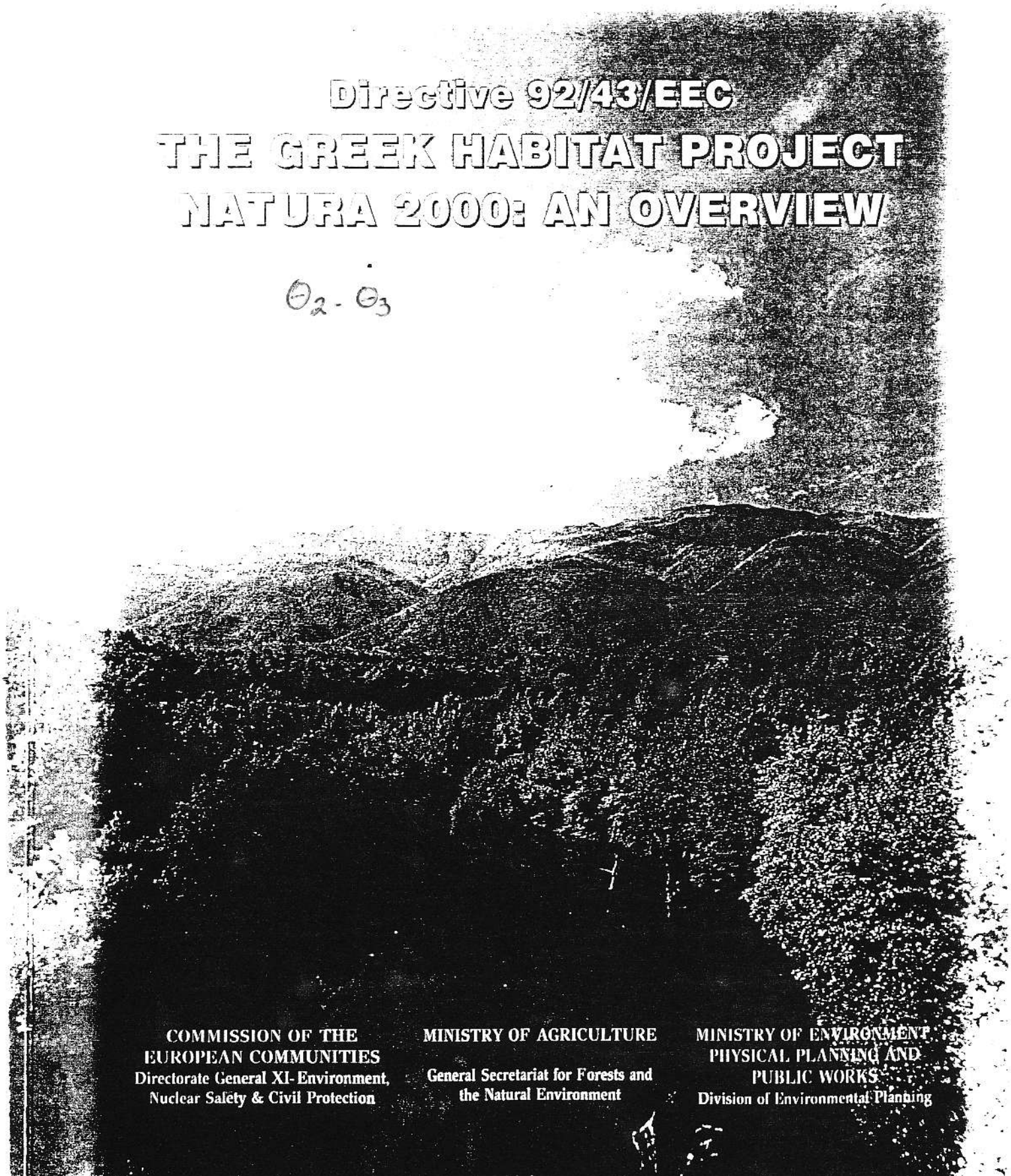
THE GOULANDRIS NATURAL HISTORY MUSEUM
GREEK BIOTOPE/WETLAND CENTRE
UNIVERSITY OF ATHENS - ARISTOTLE UNIVERSITY OF THESSALONIKI - UNIVERSITY OF PATRAS

Directive 92/43/EEC
THE GREEK HABITAT PROJECT
NATURA 2000: AN OVERVIEW

$\Theta_2 - \Theta_3$



COMMISSION OF THE EUROPEAN COMMUNITIES
Directorate General XI- Environment, Nuclear Safety & Civil Protection

MINISTRY OF AGRICULTURE
General Secretariat for Forests and the Natural Environment

MINISTRY OF ENVIRONMENT PHYSICAL PLANNING AND PUBLIC WORKS
Division of Environmental Planning

E.4. REPTILES

by B.P. Chondropoulos and E. Valakos

E.4.1. Introduction

The most recent references in the bibliography raise the number of living forms of reptiles to about 6,450 species belonging to 950 genera and 43-48 families. However, controversy exists mainly concerning the taxonomic categories above the genus level. The living reptiles are members of only four of the 17-24 orders known (depending on the adopted classification systems). These are: a) Chelonia or Testudinata (the chelonians), composed of about 270 species and 12 families; b) Squamata (the lizards, snakes, and amphisbaenians), comprising 6,150 species of 28 families; c) Rhynchocephalia (the tuatara) including only one relic species (*Sphenodon punctatus*); d) Crocodilia (the crocodiles) numbering 22 species of 2-3 families.

In Europe (west of the Ural mountains), there are over 95 species of reptiles. As for the amphibians, the number of species greatly increases from the north to the south and the populations generally become more numerous, denser and demographically healthier.

The Greek reptile fauna is very diverse comprising 59 species and 117 subspecies of chelonians and squamates. There are 8 species of chelonians classified into 6 genera of 5 families. Lizards are represented by 28 species belonging to 15 genera of 6 families, and snakes by 22 species of 10 genera and 4 families. Also, there is one species of amphisbaenians. The subspecific diversity is notable, becoming particularly great in some lizard species (for example, *Cyrtopodion kotschyi* and *Podarcis erhardii* have 17 and 28 subspecies, respectively). Many local or more widespread transitional forms further add to the overall diversity of the Greek reptile fauna.

The richness in forms is related to historical and recent environmental factors which are responsible for the biodiversity of the overall fauna of Greece. Apart from its diversity, the composition of the reptile fauna of Greece is very interesting with regard to its origin from the zoogeographical point of view. Indeed, the fauna originates from central Europe and/or northwestern Asia, central-south-western Asia, northern Africa, the Balkans and from Greece itself. As for the geographical distribution, there are taxa distributed in western Eurasia, Europe, Circum-Mediterrenean and/or the Near East, the Balkans, and Greece only (endemics). Also, there are taxa with an almost cosmopolitan distribution (sea turtle species).

