall, approximately one fifth of reptiles are considered threatened in Europe. A further 12.9% are considered Near

Threatened. By comparison, 22.9% of European amphibians, 15.2% of European mammals and 13% of European birds are threatened (BirdLife International 2004a, Temple & Terry 2007, Temple & Cox 2009). 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 27 level are listed in Table 3.

A further 17 reptile species were classed as Not Applicable, either because they were introduced after AD 1500 or are of marginal occurrence in the European region.

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

IUCN Red List categories	No. species Europe (no. endemic species)	No. species EU 27 (no. endemic species)
Extinct (EX)	0	0
Extinct in the Wild (EW)	0	0
Regionally Extinct (RE)	0	0
Threatened categories	Critically Endangered (CR)	6 (6)
	Endangered (EN)	11 (10)
	Vulnerable (VU)	10 (6)
Near Threatened (NT)	18 (13)	16 (10)
Least Concern (LC)	92 (36)	83 (26)
Data Deficient (DD)	2 (2)	2 (2)
Total number of species assessed*	139 (73)	128 (58)

*Excluding species that are considered Not Applicable.

Figure 2. Red List status of reptiles in Europe

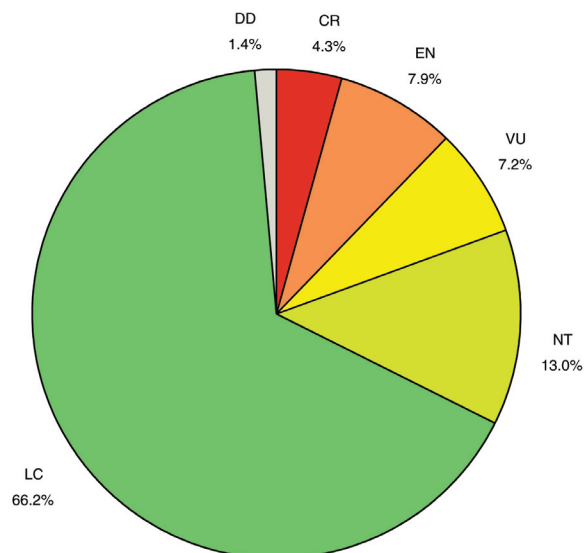


Figure 3. Red List status of reptiles in the EU 27

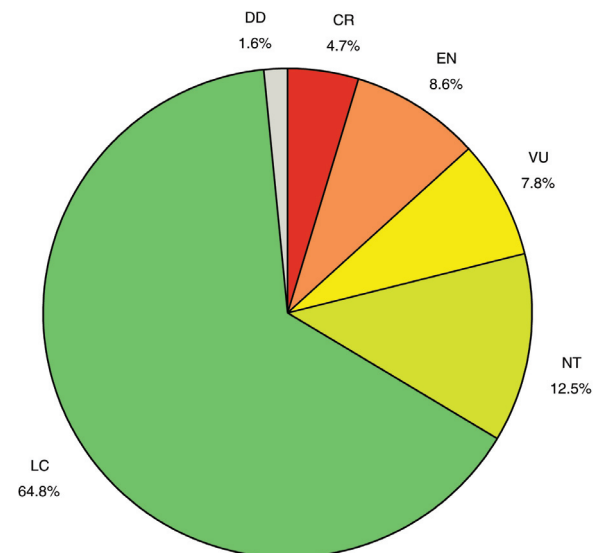


Table 3. Threatened reptile species at the European and EU 27 level¹. Most of the species listed below are endemic to Europe; those species not endemic to Europe are marked with an asterisk (*)

Family	Genus	Species	Common Name	Red List status	
				Europe	EU 27
LACERTIDAE	<i>Gallotia</i>	<i>auaritae</i>		CR	CR
LACERTIDAE	<i>Gallotia</i>	<i>bravoana</i>	La Gomera Giant Lizard	CR	CR
LACERTIDAE	<i>Gallotia</i>	<i>intermedia</i>	Tenerife Speckled Lizard	CR	CR
LACERTIDAE	<i>Gallotia</i>	<i>simonyi</i>	El Hierro Giant Lizard	CR	CR
LACERTIDAE	<i>Iberolacerta</i>	<i>martinezricai</i>	Batuecan Rock Lizard	CR	CR
LACERTIDAE	<i>Podarcis</i>	<i>raffonei</i>	Aeolian Wall Lizard	CR	CR
COLUBRIDAE	<i>Hierophis</i>	<i>cypriensis</i>	Cyprus Whip Snake	EN	EN
LACERTIDAE	<i>Acanthodactylus</i>	<i>schreiberi</i> *	Schreiber's Fringe-fingered Lizard	EN	EN
LACERTIDAE	<i>Algyroides</i>	<i>marchi</i>	Spanish Algyroides	EN	EN
LACERTIDAE	<i>Iberolacerta</i>	<i>aranica</i>	Aran Rock Lizard	EN	EN
LACERTIDAE	<i>Iberolacerta</i>	<i>aurelioi</i>	Aurelio's Rock Lizard	EN	EN
LACERTIDAE	<i>Iberolacerta</i>	<i>cyreni</i>	Carpetane rock lizard	EN	EN
LACERTIDAE	<i>Podarcis</i>	<i>carbonelli</i>	Carbonell's Wall Lizard	EN	EN
LACERTIDAE	<i>Podarcis</i>	<i>cretensis</i>	Cretan Wall Lizard	EN	EN
LACERTIDAE	<i>Podarcis</i>	<i>lilfordi</i>	Lilford's Wall Lizard	EN	EN
LACERTIDAE	<i>Macrovipera</i>	<i>schweizeri</i>	Milos Viper	EN	EN
SCINCIDAE	<i>Chalcides</i>	<i>simonyi</i>	Canarian Cylindrical Skink	EN	EN
GEOEMYDIDAE	<i>Mauremys</i>	<i>leprosa</i> *	Mediterranean Turtle	VU	VU
LACERTIDAE	<i>Dinarolacerta</i>	<i>mosorensis</i>	Mosor Rock Lizard	VU	NE
LACERTIDAE	<i>Iberolacerta</i>	<i>monticola</i>	Iberian Rock Lizard	VU	VU
LACERTIDAE	<i>Podarcis</i>	<i>gaigeae</i>	Skyros Wall Lizard	VU	VU
LACERTIDAE	<i>Podarcis</i>	<i>levendis</i>		VU	VU
LACERTIDAE	<i>Podarcis</i>	<i>milensis</i>	Milos Wall Lizard	VU	VU
TESTUDINIDAE	<i>Testudo</i>	<i>graeca</i> *	Spur-thighed Tortoise	VU	VU
VIPERIDAE	<i>Vipera</i>	<i>latastei</i> *	Lataste's Viper	VU	VU
VIPERIDAE	<i>Vipera</i>	<i>renardi</i> *	Eastern Steppe Viper	VU	NE
VIPERIDAE	<i>Vipera</i>	<i>ursinii</i>	Orsini's Viper	VU	VU
EMYDIDAE	<i>Emys</i>	<i>orbicularis</i> *	European Pond Turtle	NT	VU
LACERTIDAE	<i>Eremias</i>	<i>arguta</i> *	Steppe-runner	NT	VU

¹ Species listed as NE (Not Evaluated) in the EU 27 do not occur in the region.

Chalcides parallelus (Endangered). This species is found on the Chafarinas Archipelago (Spain), and also occurs along a narrow coastal strip in northeastern Morocco and northwestern Algeria. Development of coastal areas for tourism and military purposes are major threats to this species. Photograph © Roberto Sindaco.



Table 4. Red List Status (European Regional level) of reptiles by taxonomic family

Order	Family	Total*	CR	EN	VU	NT	LC	DD	% Threatened
Squamata	Agamidae	4	0	0	0	0	4	0	0
	Amphisbaenidae	1	0	0	0	0	1	0	0
	Anguidae	3	0	0	0	1	2	0	0
	Boidae	2	0	0	0	0	2	0	0
	Colubridae	27	0	1	0	2	23	1	3.7
	Gekkonidae	8	0	0	0	1	7	0	0
	Lacertidae	64	6	8	5	11	34	0	29.7
	Scincidae	12	0	1	0	1	10	0	8.3
	Typhlopidae	1	0	0	0	0	1	0	0
	Viperidae	10	0	1	3	0	6	0	40
Testudines	Emydidae	2	0	0	0	1	0	1	0
	Geoemydidae	2	0	0	1	0	1	0	50
	Testudinidae	3	0	0	1	1	1	0	33.3
Total		139	6	11	10	18	92	2	19.4

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

3.2 Status by taxonomic group

European reptiles belong to a number of different families (see Section 1.2), among which considerable differences exist both in species numbers as well as in threatened status (Table 4). The reptile families Viperidae (vipers), Lacertidae (wall lizards), Geoemydidae (pond turtles) and Testudinidae (tortoises) show particularly high levels of threat.