The endemic reptile species in Greece are 8-9 (depending on the taxonomic rank of 1 or 2 taxa); this figure corresponds to about 14% of the total number of the reptile species in Greece. Six of the endemic species are lizards (*Anguis cephallonicus, Algyroides moreoticus, Lacerta graeca, Podarcis gaigeae, P. milensis, P. peloponnesiaca*), and 2-3 are snakes (*Coluber gyarosensis, Vipera* (or *Macrovipera*) *schweizeri* and *Elaphe rechingeri*, if the latter taxon is ranked as a full species). All of these taxa are geographically restricted to certain parts of Greece, namely to Peloponnisos (the former two taxa also occur on some islands of Ionio Pelagos (Ionian Sea)) or to one island or one small island group of the Aigaio Pelagos (Aegean Sea) (*Podarcis gaigeae, P.*

milensis and the snake species). Among the valid 117 subspecies, 65 (i.e., 55.6%) are endemic (57 lizards and 8 snakes); nearly all of them are narrowly endemic to islands and islets of the Aigaio Pelagos. Several species and subspecies are also endemic to Greece and the adjacent Balkan countries or the western Asia Minor.

Differences in the distribution patterns of the reptiles are observed as a result of past geological factors and today's environmental conditions. Most species are widely distributed, others occur only in the mainland, and some others only on the islands. Furthermore, Greece is usally the southern or eastern limit of the distribution range for a number of taxa. With regard to vertical distribution, the less thermophilous taxa of northern origin are found at higher altitudes (e.g., the lizard *Lacerta agilis* and the snakes *Coronella austriaca, Vipera berus,* and *V. ursinii*). The most thermophilous species are usually absent or less common in the mountainous inland country, preferring the coastal zone and the islands, although they sometimes extend in the inland through valleys.

Available information indicates that the threats that the reptiles face in Greece, are almost always attributed to various human activities which negatively affect either the animals themselves or their natural environment, or both. Perhaps the most serious threat is the alteration or destruction of their habitats. This is especially evident in populations of terrapins in the case of wetland drainage or filling in, but also in populations of many other reptiles suffering loss and/or fragmentation of many habitats due to afforestation, intensive agriculture, land reclamation works, urbanization, road construction and mining activities. A great deal of urbanized areas in Greece are associated with tourist development (buildings and other settlements). Fire constitutes serious danger for the reptiles of the Mediterranean countries. Large, repetitive summer fires occurring in Greece cause an impact which has not yet been precisely evaluated but is supposed to be very detrimental or even critical for the survival of local populations of many reptile taxa (rare, threatened or endemic ones are often included). Pollution of habitats by biocides, mineral oil residues, heavy metals, and other toxic chemicals, is considered to be responsible for significant population decline; this factor acts either by killing the reptiles directly or more often by the entering of toxic substances into the food-chain, or by killing the invertebrate prey. The direct persecution of these animals by man (owing to ignorance) and their accidental death by traffic are also notable destructive factors, especially for small isolated populations. The killing of sea turtles by fishermen or by motor boats contributes to the decline of these endangered animals. Collection of reptiles for trade or as tourist souvenirs seems to be a continuously increasing danger for the fauna in Greece; the collected animals are usually the conspicuous, more or less easily caught or uncommon taxa that unfortunately rank highly on the collectors lists (e.g., *Testudo* spp., *Chamaeleo chamaeleon, Vipera* (or *Macrovipera) schweizeri,* and *V. ursinii*). Massive illegal exports of tortoises have caused a dramatic decline in several Greek populations.

Very few reptiles of Greece are truly threatened with extinction as species. In the Red Data Book of Threatened Vertebrates of Greece, only seven reptile species are mentioned; three of them are characterized as "Endangered" (*Caretta caretta, Chelonia mydas, Dermochelys coriacea*), one as "Vulnerable" (*Vipera* (or *Macrovipera) schweizeri,* mentioned in the book as *V. lebetina schweizeri*), and three as "Rare" (*Chamaeleo chamaeleon, Vipera ursinii, Blanus strauchi*). The status of their population is mostly unknown and long-term monitoring projects are non- existent.

All the above data give merely an outline of the morphological, zoogeographical and ecological complexity of the reptiles of Greece indicating the high scientific value of this fascinating group.

In the "Natura 2000" database 84 taxa of the reptiles of Greece were recorded, 54 of them being at the species, and 30 at the subspecies level. These figures constitute 30.4%, 91.5%

and 25.6% of the total numbers of Greek taxa included in the respective categories. Among the 84 evaluated taxa, only 10 (namely 11.9%) are mentioned in Annex II to Directive 92/43/EEC. Of the remaining ones (recorded in the database as Other Important and Greek Important Species) 46, i.e. 54.8% of the 84 taxa are mentioned in Annexes IV and V which refer to following stages of the directive implementation. Furthermore, the Annex II taxa *Caretta caretta* and *Vipera lebetina* (= *V. schweizeri*) are priority species denoted with an asterisk (*). Six out of the 7 threatened reptiles of Greece (85.7%) are included in the 84 reptile species that were recorded in the database (the very rare Leatherback turtle *Dermochelys coriacea*, is the only exception). Seven out of the 8-9 endemic species (87.5% or 77.8%) and 21 of the 65 endemic subspecies (32.3%) are among the 84 recorded taxa, figures corresponding to 8.3% and 25% of the total, respectively.

All 84 taxa are protected by the Bern Convention (Appendices II and III), whereas 62 of them (73.8%) are protected by the Greek Presidential Decree 67/1981. Only 6 (7.1%) and 5 (6%) of the 84 taxa are listed in the European Red List of Globally Threatened Animals and Plants (1991) and the IUCN Red List of Threatened Animals (1988) respectively. Moreover, 10 taxa (11.9%) are endemic to Greece and the adjacent Balkan countries, at least 6 (7.1%) are taxa with isolated populations, 26 taxa (31%) have the limit of their distribution range in Greece, and 23 taxa have limited distributions in Greece (27.4%). Finally, only 28 out of the 84 taxa (33.3%) were recorded in a previous survey for the evaluation of the Greek habitats and species (the CORINE-Biotopes Project).

The 84 reptile taxa have been recorded in 252 sites, i.e over 85% of the total number of proposed "Natura 2000" sites (296). The 10 Annex II taxa have been found in 217 sites (73.3%). One third of these sites (73) occur on islands, while the rest are distributed all over the Greek mainland. The species recorded as Other Important Species (field 3.3 of the SDF) and Greek Important Species (field 3.4 of the SDF) have been found in 246 sites (83.1%), 95 of them being insular sites (38.6%).

It is noteworthy that from the 74 species not included in Annex II to Directive, 50 are not recorded from any other country of the EU while 28 of them are Greek endemics. In reality, this number is higher since the number of taxa recorded in the database is less than half of the total reptile taxa present in Greece. The necessity for a revision of the lists of the Annexes to the Directive in order to include more of the reptiles present in Greece is for once more apparent.

E.4.2. Reptiles of Greece listed in Annex II to Directive 92/43/EEC

Testudo graeca Linnaeus, 1758
Class: Reptilia, Order: Chelonia, Family: Testudinidae

Common names: Spur-thighed tortoise - Γραικοχελώνα

Description: The rectilinear length of the carapace exceeds 30 cm (males usually being smaller than females). It has a strongly domed carapace shape, oval in sectional view (more rounded in juveniles and adolescents). In young individuals the carapace surface is smooth becoming rougher with age. Usually there are no lumps on the carapace surface. In older individuals the back of the carapace edge may be horizontal but not as evidently so as in *Testudo marginata*. The base colour of the carapace is yellowish-brown or olive-brown, rarely greenish or orange, with dark brown to black patches and splashes of various size. Sometimes these dark markings may be repeated more or less regularly on the successive plates of each plate series. Plastron is yellow-brown, locally overlaid by a varying amount of black. In some cases the entire shell has a uniform brown colour. Young generally have a less darker shell. The uncovered body parts are a light dirty olive-yellow in the young animals becoming almost black interrupted by yellow-brown in the adults. The distinction between this species and the other two European tortoises also living in Greece (especially from the morphologically similar *Testudo hermanni*) is based on the combined occurrence of the following characters: a) There is no large scale on the tail tip, b) there is usually a single supracaudal plate, and c) there are several conical, tubercle-like large scales on the rear surface of the thighs, by far larger than the neighbouring typical scales.