3.3 Spatial distribution of species

3.3.1 Species richness

Information on the species richness of reptiles within orders and families has already been given in Section 1.2 and Table 1. The geographic distribution of species richness in Europe is presented in Figure 4.

For reptiles, there is a clear gradient of increasing species richness from north to south, with the greatest richness being found in the Balkan peninsula. The glacial refugia of the Iberian, Italian and Balkan peninsulas are all important centres of diversity, as are a number of Mediterranean islands.

The top five EU countries in terms of reptile species richness are (in descending order): Spain, Greece, Italy, France and Bulgaria (see Table 5).

Table 5. Number of reptile species in the 27 current EU member states (excluding species classed as Not Applicable)

Country	Total number of species
Austria	15
Belgium	8
Bulgaria	33
Cyprus	24
Czech Republic	11
Denmark	7
Estonia	6
Finland	5
France	38
Germany	14
Greece	55
Hungary	16
Ireland	1
Italy	50
Latvia	7
Lithuania	7
Luxembourg	7
Malta	7
Netherlands	7
Poland	9
Portugal	30
Romania	24
Slovakia	12
Slovenia	25
Spain	65
Sweden	6
United Kingdom	8

Figure 4. Species richness of European reptiles

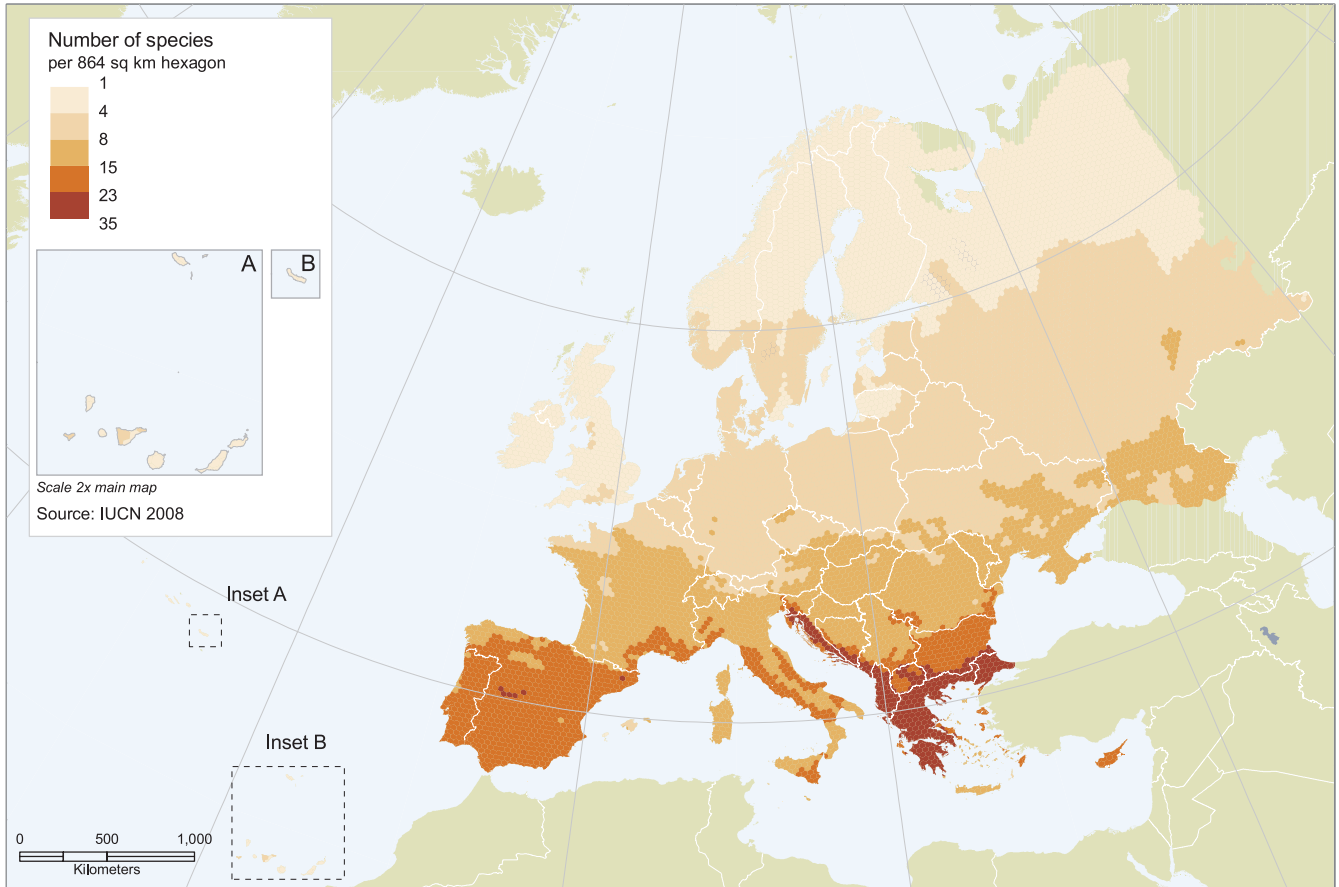
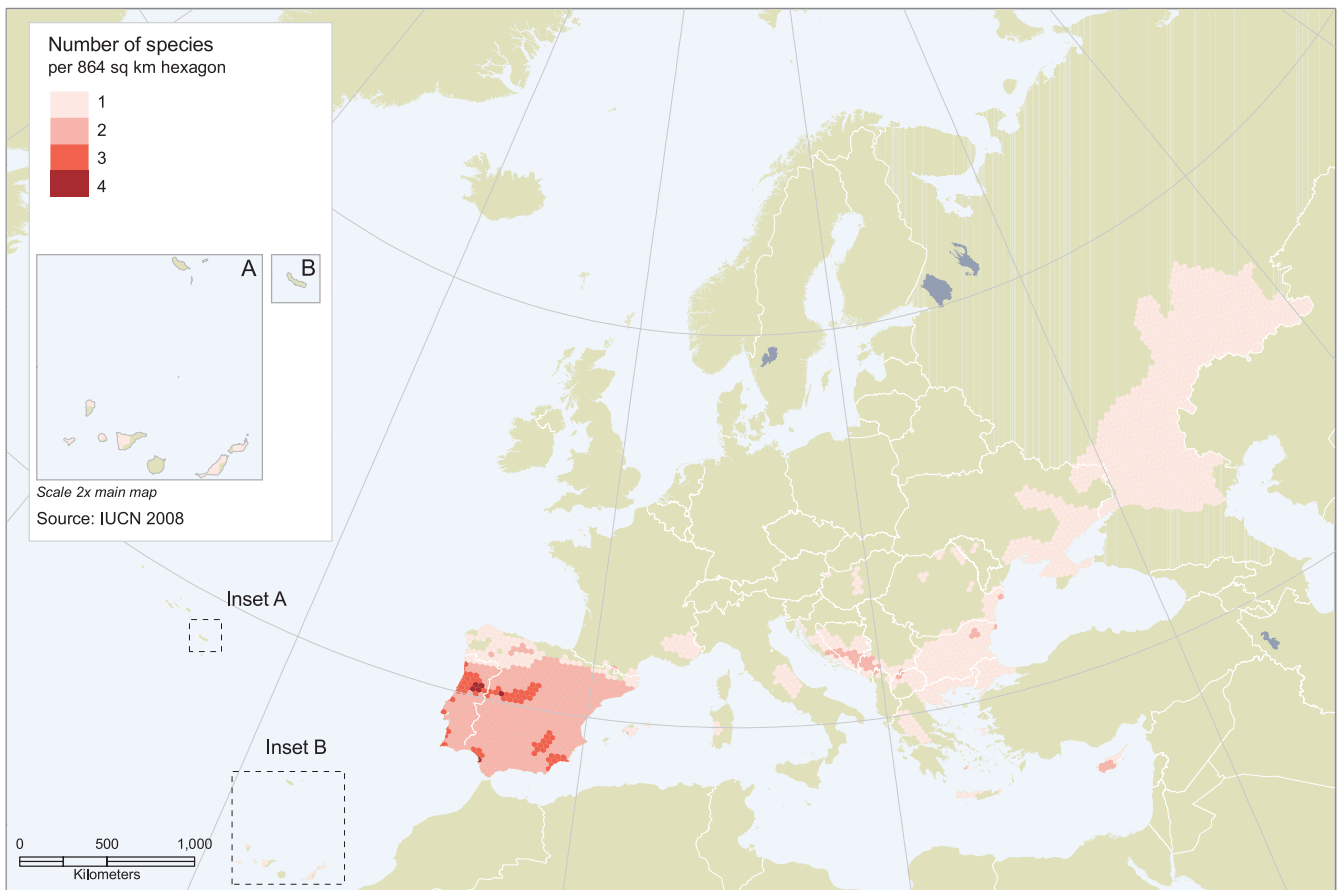


Figure 5. Distribution of threatened reptiles in Europe



3.3.2 Distribution of threatened species

The distribution of threatened reptiles in Europe (Figure 5) reveals somewhat different patterns from depictions of overall species diversity. The greatest concentration of threatened species is found in the Iberian peninsula, with the Balkans and Cyprus also highlighted as having a high number of threatened species.

3.3.3 Endemic species richness

Figure 6 shows the distribution of endemic reptile species (e.g., those that are unique to Europe and are found nowhere else in the world). Reptiles show high endemic species richness in the Iberian peninsula. The Balkans also show an important concentration of endemism. The Mediterranean islands and Macaronesian islands have many range-restricted endemic reptiles, although these regions do not show up on the endemic species richness maps because typically each particular island will only have one or a few endemic species.

3.4 Major threats to reptiles 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 7.

Habitat loss, fragmentation and degradation have by far the largest impact on both threatened and non-threatened reptiles, affecting 22 of the 27 threatened species, and 98 species in total. The number of species impacted by habitat loss and degradation is nearly three times greater than the number impacted by the next most common threats: harvesting, deliberate persecution, and pollution (which here also includes global climate change caused by greenhouse gas emissions).

Information has not been collected during the assessment process 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 species.

Grass Snake *Natrix natrix* (Least Concern). This species ranges throughout most of Europe, being absent only from Ireland, northern Scandinavia, southeastern Spain, the Balearic Islands (Spain) and Crete (Greece). Photograph © Roberto Sindaco.



Figure 6. Distribution of endemic reptiles in Europe

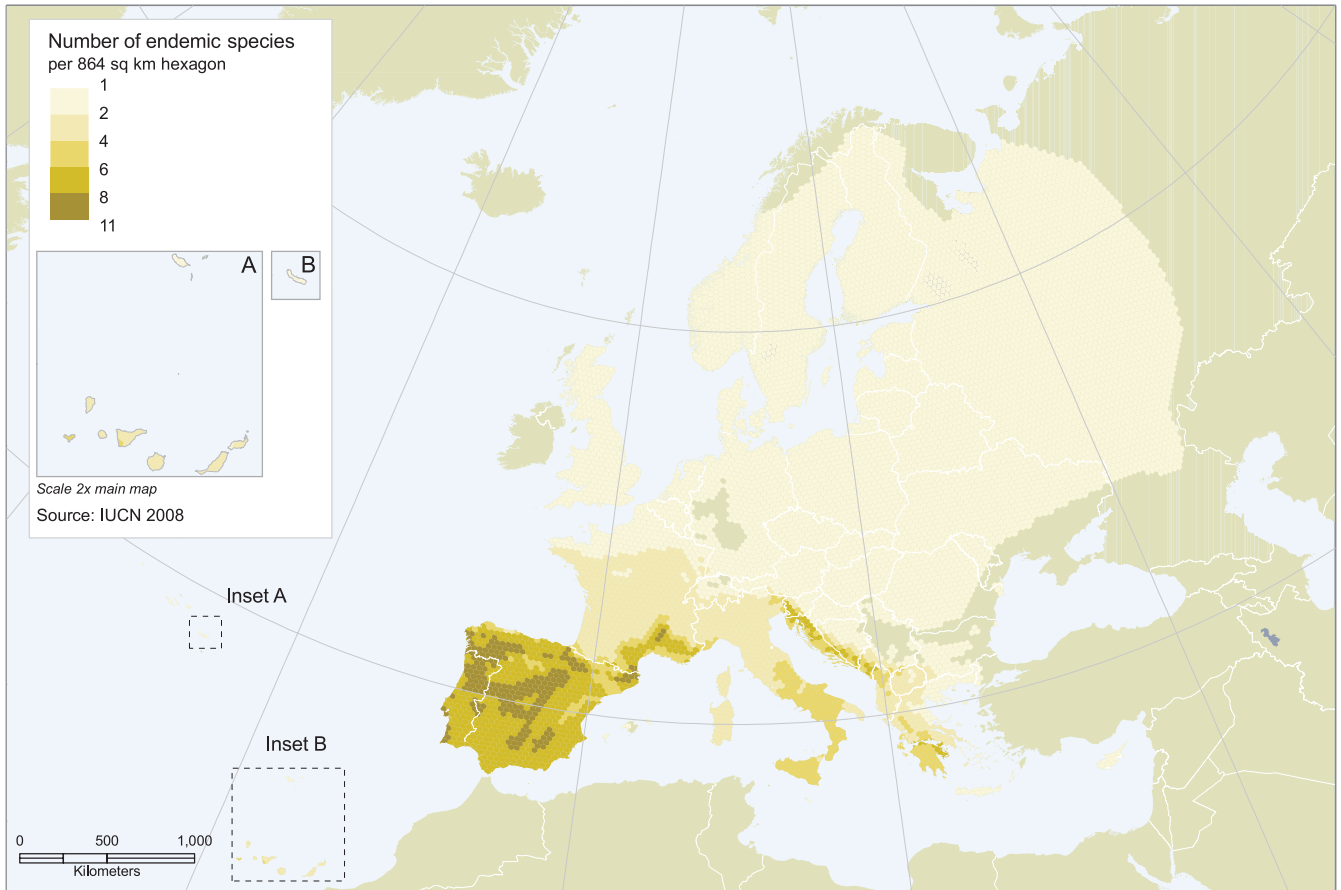
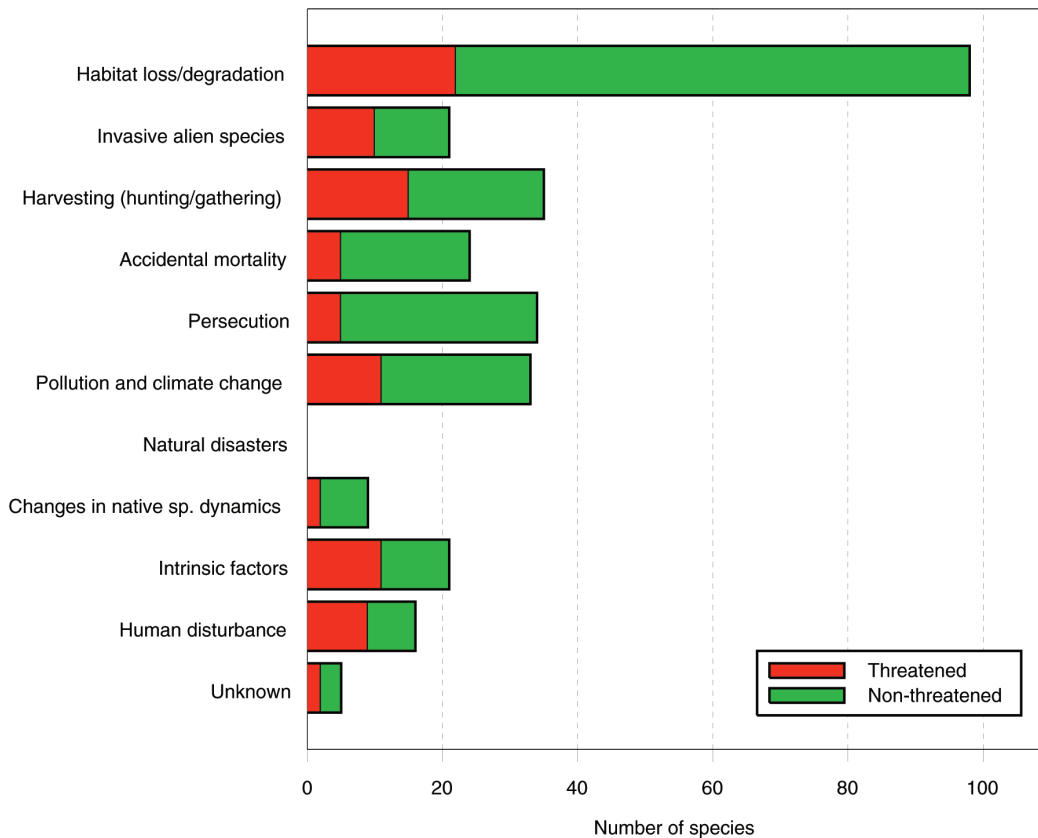


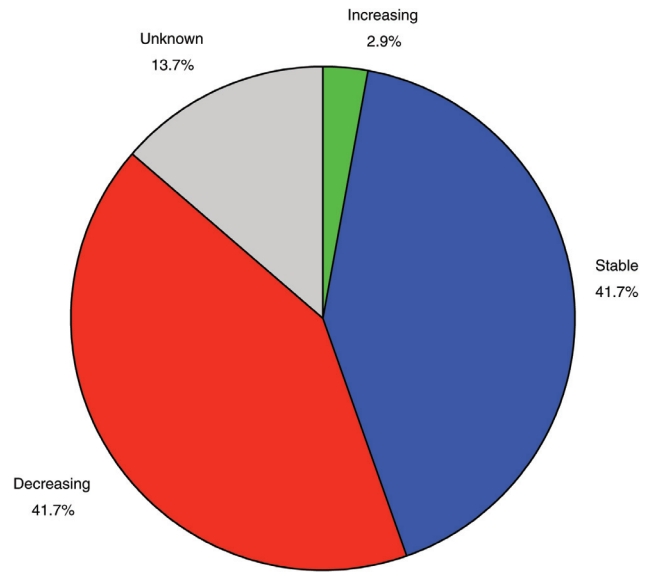
Figure 7. Major threats to reptiles in Europe



3.5 Demographic trends

Documenting population trends is a key to assessing species status, and a special effort was made to determine which species are believed to be declining, stable, or increasing. More than two-fifths (42%) of species are declining and the same percentage is stable; only 3% have an increasing population trend (Figure 8).