Ecology - habits: It lives in a variety of habitats including open woodland, thickets, grasslands, cultivated and fallow dry lands, stabilized dunes, etc. It always occurs in places with some cover, at altitudes ranging from sea-level up to 1500 m or more. A diurnal animal active mainly in the morning and afternoon. Although mostly herbivorous (leaves, fruit and flowers) it may also prey on snails, slugs, earthworms and carrion. It hibernates in a self-dug shallow hole from November to March. Mating takes place in April or May; the male courts the female by butting its shell against that of the female and mounts it clumsily from behind. The female normally produces one clutch per year (usually in June) composed of 4-15 whitish, oval eggs, which she buries in a hole of 10-15 cm in depth dug by her hind feet in soft soil. Hatchlings appear in late August-September and their carapace length is 30-40 mm.

Distribution: *Testudo graeca* is widespread in Thraki and Makedonia, being less common to rare along the eastern part of the rest of the mainland and southern to northeastern Peloponnisos. It also occurs on some islands of the Aigaio Pelagos (Aegean Sea).

Occurrence with a high degree (A or B) for Conservation and/or Global Assessment, in the proposed "Natura 2000" sites:

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
Voreia Ellada	Anatoliki Makedonia, Thraki	GR1110001	Game refuge 38%, RAMSAR, IBA, SPA

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
	Kentriki Makedonia	GR1260001	Game refuge 1%, RAMSAR, IBA, SPA
		GR1240001	Natural monument 2%, Game refuge 28%, IBA, Biogenetic reserve 1%
		GR1260004	Game refuge 10%, IBA
		GR1260007	Natural monument 38%, Controlled hunting area 62%
	Thessalia	GR1430004	Game refuge 1%, Controlled hunting area 2%, Marine Park 88%, IBA, Barcelona Convention 88%
		GR14440001	Game refuge 29%
		GR1440002	Controlled hunting area 85%, IBA
		GR1440003	Game refuge 7%, Controlled hunting area 1%, IBA, World Heritage site
Kentriki Ellada	Ipeiros	GR2110003	Game refuge 27%, IBA
	Sterea Ellada	GR2420003	Game refuge 8%, IBA
		GR2420004	Natural monument, IBA
		GR2430002	
Nisia Aigaiou, Kriti	Voreio Aigaio	GR4110001	IBA, Game refuge 5%
		GR4130001	Game refuge 8%
	Notio Aigaio	GR4210008	Game refuge 20%, IBA

Status and reasons for decline: The status of the Greek populations of the spur-thighed tortoise is hardly known. Until the middle of the previous decade this and the other two tortoise species were thought to be rather safe in Greece. Therefore they are not mentioned in the Red Data Book of Threatened Vertebrates of Greece. However, more recent studies gave data indicating that a very large percentage of the populations of all three taxa (over 60%) shows some degree of decline. Perhaps *Testudo graeca* is the most threatened tortoise in Greece since it is mainly distributed in areas of the coastal zone and in low inland areas which are more susceptible to human activities (cultivation, tourism, etc.). Illegal mass collection and export to other European countries is another danger. A few instances of uncovering such illegal collections and the repatriation of tortoises are known. An indeterminable number of tortoises are also collected by tourists as pets and by hungry foreigners as a food source. Extensive summer fires, unfortunately frequent in the Circum-Mediterranean countries, are another reason for the extermination of many Greek tortoises each year.

Protective legislation: It is protected by the Greek Presidential Decree 67/1981, the Bern Convention (Appendix II) and the CITES (Appendix II).

Selected references:

Arnold, E.N., J.A. Burton and D.W. Ovenden. 1978. A field guide to the Reptiles and Amphibians of Britain and Europe. Harper Collins Publ., London.

Ballasina, D. 1992. Report on the repatriation of tortoises to Greece. British Herpetological Society Bulletin 40: 2-4.

Gruber, U. 1994. Amphibien und Reptilien. Franckh-Kosmos, Stuttgart.

Hellmich, W. 1962. Reptiles and Amphibians of Europe. Blanford Press, London.

Honegger, R.E. 1981. Threatened Amphibians and Reptiles in Europe. Akademische Verlagsgesellschaft, Wiesbaden.

Matz, G. and D. Weber. 1983. Guide des Amphibiens et Reptiles d'Europe. Delachaux & Niestle, Paris.

Willemsen, R.E. and A. Hailey. 1989. Review: Status and conservation of tortoises in Greece. Herpet. Journal 1: 315-330.

Testudo hermanni Gmelin, 1789

Class: Reptilia, Order: Chelonia, Family: Testudinidae

Common names: Hermann's tortoise - Ονυχοχελώνα

Description: The rectilinear length of the carapace usually does not exceed 25 cm. At a glance it is similar to *Testudo graeca* in the general shell shape, smoothness and colour in both the young and adult individuals. However, in the adults there is often a large lump on each carapace plate (mainly the vertebral and costal ones). The base colour of the carapace varies geographically from brown to bright yellow with a dark pattern similar to that of *Testudo graeca*. The plastron is usually less brightly coloured. Head, limbs and tail are yellowish-brown or greenish-brown to black. This tortoise differs from the other two *Testudo* species in Europe in having the following combination of features: a) There is a single or paired, tooth-like large scale on the tail tip (especially in males), b) there are usually two supracaudal plates on the carapace, and c) there are no conical, tubercle-like large scales on the rear surface of the thighs.

Ecology - habits: Very similar to *Testudo graeca*. It is often encountered in places with a richer vegetation cover. During the hot summer days it may enter water for a bath.

Distribution: It is the most widespread and common tortoise in Greece occurring throughout the mainland, as well as on the islands of the Ionio Pelagos (Ionian Sea) and in some islands of the Aigaio Pelagos (Aegean Sea).