Figure 8. Population trends of European reptiles



Mediterranean Chamaeleon *Chamaeleo chamaeleon* (Not Applicable). As this species is introduced rather than a native species in almost all parts of its European range, it is classed as Not Applicable on the European Red List. Photograph © Roberto Sindaco.



4. Discussion

4.1 Status and population trends of European reptiles

The status of reptiles was assessed at two regional levels: geographical Europe, and the EU 27. At the European regional level, 19.4% of reptiles are threatened, with 4.3% Critically Endangered, 7.9% Endangered, and 7.1% Vulnerable. Within the EU 27 the pattern is similar: 21.1% of reptiles are threatened, with a similar breakdown between the three threatened categories (see Table 2 and Figures 2 and 3).

Birds, mammals and amphibians are the only other taxonomic groups to have been assessed at both the European and the EU³ level. In the case of birds, conservation status (*sensu* the Habitats Directive; see Section 4.6 for a definition) was assessed for all European and EU 25 species, with species divided into “Favourable” and “Unfavourable” categories (BirdLife International 2004b). A higher proportion of bird species have Unfavourable conservation status at the EU level than at the pan-European level: almost half (48%) of the EU’s 448 species were assessed as having Unfavourable conservation status, whereas only 43% of 524 European species had Unfavourable conservation status. In the case of mammals and amphibians, assessments were carried out according to IUCN Red List methodology. By contrast, mammals and amphibians showed similar levels of threat at the European and EU scale: 14% of mammal species were threatened in each case (Temple & Terry 2007); and 22% of European amphibians versus 23% of EU amphibians were threatened (Temple & Cox 2009).

Overall, approximately one fifth of reptiles are considered threatened in Europe. By comparison, 22.9% of amphibians, 15.2% of European mammals and 13% of European birds are threatened (BirdLife International 2004a; Temple & Terry 2007, 2009; Temple & Cox 2009). No other groups have yet been comprehensively assessed at the European level according to IUCN regional Red List guidelines.

The majority of threatened and Near Threatened reptile species are endemic to both Europe and the EU, highlighting the responsibility that European countries have to protect the entire global populations of these species. All Critically Endangered species and the vast majority of Endangered and Vulnerable species are endemic to both Europe and the EU.

The assessment showed that more than two fifths (42%) of reptile species are declining and the same percentage is stable; only 3% have an increasing population trend. This means that a higher proportion of reptiles are declining than is known to

be the case for mammals and birds. Just over a quarter (27%) of European mammals have declining populations, although this may be an underestimate as a further third (33%) have an unknown population trend (Temple & Terry 2007, 2009). Similarly, just under a quarter (23%) of European birds are decreasing in number, based on population trends between 1990 and 2000 (BirdLife International 2004a). The only group known to have a higher proportion of declining species is amphibians, with over half (59%) of species in decline (Temple & Cox 2009).

BirdLife International’s analysis of population trends in European birds was based on quantitative 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 only a tiny minority of reptile 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. Better monitoring of reptile populations in Europe is urgently needed, especially for threatened, Near Threatened and Data Deficient species.

4.2 Major threats to European reptiles

Habitat loss, degradation and fragmentation represent the greatest threats to European reptiles. Agricultural intensification, urban sprawl and infrastructure development are key drivers of habitat loss, and afforestation is also a problem – plantations are very low-quality habitat for reptiles. As ectothermic species reptiles are often dependent on habitats with open areas, where the sun reaches the ground – agricultural abandonment and decline of traditional cultivation and animal husbandry, which leads to vegetation succession and the replacement of open habitats with bushes and trees, is a serious problem for reptiles in many parts of Europe. Again, the fragmentation of existing habitat and the abandonment of traditional agricultural practices and contingent loss of mosaic landscapes are resulting in population declines and even local extinctions in a number of European reptile species.

Invasive alien species are not a problem for reptiles to the same degree as they are for some other European species (e.g. amphibians: Temple & Cox 2009), although predation by feral cats and habitat destruction by feral goats is a major threat to some island species and populations. However, the introduced Common Raccoon *Procyon lotor* should be monitored as

³ The European bird and mammal assessments were carried out prior to the accession of Romania and Bulgaria in 2007, so both of these assessments covered the EU 25 only.

a potential emerging threat to European reptiles – in the Caucasus predation by the raccoon is now considered to be a major threat and is causing serious declines in reptile species (to the point where some Caucasus reptiles have been uplisted by one or even two categories to a higher level of threat according to IUCN Red List criteria). Changes in native species dynamics are having a negative impact on some reptile populations – in parts of Europe, populations of predators such as the Red Fox *Vulpes vulpes*, the Wild Boar *Sus scrofa* and crows have increased and are putting additional pressure on threatened reptile species.

4.3 Protection of habitats and species in Europe

European countries and EU member states are signatories to a number of important conventions aimed at conserving biodiversity that are particularly relevant to reptiles, including the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats, the 1991 Convention on the Protection of the Alps and, most importantly, the 1992 Convention on Biological Diversity. The international trade in a small number of European reptile species is regulated under the Convention on International Trade in Endangered Species (CITES). All European countries and many lower administrative units (states, provinces, etc.) have some form of protective species legislation.

The Bern Convention is a binding international legal instrument that aims to conserve wild flora and fauna and their natural habitats and to promote European co-operation towards that objective. It covers all European countries and some African states. Considerable work has been undertaken within the Convention for the protection of reptile species. In addition to numerous workshops and seminars, the Convention has adopted recommendations and developed Action Plans for certain species (e.g., *Zamensis longissimus*, *Vipera ursinii*, *Lacerta agilis*; see Edgar & Bird 2007a,b,c).

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 reptile species show long term declines, with a proportion of threatened species that exceeds levels identified for European birds and mammals (BirdLife International 2004a, Temple & Terry 2007). This suggests that it is unlikely that the goal of halting biodiversity loss by 2010 will be met.

4.4 Protection of habitats and species in the EU

EU nature conservation policy is based on two main pieces of legislation - the Birds Directive⁴ and the Habitats Directive⁵. The main aim of this nature conservation policy is to ensure the favourable conservation status (see Box 1) 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 is 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 conservation policy. The Natura 2000 network has grown over the last 25 years and now includes more than 26,000 protected areas in all Member States combined, with a total area of around 850,000 km² – more than 20% of total EU territory⁶.

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; Annex IV species are subject to a strict protection system. Table 6 shows those species identified as threatened by the assessment and their inclusion in the protected species Annexes of the Habitats Directive and Appendix II of the Bern Convention (all reptile species that are not listed on Appendix II of the Bern Convention are automatically listed on Appendix III).

The majority of threatened species are listed on the Habitats Directive Annexes II and/or IV but there are a few exceptions, listed here. *Gallotia intermedia* is endemic to the island of Tenerife in the Canary Islands (to Spain). It was discovered in 1996 and is known only from two tiny areas in the extreme west and extreme south of the island. *Iberolacerta aurelioii* is endemic to the Pyrenees Mountains and was again relatively recently described. *Podarcis carbonelli* is endemic to the Iberian peninsula and was only recognized as a species in AD 2000 (it was previously regarded as a subspecies of *P. bocagei*). *Vipera latastei* ranges from northern Morocco to northern Algeria, and extreme northwestern Tunisia in North Africa, and it is also present on the Iberian Peninsula where it has a fragmented population in both Portugal and Spain. *Eremias arguta* only occurs in Romania within the European Union; its range extends eastwards from there through eastern Europe, central Asia and the Caucasus to China and Mongolia.

⁴ Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds

⁵ Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna

⁶ Source: http://ec.europa.eu/environment/nature/index_en.htm, downloaded February 2009.

Table 6. The threatened reptile taxa identified by the assessment and their presence on either Annexes II and IV of the Habitats Directive or Appendix II of the Bern Convention. All reptiles not listed on Appendix II of the Bern Convention are automatically listed on Appendix III. An asterisk (*) indicates that the species is a priority species for the Habitats Directive

Genus	Species	Red List status		Habitats Directive Annexes	Bern Convention Appendices
		Europe	EU 27		
<i>Gallotia</i>	<i>auaritae</i>	CR	CR	II*/IV ¹	II ¹
<i>Gallotia</i>	<i>bravoana</i>	CR	CR	II*/IV ¹	II ¹
<i>Gallotia</i>	<i>intermedia</i>	CR	CR		
<i>Gallotia</i>	<i>simonyi</i>	CR	CR	II*/IV	II
<i>Iberolacerta</i>	<i>martinezricai</i>	CR	CR	II/IV ²	II ³
<i>Podarcis</i>	<i>raffonei</i>	CR	CR	IV ¹²	
<i>Hierophis</i>	<i>cypriensis</i>	EN	EN	II*/IV ⁴	II ⁴
<i>Acanthodactylus</i>	<i>schreiberi</i>	EN	EN	II/IV ⁵	II ⁵
<i>Algyroides</i>	<i>marchi</i>	EN	EN	IV	II
<i>Iberolacerta</i>	<i>aranica</i>	EN	EN	II/IV ⁶	
<i>Iberolacerta</i>	<i>aurelioi</i>	EN	EN		
<i>Iberolacerta</i>	<i>cyreni</i>	EN	EN	II/IV ²	II ³
<i>Podarcis</i>	<i>carbonelli</i>	EN	EN		
<i>Podarcis</i>	<i>cretensis</i>	EN	EN	IV ⁷	II ⁷
<i>Podarcis</i>	<i>lilfordi</i>	EN	EN	II/IV	II
<i>Macrovipera</i>	<i>schweizeri</i>	EN	EN	II*/IV	II ⁸
<i>Chalcides</i>	<i>simonyi</i>	EN	EN	II/IV	II
<i>Mauremys</i>	<i>leprosa</i>	VU	VU	II/IV	II ⁹
<i>Dinarolacerta</i>	<i>mosorensis</i>	VU	Not present	n/a	
<i>Iberolacerta</i>	<i>monticola</i>	VU	VU	II/IV ²	II ³
<i>Podarcis</i>	<i>gaigeae</i>	VU	VU	IV ¹⁰	II ¹⁰
<i>Podarcis</i>	<i>levendis</i>	VU	VU	IV ⁷	II ⁷
<i>Podarcis</i>	<i>milensis</i>	VU	VU	IV	II
<i>Testudo</i>	<i>graeca</i>	VU	VU	II/IV	II
<i>Vipera</i>	<i>latastei</i>	VU	VU		II
<i>Vipera</i>	<i>renardi</i>	VU	Not present	n/a	
<i>Vipera</i>	<i>ursinii</i>	VU	VU	II/IV ¹¹	II
<i>Emys</i>	<i>orbicularis</i>	NT	VU	II/IV	II
<i>Eremias</i>	<i>arguta</i>	NT	VU		

¹ As part of *Gallotia simonyi*.

² As part of *Lacerta monticola*.

³ As part of *Archaeolacerta monticola*.

⁴ As *Coluber cypriensis*.

⁵ As *Lacerta schreiberi*.

⁶ As part of *Lacerta bonnali*.

⁷ As part of *Podarcis erhardii*.

⁸ As part of *Vipera lebetina*.

⁹ As part of *Mauremys caspica*.

¹⁰ As part of *Podarcis taurica*.

¹¹ Except *Vipera ursinii rakosiensis*.

¹² As part of *Podarcis siculus/P. waglerianus*.

4.5 Conservation management of reptiles in the EU

LIFE is the EU's financial instrument supporting environmental and nature conservation projects throughout the EU as well as in some candidate, acceding and neighbouring countries. Since 1992, LIFE has co-financed over 2,700 projects with a total budget of approximately €1.35 billion. LIFE supports the implementation of the Birds and Habitats Directives and the establishment of 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 project database that lists all past and current LIFE projects, 40 projects link their actions to reptile conservation and 18 target specific species. Table 7 shows the taxonomic breakdown of these projects. Examples of actions taken within these projects include habitat restoration, habitat conservation and re-introductions.

Table 7. The number of LIFE projects targeted either towards specific species or broader taxonomic groups. This review is based on a search for reptile species on the LIFE database <http://ec.europa.eu/environment/life/project/Projects/index.cfm> which identified 40 projects. Some projects target more than one species. Species based projects were not included in the count for taxonomic group projects. Most of the 40 projects were focused at the habitat or site level rather than on particular species

Species	Projects
La Gomera Giant Lizard <i>Gallotia bravoana</i>	2
El Hierro Giant Lizard <i>Gallotia simonyi</i>	2
<i>Vipera ursinii</i>	4
<i>Caretta caretta</i>	8
<i>Emys orbicularis</i>	2
Taxonomic Group	
Turtles	1
Habitat	
Habitats and sites for reptile species	25

4.6 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 1). No species meeting the IUCN Red List Criteria for one of the threatened

categories 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 3 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). 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 (BirdLife International 2004a). 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 reptile species remain widely distributed in Europe, although their populations and ranges have suffered significant long-term decline as a result of habitat loss and degradation in conjunction with other threats (see Sections 3.4 and 3.5). The European Red List has highlighted the fact that more than two fifths of reptiles (42%) have declining populations (see Figure 8). Many of 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. Nevertheless, although many of these species would be categorised as Least Concern, those showing significant long-term decline could not be regarded as having Favourable conservation status.

Box 1. 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.



4.7 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 conservation priorities. The purpose of the Red List categorization is to produce a relative estimate of the likelihood of extinction of 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.

5. Conclusions

5.1 Application of project outputs

The reptiles data set, a summary of which is presented here, is part of a wider European assessment that also covers other species groups including mammals (Temple & Terry 2007), amphibians (Temple & Cox 2009), freshwater fishes, butterflies, dragonflies, and selected beetles, molluscs, and plants. In conjunction with data compiled on European birds by BirdLife International (BirdLife International 2004a,b), it provides a key resource for conservationists, policymakers, and environmental planners throughout the region. By making this data widely and freely available, we aim to stimulate and support research, monitoring and conservation action at local, regional, and international levels.

The outputs from this project can be applied at the regional scale to prioritise sites and species to include in regional research and monitoring 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 update of the IUCN global Red List (www.iucnredlist.org). The large amount of data collected during the assessment process (available online at <http://ec.europa.eu/environment/nature/conservation/species/redlist> and <http://www.iucnredlist.org/europe>) can be used for further analyses to give deeper insights into the conservation needs of European species and the impacts on their populations of land-use policies and natural resource use.

5.2 Future work

Through the process of compiling reptile data for the European Red List a number of knowledge gaps have been identified. Across Europe there are significant geographic, geopolitical and taxonomic biases in the quality of data available on the distribution and status of species. Few European countries have any kind of organised and systematic monitoring for reptile species, even though monitoring of reptile species of European interest is now a statutory responsibility under EU legislation. National reptile population monitoring schemes have been initiated in some EU Member States, for example in the Netherlands (since 1964) and the United Kingdom, but in a number of countries of the EU even basic data on species distribution and population status are limited. 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.

A challenge for the future is to improve monitoring and the quality of data, so that the information and analyses presented here and on the European Red List website can be updated

and improved, and conservation action can be given as solid a scientific basis as possible. If the reptile assessments are periodically updated, they will enable the changing status of these species to be tracked through time via the production of a Red List Index (Butchart *et al.* 2004, 2005, 2006, 2007). To date, this indicator has been produced for birds at the European regional level and has been adopted as one of the headline biodiversity indicators to monitor progress towards halting biodiversity loss in Europe by 2010 (European Environment Agency 2007). By regularly updating the data presented here we will be able to track the changing fate of European reptiles to 2010 and beyond.

Balkan Green Lizard *Lacerta trilineata* (Least Concern). Photograph © Roberto Sindaco.



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Appendix 1. Red List status of European reptiles