Occurrence with a high degree (A or B) for Conservation and/or Global Assessment, in the proposed "Natura 2000" sites:

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
Voreia Ellada	Anatoliki Makedonia, Thraki	GR1110001	Game refuge 38%, Ramsar, IBA, SPA
	Kentriki Makedonia	GR1260001	Game refuge 1%, Ramsar, IBA, SPA
		GR1240001	Natural monument 2%, Game refuge 28%, IBA, Biogenetic reserve 1%
		GR1260004	Game refuge 10%, IBA
		GR1260007	Natural monument 38%, Controlled hunting area 62%
	Dytiki Makedonia	GR1310002	Core strict of National Park 100%, Game refuge 6%, IBA, Biogenetic reserve 100%, SPA
		GR1310003	Core strict 49%, Peripheral zone 51%, Game refuge 21%, IBA, Biogenetic reserve 49%, SPA

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
	Thessalia	GR1410002	
		GR1420003	Aesthetic forest 100%, Controlled hunting area 80%, IBA, SPA
		GR1420004	Game refuge 16%, IBA
		GR1430001	Game refuge 20%, IBA
		GR1430002	Aesthetic forest 20%, IBA, Biogenetic reserve 20%
		GR1440002	Controlled hunting area 85%, IBA
		GR1440003	Game refuge 7%, Controlled hunting area 1%, IBA, World Heritage site
Kentriki Ellada	Ipeiros	GR2110001	IBA, Barcelona Convention, Ramsar 49%, SPA
		GR2110003	Game refuge 27%, IBA
		GR2110004	IBA, Barcelona Convention, Ramsar 100%, SPA
		GR2120001	Game refuge 21%, IBA
		GR2120002	
		GR2120003	IBA
		GR2120004	IBA
		GR2130001	Core strict 27%, Peripheral zone 73%, Game refuge 9%, IBA, SPA
		GR2130003	Game refuge 5%, IBA
		GR2130004	IBA
		GR2130006	
		GR2140001	IBA
	Ionia Nisia	GR2210001	
		GR2210002	Biogenetic reserve 49%
		GR2220001	IBA
		GR2220002	Core strict 100%, Biogenetic reserve 100%
		GR2220003	Ramsar 10%
		GR2230002	Game refuge 5%
	Dytiki Ellada	GR2310001	Natural monument, Game refuge 1%, Ramsar 27%, Biogenetic reserve, SPA
		GR2310003	IBA
		GR2310005	Game refuge 70%
		GR2310010	Game refuge 6%
		GR2320001	Ramsar 75%, IBA
		GR2320003	Game refuge 27%, IBA
		GR2320004	Aesthetic forest 100%, IBA
		GR2320007	Game refuge 20%
		GR2330004	
		GR2330005	Game refuge 9%
	Sterea Ellada	GR2420003	Game refuge 8%, IBA
		GR2420004	Natural monument, IBA
		GR2430001	Game refuge 50%,
		GR2430002	
		GR2440001	Controlled hunting area 13%
		GR2440003	Peripheral zone 35%
		GR2440004	Core strict 43%, Peripheral zone 57%, IBA, Biogenetic reserve 43%, SPA

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
		GR2410001	Game refuge 10%
		GR2450004	
	Peloponnisos	GR2510003	
		GR2520001	Game refuge 2%
		GR2520006	Natural monument, Game refuge 3%
		GR2530002	Game refuge 7%, IBA
		GR2530004	Game refuge 9%
		GR2530005	Game refuge 19%
		GR2540001	Game refuge 13%, IBA
		GR2540003	IBA
		GR2550001	
		GR2550002	
		GR2550004	IBA
		GR2550005	
		GR2550006	Game refuge 3%, IBA
Attiki		GR3000003	
		GR3000004	

Status and reasons for decline: Mostly as in *Testudo graeca*. Populations from many islands and the southern mainland are in danger from the same reasons as *Testudo graeca*. Populations from the southern mainland usually living in disturbed areas are characterized by an, at least, partly genetically determined smaller carapace length; therefore their decline reduces the overall genetic variability of this species.

Protective legislation: *Testudo hermanni* is protected by the Greek Presidential Decree 67/1981, the Bern Convention (Appendix II) and the CITES (Appendix II).

Selected references:

Arnold, E.N., J.A. Burton and D.W. Ovenden. 1978. A field guide to the Reptiles and Amphibians of Britain and Europe. Harper Collins Publ., London.

Ballasina, D. 1992. Report on the repatriation of tortoises to Greece. British Herpetological Society Bulletin 40: 2-4.

Gruber, U. 1994. Amphibien und Reptilien. Franckh-Kosmos, Stuttgart.

Hellmich, W. 1962. Reptiles and Amphibians of Europe. Blanford Press, London.

Honegger, R.E. 1981. Threatened Amphibians and Reptiles in Europe. Akademische Verlagsgesellschaft, Wiesbaden.

Matz, G. and D. Weber. 1983. Guide des Amphibiens et Reptiles d'Europe. Delachaux & Niestle, Paris.

Willemsen, R.E. and A. Hailey. 1989. Review: Status and conservation of tortoises in Greece. Herpetological Journal 1: 315-330.

Testudo marginata Schoepff, 1792

Class: Reptilia, Order: Chelonia, Family: Testudinidae

Common names: Marginated tortoise - Κρασπεδοχελώνα

Description: The domed adult carapace seen in sectional view is evidently longer than in the other two *Testudo* taxa (occasionally exceeding 35 cm); a well-developed, wide, almost horizontal and serrated edge is always present in the rear part of the adult carapace. This feature is missing from the young and is progressively formed in adolescents as their rear marginal plates turn outwards. The base colour of the adult shell is mostly black with central yellow (rarely orange) blotches of various size at least on some plates. Almost entirely black animals also exist. The young are not easily distinguished from the equally-sized individuals of the other two tortoise species, since all are oval-shaped in sectional view, have similar colours and lack a horizontal edge on the rear part of the carapace. The distinction from *Testudo hermanni* is based on the usual occurrence of a single supracaudal plate and, sometimes, of a few small conical, tubercle-like scales on the rear surface of the thighs of *T. marginata*. The separation from *T. graeca* is more difficult, especially when the young of *T. marginata* possess the two features just mentioned. The adolescents of *T. marginata* are rather distinct however, since they already have acquired the characteristic long, dark shell and, at least some of them, the horizontal carapace edge.

Ecology - habits: It often lives in dry stony and rocky areas with maquis and other dense scrub and forest vegetation but sometimes in habitats frequented by the other two *Testudo* species, at altitudes ranging from sea-level up to 1000 m (usually 100-800 m). When it occurs in sympatry with *T. hermanni*, it tends to be confined to higher elevations (but exceptions are known). It is active from March to October. Sexual maturity is attained at the age of 10 years. Mating takes place in spring (April-May) after a courtship performed by the males; during this period the males show increased aggressive behaviour. Females produce clutches of 3-10 eggs which they bury in holes dug in soft soil.

Distribution: *Testudo marginata* is virtually a Greek and southernmost Albanian endemic species, also introduced to Sardinia and possibly other Mediterranean areas. Its distribution area in Greece includes the mainland, except Thraki and most of Makedonia, and some islands of the Aigaio Pelagos (Aegean Sea) and the Ionio Pelagos (Ionion Sea).