Order	Family	Species	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 27)	IUCN Red List Criteria (EU 27)	Endemic to Europe?	Endemic to EU 27?
SQUAMATA	AGAMIDAE	<i>Laudakia stellio</i>	LC		LC			
SQUAMATA	AGAMIDAE	<i>Phrynocephalus guttatus</i>	LC		NE			
SQUAMATA	AGAMIDAE	<i>Phrynocephalus helioscopus</i>	LC		NE			
SQUAMATA	AGAMIDAE	<i>Phrynocephalus mystaceus</i>	LC		NE			
SQUAMATA	AMPHISBAENIDAE	<i>Blanus cinereus</i>	LC		LC		Yes	Yes
SQUAMATA	AMPHISBAENIDAE	<i>Blanus strauchi</i>	NA		NA			
SQUAMATA	ANGUIDAE	<i>Anguis cephalonica</i>	NT		NT		Yes	Yes
SQUAMATA	ANGUIDAE	<i>Anguis fragilis</i>	LC		LC			
SQUAMATA	ANGUIDAE	<i>Pseudopus apodus</i>	LC		LC			
SQUAMATA	BOIDAE	<i>Eryx jaculus</i>	LC		LC			
SQUAMATA	BOIDAE	<i>Eryx miliaris</i>	LC		NE			
SQUAMATA	CHAMAELEONIDAE	<i>Chamaeleo africanus</i>	NA		NA			
SQUAMATA	CHAMAELEONIDAE	<i>Chamaeleo chamaeleon</i>	NA		NA			
SQUAMATA	COLUBRIDAE	<i>Coronella austriaca</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Coronella girondica</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Dolichophis caspius</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Dolichophis jugularis</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Eirenis modestus</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Elaphe dione</i>	LC		NE			
SQUAMATA	COLUBRIDAE	<i>Elaphe quatuorlineata</i>	NT		NT		Yes	
SQUAMATA	COLUBRIDAE	<i>Elaphe sauromates</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Hemorrhois hippocrepis</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Hemorrhois nummifer</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Hemorrhois ravergieri</i>	NA		NA			
SQUAMATA	COLUBRIDAE	<i>Hierophis cypriensis</i>	EN	B1ab(iii)	EN	B1ab(iii)	Yes	Yes
SQUAMATA	COLUBRIDAE	<i>Hierophis gemonensis</i>	LC		LC		Yes	
SQUAMATA	COLUBRIDAE	<i>Hierophis viridiflavus</i>	LC		LC		Yes	
SQUAMATA	COLUBRIDAE	<i>Macroprotodon brevis</i>	NT		NT			
SQUAMATA	COLUBRIDAE	<i>Macroprotodon cucullatus</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Malpolon insignitus</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Malpolon monspessulanus</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Natrix maura</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Natrix natrix</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Natrix tessellata</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Platyceps collaris</i>	LC		NA			
SQUAMATA	COLUBRIDAE	<i>Platyceps najadum</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Rhinechis scalaris</i>	LC		LC		Yes	Yes
SQUAMATA	COLUBRIDAE	<i>Telescopus fallax</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Zamenis hobenackeri</i>	NE		NE			
SQUAMATA	COLUBRIDAE	<i>Zamenis lineatus</i>	DD		DD		Yes	Yes
SQUAMATA	COLUBRIDAE	<i>Zamenis longissimus</i>	LC		LC			
SQUAMATA	COLUBRIDAE	<i>Zamenis situla</i>	LC		LC			
SQUAMATA	GEKKONIDAE	<i>Alsophylax pipiens</i>	NA		NE			
SQUAMATA	GEKKONIDAE	<i>Cyrtopodion caspius</i>	NA		NE			
SQUAMATA	GEKKONIDAE	<i>Cyrtopodion kotschyi</i>	LC		LC			
SQUAMATA	GEKKONIDAE	<i>Euleptes europaea</i>	NT		NT			
SQUAMATA	GEKKONIDAE	<i>Hemidactylus turcicus</i>	LC		LC			
SQUAMATA	GEKKONIDAE	<i>Saurodactylus mauritanicus</i>	NA		NA			
SQUAMATA	GEKKONIDAE	<i>Tarentola angustimentalis</i>	LC		LC		Yes	Yes
SQUAMATA	GEKKONIDAE	<i>Tarentola boettgeri</i>	LC		LC		Yes	Yes

Order	Family	Species	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 27)	IUCN Red List Criteria (EU 27)	Endemic to Europe?	Endemic to EU 27?
SQUAMATA	GEKKONIDAE	<i>Tarentola delalandii</i>	LC		LC		Yes	Yes
SQUAMATA	GEKKONIDAE	<i>Tarentola gomerensis</i>	LC		LC		Yes	Yes
SQUAMATA	GEKKONIDAE	<i>Tarentola mauritanica</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Acanthodactylus erythrurus</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Acanthodactylus schreiberi</i>	EN	B2ab (i,ii,iii,iv)	EN	B2ab (i,ii,iii,iv)		
SQUAMATA	LACERTIDAE	<i>Algyroides fitzingeri</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Algyroides marchi</i>	EN	B1ab(iii,iv) +2ab(iii,iv)	EN	B1ab(iii,iv) +2ab(iii,iv)	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Algyroides moreoticus</i>	NT		NT		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Algyroides nigropunctatus</i>	LC		LC		Yes	
SQUAMATA	LACERTIDAE	<i>Anatololacerta anatolica</i>	NA		NA			
SQUAMATA	LACERTIDAE	<i>Anatololacerta oertzeni</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Archaeolacerta bedriagae</i>	NT		NT		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Dalmatolacerta oxycephala</i>	LC		NE		Yes	
SQUAMATA	LACERTIDAE	<i>Darevskia praticola</i>	NT		NT			
SQUAMATA	LACERTIDAE	<i>Dinarolacerta mosorensis</i>	VU	B2ab(iii)	NE	B2ab(iii)	Yes	
SQUAMATA	LACERTIDAE	<i>Eremias arguta</i>	NT		VU	B2ab(iii)		
SQUAMATA	LACERTIDAE	<i>Eremias velox</i>	LC		NE			
SQUAMATA	LACERTIDAE	<i>Gallotia atlantica</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Gallotia avaritae</i>	CR	D	CR	D	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Gallotia bravoana</i>	CR	D	CR	D	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Gallotia caesaris</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Gallotia galloti</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Gallotia intermedia</i>	CR	B1ab(v) +2ab(v)	CR	B1ab(v) +2ab(v)	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Gallotia simonyi</i>	CR	B1ab(v) +2ab(v)	CR	B1ab(v) +2ab(v)	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Gallotia stehlini</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Hellenolacerta gnaeca</i>	NT		NT		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Iberolacerta aranica</i>	EN	B1ab(iii)	EN	B1ab(iii)	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Iberolacerta aurelioi</i>	EN		EN		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Iberolacerta bonnali</i>	NT		NT		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Iberolacerta cyreni</i>	EN	B1ab(iii)	EN	B1ab(iii)	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Iberolacerta galani</i>	NT		NT		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Iberolacerta horvathi</i>	NT		NT		Yes	
SQUAMATA	LACERTIDAE	<i>Iberolacerta martinzeirica</i>	CR	B2ab(v); C2a(ii)	CR	B2ab(v); C2a(ii)	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Iberolacerta monticola</i>	VU	B1ab(iii)	VU	B1ab(iii)	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Lacerta agilis</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Lacerta bilineata</i>	LC		LC		Yes	
SQUAMATA	LACERTIDAE	<i>Lacerta schreiberi</i>	NT		NT		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Lacerta strigata</i>	LC		NE			
SQUAMATA	LACERTIDAE	<i>Lacerta trilineata</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Lacerta viridis</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Ophisops elegans</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Phoenicolacerta troodica</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis bocagei</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis carbonelli</i>	EN	B1ab (i,ii,iii,iv,v)	EN	B1ab (i,ii,iii,iv,v)	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis cretensis</i>	EN	B1ab(iii)	EN	B1ab(iii)	Yes	Yes