Occurrence with a high degree (A or B) for Conservation and/or Global Assessment, in the proposed "Natura 2000" sites:

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
Voreia Ellada	Thessalia	GR1410002	
		GR1420003	Aesthetic forest 100%, Controlled hunting area 80%, IBA, SPA
		GR1420004	Game refuge 16%, IBA
		GR1430001	Game refuge 20%, IBA
		GR1430002	Aesthetic forest 20%, IBA, Biogenetic reserve 20%
		GR1430004	Game refuge 1%, Controlled hunting area 2%, Marine park 88%, IBA, Barcelona Convention 88%
		GR14440002	Controlled hunting area 85%, IBA

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
		GR14400003	Game refuge 7%, Controlled hunting area 1%, IBA, World Heritage site
Kentriki Ellada	Ipeiros	GR2110001	IBA, SPA, Ramsar, Barcelona Convention 49%
		GR2110004	IBA, Ramsar, Barcelona Convention 100%
		GR2120001	IBA, Game refuge 21%
		GR2120002	
		GR2120003	IBA
		GR2130001	Core strict 27%, Peripheral zone 73%, Game refuge 9%, IBA, SPA
		GR2130004	IBA
		GR2140001	IBA
	Dytiki	GR2310001	Natural monument, Game refuge 1%, Ramsar 27%, IBA, Biogenetic reserve
		GR2310005	Game refuge 70%
		GR2320001	Ramsar 75%, IBA
		GR2320003	Game refuge 27%, IBA
		GR2320007	Game refuge 20%
		GR2320008	Game refuge 5%, Game breeding station 1%
	Sterea Ellada	GR2410001	Game refuge 10%
		GR2420003	Game refuge 8%, IBA
		GR2430001	Game refuge 50%
		GR2430002	
		GR2440001	Controlled hunting area 13%
		GR2440003	Peripheral zone 35%
	Peloponnisos	GR2510002	
		GR2510003	
		GR2520001	Game refuge 2%
		GR2520003	Game refuge 8%
		GR2520004	
		GR2520005	
		GR2520006	Natural monument, Game refuge 3%
		GR2530003	
		GR2530004	Game refuge 9%
		GR2530005	Game refuge 19%
		GR2540001	Game refuge 13%, IBA
		GR2540002	Game refuge 5%
		GR2540003	IBA
		GR2540004	IBA
		GR2540005	
		GR2550001	
		GR2550004	IBA
		GR2550005	
		GR2550006	Game refuge 3%, IBA
Attiki		GR3000003	
		GR3000004	

Status and reasons for decline: Populations living in natural undisturbed habitats are generally safe, especially those occurring in rocky areas with sclerophyllous scrub vegetation. Such populations are threatened only if human interference affects the habitats integrity (e.g. road opening, clearance, fires). The populations living on the edges of cultivated land are more at risk, since there a continuous loss of individuals exists in these areas due to death by machinery and pesticides. Although slow, this loss may be critical bearing in mind the slow maturation, the smaller clutch size, and the possible greater young mortality rate of this species. All these factors make *Testudo marginata* extremely vulnerable to the collection of individuals for the pet trade; but unfortunately this species appears to be the most preferable for collection. Populations of this tortoise in southern Peloponnisos, eastern Sterea Ellada and some islands are known to be in need of immediate protection, but generally we are far away from sufficient knowledge on the status of the Greek populations.

Protective legislation: It is protected by the Greek Presidential Decree 67/1981, the Bern Convention (Appendix II) and the CITES (Appendix II).

Selected references:

Arnold, E.N., J.A. Burton and D.W. Ovenden. 1978. A field guide to the Reptiles and Amphibians of Britain and Europe. Harper Collins Publ., London.

Ballasina, D. 1992. Report on the repatriation of tortoises to Greece. British Herpetological Society Bulletin 40: 2-4.

Gruber, U. 1994. Amphibien und Reptilien. Franckh-Kosmos, Stuttgart.

Hellmich, W. 1962. Reptiles and Amphibians of Europe. Blanford Press, London.

Honegger, R.E. 1981. Threatened Amphibians and Reptiles in Europe. Akademische Verlagsgesellschaft, Wiesbaden.

Matz, G. and D. Weber. 1983. Guide des Amphibiens et Reptiles d'Europe. Delachaux & Niestle, Paris.

Willemsen, R.E. and A. Hailey. 1989. Review: Status and conservation of tortoises in Greece. Herpetological Journal 1: 315-330.

Emys orbicularis (Linnaeus, 1758)

Class: Reptilia, Order: Chelonia, Family: Emydidae

Common names: European pond terrapin- Βαλτοχελώνα

Description: The rectilinear carapace length of adults is usually 20-25 cm, sometimes up to 30 cm or more. In sectional view, the outline of the shell is oval and slightly wider behind. Young individuals have a central keel along the carapace which disappears in the adult animals. The plastron is more flexible in the young and more rigid in old individuals but its halves can move slightly up and down, due to a transverse flexible hinge. There are no inguinal plates at the rear end of the carapace-plastron join at each shell side. The base colour of the carapace is dark brown to black with a pattern of light, usually yellow, spots or radiating lines on each plate. Plastron is greyish-yellow with irregular brown marks. The head is brownish-black, spotted with yellow. Usually light-coloured spots on the neck. As with all terrapins, *Emys orbicularis* is distinguished from tortoises by the conspicuously more flattened shell, the much longer tail and the webbed fingers and toes. Hatchlings are very small (the

shell often shorter than 2 cm), have a more rounded outline, more brightly-coloured marks, and a relatively longer tail than the adults.

Ecology - habits: Usually found in still (ponds, ditches, swamps and lakes) or slow moving water with a good growth of aquatic plants and overhanging vegetation. It basks on stones or on logs at the waters edge. It is a timid animal; at the slightest disturbance it immediately dives and swims under water. It feeds mainly on small fishes, small frogs and tadpoles, crustaceans, molluscs, insects and worms. The northern populations hibernate from October to March or later. In hotter areas hibernation is shorter and the animals aestivate during summer. The reproduction period begins in mid-May and oviposition takes place in June-early July when the females lay 5-20 eggs in holes (about 15 cm deep) that they dig in the banks. The duration of incubation depends on the temperature. Normally the hatchlings appear after about 3 months, but in cold areas they hatch during the favourable period of the next year.

Distribution: It is distributed throughout the mainland as well as on many islands of the Ionio Pelagos (Ionian Sea) and Aigaio Pelagos (Aegean Sea).

Occurrence with a high degree (A or B) for Conservation and/or Global Assessment, in the proposed "Natura 2000" sites:

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
Voreia Ellada	Anatoliki Makedonia, Thraki	GR1110001	Game refuge 38%, Ramsar, IBA, SPA
	Kentriki Makedonia	GR1260001 GR1260007 GR1270002	Game refuge 1%, Ramsar, IBA, SPA Natural monument 38%, Controlled hunting area 62% IBA
	Thessalia	GR1430001 GR1420004 GR1440001	Game refuge 20%, IBA Game refuge 16%, IBA Game refuge 29%
Kentriki Ellada	Ipeiros	GR2120001 GR2110001 GR2110004 GR2120002 GR2120003 GR2130005 GR2140001	Game refuge 21%, IBA Ramsar 49%, IBA, Barcelona Convention, SPA IBA, Barcelona Convention, Ramsar 100%, SPA IBA IBA
	Ionia Nisia	GR2230002 GR2230001	Game refuge 5%
	Dytiki Ellada	GR2310001 GR2320007 GR2310002 GR2310001 GR2330001	Game refuge 1%, Natural monument, Ramsar 27%, IBA, Biogenetic reserve, SPA Game refuge 20% Ramsar 100%, IBA Ramsar 75%, IBA

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
	Sterea Ellada	GR2410001	Game refuge 10%
		GR2420003	Game refuge 8%, IBA
		GR2420004	Natural monument, IBA
		GR2440001	Controlled hunting area 13%
		GR2440003	Peripheral zone 35%
		GR2430002	
	Peloponnisos	GR2530002	Game refuge 7%, IBA
		GR2550004	IBA
Attiki	Attiki	GR3000003	
		GR3000004	

Status and reasons for decline: This species is threatened in many European countries, being near to extinction or already extinct in some of them. In Greece, the species seems rather safe for the time being; however, many populations are decreasing in number. The loss of wetlands due to drainage projects and water pollution are the main reasons for population decline. The results are more dramatic in the island populations.

Protective legislation: *Emys orbicularis* is protected by the Greek Presidential Decree 67/1981 and the Bern Convention (Appendix II).

Selected references:

Arnold, E.N., J.A. Burton and D.W. Ovenden. 1978. A field guide to the Reptiles and Amphibians of Britain and Europe. Harper Collins Publ., London.

Diesener, G., and J. Reichholf. 1986. Lurche und Kriechtiere. Mosaik Verlag, Munchen.

Engelmann, W.E., J. Fritzsche, R. Günther and F.J. Obst. 1985. Lurche und Kriechtiere Europas. Neumann, Leipzig.

Honegger, R.E. 1981. Threatened Amphibians and Reptiles in Europe. Akademische Verlagsgesellschaft, Wiesbaden.

Lanka, V. and Z. Vit. 1990. Anfibios y Reptiles. Susaeta, Madrid.

Matz, G. and D. Weber. 1983. Guide des Amphibiens et Reptiles d'Europe. Delachaux & Niestle, Paris.

Mauremys caspica (Gmelin, 1774)

Class: Reptilia, Order: Chelonia, Family: Bataguridae

Common names: Stripe-necked Terrapin - Ποταμοχελώνα

Description: In adults, the rectilinear carapace length is usually up to 20 cm, sometimes longer. The general appearance is similar to that of *Emys orbicularis*, but several differences are easily recognized: a) The shell colouring is usually lighter, often being grey-brown or greenish-brown dotted with yellowish faint markings or without them; b) on the sides of the neck, there are distinct yellow (rarely orange) parallel stripes bordered in black; c) the conspicuous central carapace keel of the young is still well visible in adults, at least at the rear part; d) the

flexible plastron of the young always becomes rigid in the adults (no hinge); e) the inguinal plates are always present. The shell colour in young individuals is often warm brown with clear red or yellowish markings. Hatchlings are 2-3 cm long and show the features mentioned for those of the pond terrapin.

Ecology - habits: *Mauremys caspica* usually lives in larger, more open, still or slow flowing waters (lakes, large ponds, streams, irrigation canals, rivers, etc.). It likes basking on banks or floating objects but dives quickly when disturbed, disappearing within the aquatic vegetation or the muddy bottom. It may, however, be seen wandering on land at some distance from the water. Compared to *Emys orbicularis* it is much more tolerant of brackish or polluted waters. Its prey mainly consists of amphibians and their larvae and on various invertebrates; however it is not exclusively carnivorous as *E. orbicularis* is. The stripe-necked terrapin hibernates at least in the northern parts of its distribution range; when it lives in small water bodies it tends to aestivate if they dry up. Mating takes place in April, usually into water, and may be repeated in autumn. The clutch size is 6-12 eggs; they are laid in holes (about 10-15 cm deep) dug in the banks.

Distribution: It is distributed throughout the mainland, many islands of Ionio Pelagos (Ionian Sea) and Aigaio Pelagos (Aegean Sea), as well as on Kriti.

Occurrence with a high degree (A or B) for Conservation and/or Global Assessment, in the proposed "Natura 2000" sites:

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
Voreia Ellada	Kentriki Makedonia	GR1260001	Game refuge 1%, Ramsar, IBA, SPA
		GR1260007	Natural monument 38%, Controlled hunting area 62%
		GR1260008	Ramsar, IBA, SPA
		GR1270002	IBA
	Thessalia	GR1440001	Game refuge 29%
Kentriki Ellada	Ipeiros	GR2120001	Game refuge 21%, IBA
		GR2110003	Game refuge 27%, IBA
		GR2110001	Ramsar, IBA, Barcelona Convention 49%, SPA
		GR2110004	Ramsar, IBA, Barcelona Convention 100%, SPA
		GR2120003	IBA
		GR2140001	IBA
	Ionia Nisia	GR2230002	Game refuge 5%
		GR2210002	Biogenetic reserve 49%
		GR2230001	
	Dytiki Ellada	GR2310001	Game refuge 1%, Natural monument, Ramsar, IBA, Biogenetic reserve, SPA
		GR2330005	Game refuge 9%
		GR2310002	Ramsar, IBA, SPA
		GR2320001	Ramsar, IBA
	Sterea Ellada	GR2420004	Natural monument, IBA
		GR2420003	Game refuge 8%, IBA

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
	Peloponnisos	GR2540001	Game refuge 13%, IBA
		GR2530002	Game refuge 7%, IBA
		GR2550003	Natural monument, Controlled hunting area 9%, Biogenetic reserve
		GR2540002	Game refuge 5%
		GR2550006	Game refuge 3%, IBA
		GR2510002	
		GR2540003	IBA
		GR2550002	
		GR2550004	IBA
		GR2510003	
Attiki	Attiki	GR3000003	
Nisia Aigaiou, Kriti	Voreio Aigaio	GR4110001	Game refuge 5%, IBA
		GR4110004	Game refuge 1%, IBA
		GR4130001	Game refuge 8%
		GR4120004	IBA
	Notio Aigaio	GR4210008	Game refuge 20%, IBA
		GR4220009	Game refuge 10%
		GR4220008	Game refuge 9%, IBA
		GR4220005	
		GR4220010	
		GR4220012	
		GR4220015	
		GR4220018	IBA
		GR4220019	
	Kriti	GR4330004	Game refuge 4%, IBA
		GR4310001	Game refuge 20%
		GR4330001	Game refuge 29%
		GR4310004	
		GR4330003	IBA
		GR4340005	
		GR4340006	
		GR4340010	IBA
		GR4340013	

Status and reasons for decline: The populations of this species are clearly decreasing in number throughout most of the distribution area. In Greece, *Mauremys caspica* is not thought to be a threatened species, but some populations have become extinct as a result of habitat alteration or destruction, pollution and possibly the collection of specimens.

Protective legislation: It is protected by the Greek Presidential Decree 67/1981 and the Bern Convention (Appendix II).

Selected references:

Arnold, E.N., J.A. Burton and D.W. Ovenden. 1978. A field guide to the Reptiles and

Amphibians of Britain and Europe. Harper Collins Publ., London.
Diesener, G. and J. Reichholf. 1986. Lurche und Kriechtiere. Mosaik Verlag, Munchen.
Engelmann, W.E., J. Fritzsche, R. Günther and F.J. Obst. 1985. Lurche und Kriechtiere Europas. Neumann, Leipzig.
Honegger, R.E. 1981. Threatened Amphibians and Reptiles in Europe. Akademische Verlagsgesellschaft, Wiesbaden.
Matz, G. and D. Weber. 1983. Guide des Amphibiens et Reptiles d'Europe. Delachaux & Niestle, Paris.

Caretta caretta (Linnaeus, 1758)

Class: Reptilia, Order: Chelonia, Family: Cheloniidae

Common names: Loggerhead turtle - Καρέττα

Description: Large-sized, horny-shelled sea turtle with a rectilinear carapace length reaching 110 cm but not exceeding 80 cm in the Mediterranean animals. The carapace of adults is oval in sectional view, often rather long, and its colour is brown to reddish-brown. The head is large with strong hooked jaws and the limbs are long, flat, flipper-shaped (especially the forelimbs, which usually bear two claws each). There are 5 costal and usually 3 inframarginal plates on each side of the carapace and plastron, respectively. Also, there are 4 (two pairs) of prefrontals in the middle of the head and 3 postoculars in each side of the head (in the morphologically closer species, the green turtle *Chelonia mydas*, the respective numbers are 4, 4, 2 and 4). In hatchlings, the carapace is 5-6 cm long, dark brown or blackish-brown with darker streaks and has keeled vertebral plates.