Order	Family	Species	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 27)	IUCN Red List Criteria (EU 27)	Endemic to Europe?	Endemic to EU 27?
SQUAMATA	LACERTIDAE	<i>Podarcis erhardii</i>	LC		LC		Yes	
SQUAMATA	LACERTIDAE	<i>Podarcis filfolensis</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis gaigeae</i>	VU	D2	VU	D2	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis hispanicus</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis levendis</i>	VU	D2	VU	D2	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis lilfordi</i>	EN	B1ab(ii) +2ab(iii)	EN	B1ab(ii) +2ab(iii)	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis melisellensis</i>	LC		LC		Yes	
SQUAMATA	LACERTIDAE	<i>Podarcis milensis</i>	VU	D2	VU	D2	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis muralis</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Podarcis peloponnesiacus</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis pityusensis</i>	NT		NT		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis raffonei</i>	CR	B1ab(v) +2ab(v)	CR	B1ab(v) +2ab(v)	Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis siculus</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Podarcis tauricus</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Podarcis tiliguerta</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Podarcis vaucheri</i>	LC		LC			
SQUAMATA	LACERTIDAE	<i>Podarcis waglerianus</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Psammotromus blanci</i>	NE		NA			
SQUAMATA	LACERTIDAE	<i>Psammotromus hispanicus</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Psammotromus jeanneae</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Psammotromus manuelae</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Scelarcis perspicillata</i>	NA		NA			
SQUAMATA	LACERTIDAE	<i>Teira dugesii</i>	LC		LC		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Timon lepidus</i>	NT		NT		Yes	Yes
SQUAMATA	LACERTIDAE	<i>Timon tangitanus</i>	NE		NA			
SQUAMATA	LACERTIDAE	<i>Zootoca vivipara</i>	LC		LC			
SQUAMATA	SCINCIDAE	<i>Ablepharus budaki</i>	LC		LC			
SQUAMATA	SCINCIDAE	<i>Ablepharus kitaibelii</i>	LC		LC			
SQUAMATA	SCINCIDAE	<i>Chalcides bedriagai</i>	NT		NT		Yes	Yes
SQUAMATA	SCINCIDAE	<i>Chalcides chalcides</i>	LC		LC			
SQUAMATA	SCINCIDAE	<i>Chalcides ocellatus</i>	LC		LC			
SQUAMATA	SCINCIDAE	<i>Chalcides parallelus</i>	NA		NA			
SQUAMATA	SCINCIDAE	<i>Chalcides sexlineatus</i>	LC		LC		Yes	Yes
SQUAMATA	SCINCIDAE	<i>Chalcides simonyi</i>	EN	B1ab(iii)	EN	B1ab(iii)	Yes	Yes
SQUAMATA	SCINCIDAE	<i>Chalcides striatus</i>	LC		LC		Yes	Yes
SQUAMATA	SCINCIDAE	<i>Chalcides viridanus</i>	LC		LC		Yes	Yes
SQUAMATA	SCINCIDAE	<i>Eumeces schneideri</i>	LC		LC			
SQUAMATA	SCINCIDAE	<i>Ophiomorus punctatissimus</i>	LC		LC			
SQUAMATA	SCINCIDAE	<i>Trachylepis aurata</i>	NA		NA			
SQUAMATA	SCINCIDAE	<i>Trachylepis vittata</i>	LC		LC			
SQUAMATA	TROGONOPHIDAE	<i>Trogonophis wiegmanni</i>	NE		NA			
SQUAMATA	TYPHLOPIDAE	<i>Typhlops vermicularis</i>	LC		LC			
SQUAMATA	VIPERIDAE	<i>Gloydius halys</i>	NA		NE			
SQUAMATA	VIPERIDAE	<i>Macrovipera lebetina</i>	LC		LC			
SQUAMATA	VIPERIDAE	<i>Macrovipera schweizeri</i>	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
SQUAMATA	VIPERIDAE	<i>Montivipera xanthina</i>	LC		LC			
SQUAMATA	VIPERIDAE	<i>Vipera ammodytes</i>	LC		LC			
SQUAMATA	VIPERIDAE	<i>Vipera aspis</i>	LC		LC		Yes	
SQUAMATA	VIPERIDAE	<i>Vipera berus</i>	LC		LC		Yes	
SQUAMATA	VIPERIDAE	<i>Vipera latastei</i>	VU	A2c	VU	A2c		
SQUAMATA	VIPERIDAE	<i>Vipera renardi</i>	VU	A1c+2c	NE			
SQUAMATA	VIPERIDAE	<i>Vipera seoanei</i>	LC		LC		Yes	Yes
SQUAMATA	VIPERIDAE	<i>Vipera ursinii</i>	VU	B2ab(iii)	VU	B2ab(iii)	Yes	
TESTUDINES	EMYDIDAE	<i>Emys orbicularis</i>	NT		VU	A2bcde		
TESTUDINES	EMYDIDAE	<i>Emys trinacris</i>	DD		DD		Yes	Yes

Order	Family	Species	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 27)	IUCN Red List Criteria (EU 27)	Endemic to Europe?	Endemic to EU 27?
TESTUDINES	GEOEMYDIDAE	<i>Mauremys leprosa</i>	VU	A2ac +3c	VU	A2ac +3c		
TESTUDINES	GEOEMYDIDAE	<i>Mauremys rivulata</i>	LC		LC			
TESTUDINES	TESTUDINIDAE	<i>Testudo graeca</i>	VU	A2bcde +4bcde	VU	A2bcde +4bcde		
TESTUDINES	TESTUDINIDAE	<i>Testudo hermanni</i>	NT		NT		Yes	
TESTUDINES	TESTUDINIDAE	<i>Testudo marginata</i>	LC		LC		Yes	
TESTUDINES	TRIONYCHIDAE	<i>Trionyx triunguis</i>	NA		NA			

*Species were considered to be Not Applicable (NA) if they were introduced after AD 1500 or if they were considered to be of marginal occurrence in the region. 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.

Appendix 2. Methodology for spatial analyses

Data were analysed using a geodesic discrete global grid system, defined on an icosahedron and projected to the sphere using the inverse Icosahedral Snyder Equal Area (ISEA) Projection (S39). This corresponds to a hexagonal grid composed of individual units (cells) that retain their shape and area (~22,300 km²) throughout the globe. These are more suitable for a range of ecological applications than the most commonly used rectangular grids (S40).

The range of each species was converted to the hexagonal grid for analysis purposes. Coastal cells were clipped to the

coastline. Patterns of species richness (Fig. 4) were mapped by counting the number of species in each cell (or cell section, for species with a coastal distribution). Patterns of threatened species richness (Fig. 5) were mapped by counting the number of threatened species (categories CR, EN, VU at the European regional level) in each cell or cell section. Patterns of endemic species richness were mapped by counting the number of species in each cell (or cell section for coastal species) that were flagged as being endemic to geographic Europe as defined in this project (Fig. 6).

Appendix 3. 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 Red List website and data portal available online at <http://ec.europa.eu/environment/nature/conservation/species/redlist> and <http://www.iucnredlist.org/europe>.

<u>Gallotia intermedia</u>		CR
Taxonomic Authority: Barbadillo, Lacomba, Pêrez-Mellado, Sancho and López-Jurado, 1999		
<input type="checkbox"/> Global Assessment	<input checked="" type="checkbox"/> Regional Assessment	Region: Europe <input checked="" type="checkbox"/> Endemic to region
<u>No synonyms available</u>		<u>Common names</u>
		Lagarto Canario Moteado Spanish; Castilian Tenerife Speckled Lizard English
<u>Upper Level Taxonomy</u>		
Kingdom: ANIMALIA	Phylum: CHORDATA	
Class: REPTILIA	Order: SQUAMATA	
Family: LACERTIDAE		
<u>Lower Level Taxonomy</u>		
Rank:	Infra- rank name:	<input type="checkbox"/> Plant Hybrid
Subpopulation:	Authority:	
This species is described by Hernández et al. (2000), but the name first appeared in Barbadillo et al. (1999).		
<u>General Information</u>		
<u>Distribution</u>		
This species was discovered in 1996 in the Macizo de Teno in the extreme northwest of Tenerife island, in the Canary Islands (Spain). It is now know from a small area of coastline in the extreme west of the island, and also from Montana de Guaza in the extreme south. It is believed that the species was once widespread throughout much of Tenerife.		
<u>Range Size</u>	<u>Elevation</u>	<u>Biogeographic Realm</u>
Area of Occupancy:	Upper limit:	<input type="checkbox"/> Afrotropical
Extent of Occurrence:	Lower limit:	<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 checked="" 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>		
There are 40 isolated populations along 9 km of coastline, totaling 500 animals. The population at Montana de Guaza is around 100 animals. It is increasing as a result of the control of introduced mammals.		
<u>Total Population Size</u>		
Minimum Population Size:	Maximum Population Size:	

Habitat and Ecology

This species inhabits rugged terrain, with rocks and boulders, often found on small rock ledges with sparse vegetation. The species is presumed to have once occurred in a variety of habitats across Tenerife. The species is largely herbivorous. It is an egg-laying species.

System	Movement pattern	Crop Wild Relative
<input checked="" type="checkbox"/> Terrestrial	<input type="checkbox"/> Nomadic	<input type="checkbox"/> Is the species a wild relative of a crop?
<input type="checkbox"/> Freshwater	<input type="checkbox"/> Congregatory/Dispersive	
<input type="checkbox"/> Marine	<input type="checkbox"/> Migratory	
	<input type="checkbox"/> Altitudinally migrant	

Breeding Strategy for Amphibians and Reptiles

Does the species lay eggs?	Yes	Does the species have a free-living larval stage?	Unknown
Does the species give birth to live young?	Unknown	Does the species require water for breeding?	Unknown
Does the species exhibit parthenogenesis?	Unknown		

Threats

The main threat to this species is predation by feral cats and, to a lesser degree, by rats. It is presumed that the historical decline in this species was largely due to predation by cats. Several of the smaller populations, consisting of a few individuals, may be threatened by the effects of inbreeding.

	Past	Present	Future
2 Invasive alien species (directly affecting the species)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2.2 Predators	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9 Intrinsic factors	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9.1 Limited dispersal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9.2 Poor recruitment/reproduction/regeneration	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9.4 Inbreeding	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9.7 Slow growth rates	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9.9 Restricted range	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Conservation Measures

Measures to control access by cats to some of the remaining populations, such as fencing, have been implemented. A recovery action plan has been developed for this species. The species may still exist in other inaccessible parts of Tenerife, more field surveys are urgently needed. It occurs in at least one protected area.

	In Place	Needed
1 Policy-based actions	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.1 Management plans	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.1.1 Development	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.2 Legislation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.2.1 Development	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.2.1.1 International level	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.2.2 Implementation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.2.2.1 International level	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2 Communication and Education	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2.2 Awareness	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3 Research actions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3.2 Population numbers and range	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3 Biology and Ecology	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.4 Habitat status	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3.5 Threats	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.8 Conservation measures	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3.9 Trends/Monitoring	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4 Habitat and site-based actions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4.1 Maintenance/Conservation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.4 Protected areas	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

4.4.1 Identification of new protected areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4.4.2 Establishment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4.4.3 Management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5 Species-based actions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5.4 Recovery management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Countries of Occurrence

	PRESENCE							ORIGIN				
	Year Round	Breeding Season only	Non-breeding season only	Passage migrant	Possibly extinct	Extinct	Presence uncertain	Native	Introduced	Re-Introduced	Vagrant	Origin uncertain
Spain	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

General Habitats

	Score	Description	Major Importance
3 Shrubland	1	Suitable	Unset
3.4 Shrubland - Temperate	1	Suitable	Unset
6 Rocky areas (eg. inland cliffs, mountain peaks)	1	Suitable	Unset

Species Utilisation

Species is not utilised at all

IUCN Red Listing

Red List Assessment: (using 2001 IUCN system) Critically Endangered (CR)

Red List Criteria: B1ab(v)+2ab(v)

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

Listed as Critically Endangered because its Extent of Occurrence is less than 100 km² and its Area Of Occupancy is less than 10km², its distribution is severely fragmented, and although it is no longer experiencing a continuing population decline, it has only been increasing since 2001.

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

- | | | |
|--|---|---|
| <input type="checkbox"/> Genuine Change | <input type="checkbox"/> Nongenuine Change | <input checked="" type="checkbox"/> No Change |
| <ul style="list-style-type: none"> <input type="checkbox"/> Genuine (recent) <input type="checkbox"/> Genuine (since first assessment) | <ul style="list-style-type: none"> <input type="checkbox"/> New information <input type="checkbox"/> Knowledge of Criteria <input type="checkbox"/> Incorrect data used previously | <ul style="list-style-type: none"> <input type="checkbox"/> Taxonomy <input type="checkbox"/> Criteria Revisio <input type="checkbox"/> Other |
| | | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Same category and criteria <input type="checkbox"/> Same category but change in criteria |

Current Population Trend: Increasing

Date of Assessment: 14/12/2008

Name(s) of the Assessor(s): Jose Antonio Mateo Miras, Valentin Pérez-Mellado, Iñigo Martínez-Solano

Evaluator(s): Neil Cox and Helen Temple

Notes:

% 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:

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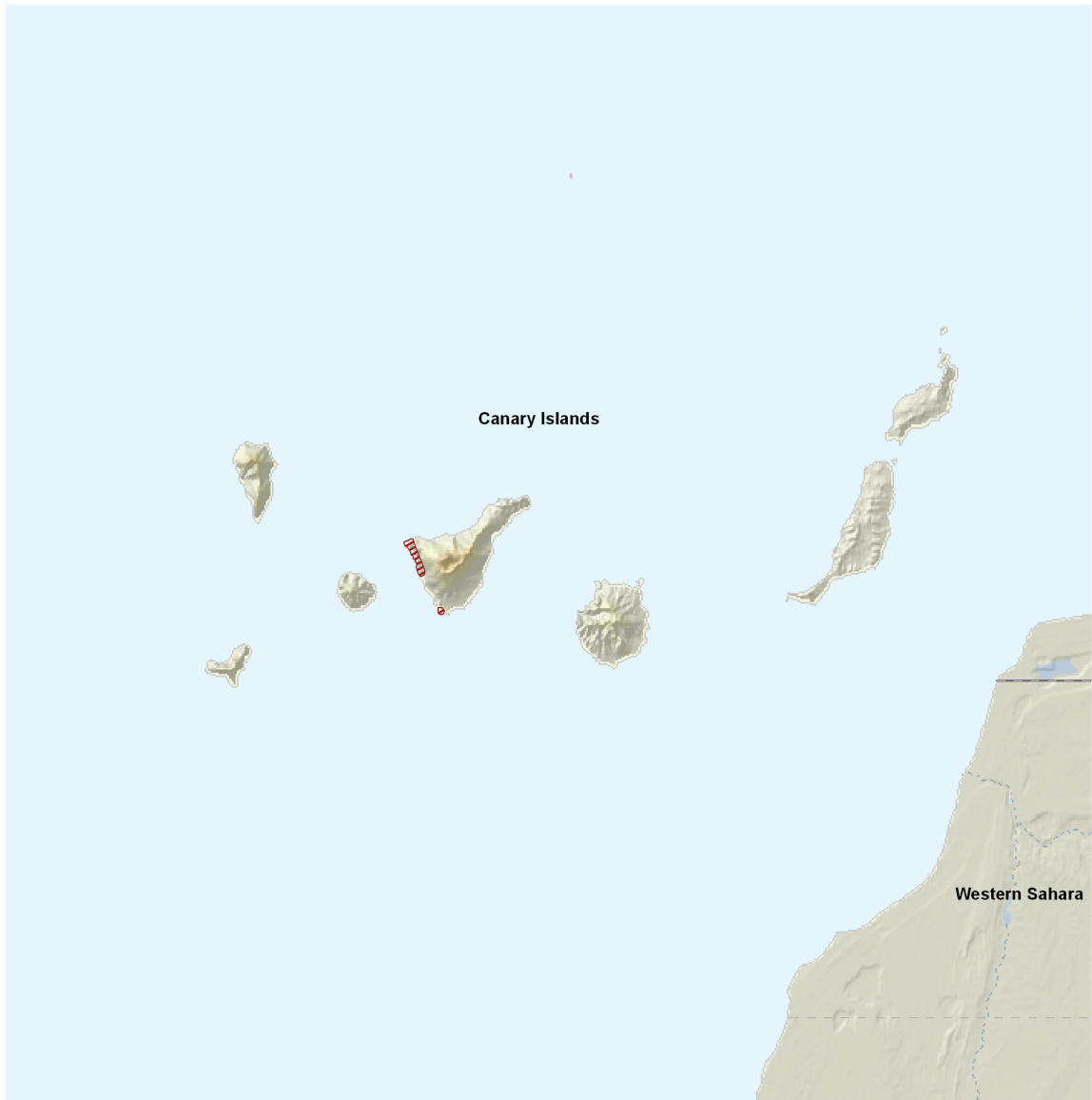
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Gallotia intermedia

range type

-  native (resident)
-  native (breeding)
-  native (non breeding)
-  reintroduced
-  introduced
-  uncertain origin
-  possibly extinct
-  extinct

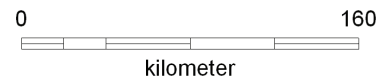
-  national boundaries
-  subnational boundaries
-  lakes, rivers, canals
-  salt pans, intermittent rivers

data source:
IUCN (International Union for Conservation of Nature)



azimuthal equal area central point: 0°, 0°

Map created 02/13/2009



European Commission

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ISBN 978-92-79-11357-4

IUCN Red List of Threatened Species™ – Regional Assessments

The Status and Distribution of Freshwater Biodiversity in Eastern Africa. Compiled by William R.T. Darwall, Kevin G. Smith, Thomas Lowe, Jean-Christophe Vié, 2005

The Status and Distribution of Freshwater Fish Endemic to the Mediterranean Basin. Compiled by Kevin G. Smith and William R.T. Darwall, 2006

The Status and Distribution of Reptiles and Amphibians of the Mediterranean Basin. Compiled by Neil Cox, Janice Chanson and Simon Stuart, 2006

The Status and Distribution of European Mammals. Compiled by Helen J. Temple and Andrew Terry, 2007

Overview of the Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea. Compiled by Rachel D. Cavanagh and Claudine Gibson, 2007

The Status and Distribution of Freshwater Biodiversity in Southern Africa. Compiled by William R.T. Darwall, Kevin G. Smith, Denis Tweddle and Paul Skelton, 2009

European Red List of Amphibians. Compiled by Helen J. Temple and Neil Cox, 2009

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/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, The IUCN Red List, Freshwater Biodiversity Assessment Initiative (all located in Cambridge, UK), and the Global Biodiversity Assessment Initiative (located in Washington DC, USA). www.iucn.org/species

IUCN – Regional Office for Pan-Europe

The IUCN Regional Office for Pan-Europe and Permanent Representation to the European Union (ROfE) is based in Brussels, Belgium. Through its Programme Offices in Belgrade, Moscow and Tbilisi and in cooperation with more than 350 European members and other parts of the IUCN constituency, the Regional Office for Pan-Europe implements the IUCN European Programme. The Programme area covers 55 countries and stretches from Greenland in the west to Kamchatka in the east. www.iucn.org/europe

The European Red List is a review of the conservation status of c.6,000 European species (mammals, reptiles, amphibians, freshwater fishes, butterflies, dragonflies, and selected groups of beetles, molluscs, and vascular plants) 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.

This publication summarises results for Europe's 151 native species of terrestrial and freshwater reptiles. Approximately one fifth of these species are threatened with extinction at the European level as a result of threats including habitat loss, fragmentation and degradation, pollution, overharvesting, and deliberate persecution.

The European Red List was compiled by IUCN's Species Programme, Species Survival Commission and Regional Office for Europe and is the product of a service contract with the European Commission. It is available online at <http://ec.europa.eu/environment/nature/conservation/species/redlist> and <http://www.iucnredlist.org/europe>.