Ecology - habits: *Caretta caretta* lives in the warmer waters of the Atlantic Ocean, also entering the North Sea as a vagrant), Mediterranean and Black Seas, and Indian and Pacific Oceans. It is the commonest sea turtle in the Mediterranean. Its food mainly consists of jellyfish and salps (in deep waters), and molluscs, crustaceans, echinoderms and sponges (in shallow waters). Behaviour is rather aggressive. Reproduction is made by oviparity and oviposition takes place in sandy beaches of subtropical and temperate areas, usually during the night. Eggs are laid in a hole dug by the female in a place lying above the tidal line. After oviposition, the eggs are carefully covered with sand. In the Mediterranean area, nesting is known to occur only in Greece, Turkey and Cyprus. The number of females nesting in a given area varies from year to year. The reasons for such fluctuations are not sufficiently known. *Caretta caretta* is the only sea turtle nesting in Greece, and the values of nest density (i.e., the number of nests per km of beach length) concerning the Greek island of Zakynthos, are among the highest all over the world. The nesting beaches of western Peloponnisos are also very significant. The nesting period in Greece lasts from the end of May to late August. The production of more than one clutch of eggs per reproductive period by the same female is not unusual (up to four clutches have been recorded), however, the mature females do not lay eggs every year but mostly every two or three years. The number of eggs in Greek nests roughly ranges from 50 to 200 and the incubation period is about two months.

Distribution: It is distributed throughout all the Greek seas. The main nesting areas are in the island of Zakynthos, western and southern Peloponnisos and the island of Kriti. To a lesser degree, many other coastal localities of the mainland and insular country are also used by

Caretta caretta for ovipoisition.

Occurrence with a high degree (A or B) for Conservation and/or Global Assessment, in the proposed "Natura 2000" sites:

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
Voreia Ellada	Thessalia	GR1430004	Game refuge 1%, Controlled hunting area 2%, Marine Park 88%, IBA, Barcelona Convention 88%
Kentriki Ellada	Ipeiros	GR2110001	IBA, Barcelona Convention 49%, SPA, Ramsar
		GR2110004	IBA, Barcelona Convention, Ramsar, SPA
		GR2140001	IBA
	Ionia Nisia	GR2210002	Biogenetic reserve 49%
	Dytiki Ellada	GR2310001	Natural monument, Game refuge 1%, Ramsar, IBA, Biogenetic reserve, SPA
		GR2310002	Ramsar, IBA, SPA
		GR2320001	Ramsar, IBA
		GR2330005	Game refuge 9%
		GR2330006	Ramsar, IBA, SPA
		GR2330007	
		GR2330008	
	Peloponnisos	GR2540003	IBA
		GR2550003	Natural monument, Controlled hunting area 9%, Biogenetic reserve
		GR2550004	IBA
		GR2550005	
Nisia Aigaiou, Kriti	Notio Aigaio	GR4210009	
		GR4220018	IBA
	Kriti	GR4310004	
		GR4330001	Game refuge 29%
		GR4330004	Game refuge 4%, IBA
		GR4340003	Game refuge 28%, IBA
		GR4340006	
		GR4340010	IBA

Status and reasons for decline: The loggerhead turtle is a seriously threatened species throughout its range. It is included in the Red Data Book of Threatened Vertebrates of Greece under the threat category "Endangered". Destruction or degradation of nesting sites mainly due to building or tourist development are the most serious threats. Electric lights near the nesting beaches negatively affect the adult turtles and disorientate the hatchlings. Nest predation by dogs, foxes and badgers is responsible for the loss of a high percentage (sometimes up to 60%) of the total number of nests on some beaches. Entanglement in fishing nets, killing by boats and pollution from plastics, heavy metals and hydrocarbons are other threats hanging over the turtles.

Protective legislation: *Caretta caretta* is protected by the Greek Presidential Decrees 617/1980 and 67/1981, as well as by a number of Ministerial Decisions. It is also included in the Bern Convention (Appendix II) and the CITES (Appendix I).

Selected references:

Arnold, E.N., J.A. Burton and D.W. Ovenden. 1978. A field guide to the Reptiles and Amphibians of Britain and Europe. Harper Collins Publ., London.

Hellmich, W. 1962. Reptiles and Amphibians of Europe. Blanford Press, London.

Margaritoulis, D. 1992. *Caretta caretta* (Linnaeus, 1758). p. 97-100. In: Karandinos M. (ed.). The Red Data Book of Threatened Vertebrates of Greece. Hellenic Zoological Society & Hellenic Ornithological Society, Athens. 356 p.

Matz, G. and D. Weber. 1983. Guide des Amphibiens et Reptiles d'Europe. Delachaux & Niestle, Paris.

Elaphe quatuorlineata (Lacépède, 1789)

Class: Reptilia, Order: Squamata, Family: Colubridae

Common names: Four-lined snake - Λαφιάτης or Λαφίτης

Description: A robust snake, one of the biggest in its family. Adults usually 130-160 cm long but animals of 200 cm and rarely of 250 cm have been observed. As typical for the colubrid snakes, scaling on top of head consists of 9 large, symmetrically arranged scales. The number of dorsal scales around the mid-body is 25 (rarely 23-27) and that of the ventral scales is 195-234. The tail has two ventral rows of 49-90 scales each. The head is rather long, the pupils are round and the dorsal scales of adults are keeled. There are two preocular scales. Colouring shows variation depending on the geographical area and the individual's age. The adults of western origin (from the Kyklades archipelago, through mainland Greece, to Italy) are brown, yellow-brown or grey, with four dark stripes along both sides of the trunk and a dark streak on the side of the head from the eye to the corner of the mouth. The underside is light-coloured (usually yellowish) with a varying amount of dark markings. The young (until 2-3 years of age) are greyish in background and have a row of dark, broad spots or bars on their back and two series of smaller, dark spots on each flank; head has a dark pattern and the belly has dark markings in two rows or streaks. The young animals of eastern origin (NE Greece, Turkey, Bulgaria and Rumania) have the same colouring and pattern as in western populations. The adults, however, lack dark stripes and often keep the colouring and pattern of the young, or become darker with an invisible or faint pattern.

Ecology - habits: It lives in a wide variety of habitats, preferring some shade and humidity. Often found along the edges of woodland, open woods, maquis, rocky and bushy areas, and cultivated areas. Also found near river and pool edges as well as in marshy areas. In Europe, it occurs up to 1200 m but in Armenia it is found at altitudes of 2500 m. Active from March to November but at the southern end of its range active throughout the year. A diurnal snake with daily activity depending on the season and habitat; it generally avoids heat, often hunting in late afternoon and at dusk and even on cloudy days. It is a non-aggressive snake having climbing and swimming abilities. Its food consists mainly of small mammals (insectivores, rodents, small rabbits), although young birds, eggs and occasionally lizards are also preyed on.

The young feed on small mammals, lizards and large insects. The mating period is during April-May and in June-July. After a gestation period of about 2 months each female lays 3-18 eggs within soft soil or under rocks. The incubation period lasts about two months. Hatchlings are 25-40 cm long and emerge until September.

Distribution: It is widely distributed throughout mainland and insular Greece. Absent from Kriti.

Occurrence with a high degree (A or B) for Conservation and/or Global Assessment, in the proposed "Natura 2000" sites:

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
Voreia Ellada	Anatoliki Makedonia, Thraki	GR1110001	Game refuge 38%, Ramsar, IBA, SPA
	Kentriki Makedonia	GR1260001	Game refuge 1%, Ramsar, IBA, SPA
		GR1240001	Natural monument 4%, Game refuge 28% IBA, Biogenetic reserve 1%
	Thessalia	GR1430004	Marine Park 88%, Controlled hunting area 2%, Game refuge 1%, IBA, Barcelona Convention 88%
		GR1440004	IBA
Kentriki Ellada	Ipeiros	GR2120001	Game refuge 21%, IBA
		GR2130001	Core strict 27%,Peripheral zone 73%, Game refuge 9%, IBA, SPA
		GR2130003	Game refuge 5%, IBA
		GR2110001	Ramsar, IBA, Barcelona Convention 49%, SPA
		GR2110003	Game refuge 27%, IBA
		GR2110004	Ramsar, IBA, Barcelona Convention 100%, SPA
		GR2120002	
		GR2130004	IBA
		GR2140001	IBA
	Ionia Nisia	GR2210001	Ramsar 10%
		GR2220003	
		GR2230001	
		GR2230003	
		GR2240001	
	Dytiki Ellada	GR2310001	Natural monument, Game refuge 1%, Ramsar, IBA, Barcelona Convention, SPA, Biogenetic reserve
		GR2320004	Aesthetic Forest 100%, IBA, SPA
		GR2310006	Game refuge 14%, Ramsar
		GR2310009	
		GR2320001	Ramsar, IBA
		GR2320007	Game refuge 20%
		GR2330002	IBA
		GR2330003	
		GR2330004	

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
	Sterea Ellada	GR2410001	Game refuge 10%
		GR2420001	IBA
		GR2420003	Game refuge 8%, IBA
		GR2420004	Natural monument, IBA
		GR2430002	
	Peloponnisos	GR2550006	Game refuge 3%, IBA
		GR2520006	Natural monument, Game refuge 3%
		GR2530004	Game refuge 9%
		GR2540003	IBA
		GR2540005	
		GR2550001	
		GR2550004	IBA
Nisia Aigaiou, Kriti	Notio Aigaio	GR4220004	Game refuge 10%
		GR4220014	Game refuge 2%, IBA
		GR4220016	
		GR4220007	Game breeding station 100%
		GR4220012	
		GR4220014	Game refuge 2%, IBA

Status and reasons for decline: As a species, this snake seems to be rather unthreatened in Greece. At the population level, habitat destruction (as a result of agricultural and tourist development) and the killing of individuals by humans, constitute the main reasons for declining populations.

Protective legislation: The species is protected by the Greek Presidential Decree 67/1981 and the Bern Convention 1988 (Appendix II).

Selected references

Arnold, E.N., J.A. Burton and D.W. Ovenden. 1978. A field guide to the Reptiles and Amphibians of Britain and Europe. Harper Collins Publ., London.

Böhme, W. and N. Scerbak. 1993. *Elaphe quatuorlineata* (Lacépède, 1789)- Vierstreifennater. p. 373-396. In: Böhme W. (ed.). Handbuch der Reptilien und Amphibien Europas, Band 3/I. AULA - Verlag, Wiesbaden.

Bruno, S., and S. Maugeri. 1990. Serpenti d'Italia e d'Europa. Mondadori, Milano.

Engelmann, W.E., J. Fritzsche, R. Günther and F.J. Obst. 1985. Lurche und Kriechtiere Europas. Neumann, Leipzig.

Gruber, U. 1989. Die Schlangen Europas und rund ums Mittelmeer. Franckh-Kosmos, Stuttgart.

Honegger, R.E. 1981. Threatened Amphibians and Reptiles in Europe. Akademische Verlagsgesellschaft, Wiesbaden.

Matz, G. and D. Weber. 1983. Guide des Amphibiens et Reptiles d'Europe. Delachaux & Niestle, Paris.

Elaphe situla (Linnaeus, 1758)
Class: Reptilia, Order: Squamata, Family: Colubridae

Common names: Leopard snake - Σπιτόφιδο

Description: A medium-sized, slender snake very rarely exceeding 100 cm (usually 70-90 cm). Dorsal scales at mid-body are in 27 (occasionally 23, 25 or 29) longitudinal rows; there are 215-260 ventral scales and 54-92 scales in each of the two subcaudal rows. The distinct head is rather narrow, the pupils are round and the dorsal scales are smooth. There is usually one preocular scale. The colouring and pattern is quite variable but usually the same in adults and juveniles. The basic colour is greyish, yellowish or buff. Along the back a row of almost rounded, black-edged, brown to red-brown large spots exists. In many animals these spots are (or tend to be) divided in two or replaced by two dark-edged brown or red-brown longitudinal stripes. In all cases, on the head top and neck these spots or stripes form a Y-shaped "crown". Additional dark markings also occur on head top and sides. Sometimes in adult animals, the back pattern is of less vivid colours. On each flank there is a row of smaller, red-brown or dark spots. Underside is yellowish with many dark markings towards the tail. Eyes are red-brown.

Ecology - habits: It is encountered in sunny habitats such as areas with Mediterranean type vegetation (phrygana, maquis), cultivated areas, edges of deciduous forests, rocky areas and dry-stone walls, roadsides, gardens and around buildings. Sometimes near marshes and streams. Usually found at altitudes of 500- 700 m but in Greece it has been observed in localities up to 1600 m. It is a ground-dwelling snake also climbing quite well. Mainly a diurnal animal sometimes being active at dusk. Its daily activity depends on the area of its distribution. Hibernation lasts from October or November to April but at the southern parts of its range it may not hibernate. The adults mostly prey upon small rodents and occasionally lizards, birds and their eggs, whereas the young feed on lizards and large insects. A calm, non-aggressive snake. The reproductive season starts late in spring (mid-May to June) and after about 1.5 months females lay 2- 7 eggs. Often two clutches per year are produced. The first clutch is laid until early July and the second in late July or early August. Hatchlings appear after an incubation period of 50- 70 days and they are 30-35 cm long.

Distribution: It is distributed throughout the mainland and on most of the islands of the Ionio Pelagos (Ionian Sea), Aigaio Pelagos (Aegean Sea), and on Kriti.

Occurrence with a high degree (A or B) for Conservation and/or Global Assessment, in the proposed "Natura 2000" sites:

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
Voreia Ellada	Anatoliki Makedonia, Thraki	GR1110001	Game refuge 38%, Ramsar, IBA, SPA
	Kentriki Makedonia	GR1260001	Game refuge 1%, Ramsar, IBA, SPA
	Dytiki Makedonia	GR1310003	Core strict 49%, Peripheral zone 51%, Game refuge 21%, IBA, SPA, Biogenetic reserve

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
		GR1310002	Core strict 100%, Game refuge 6%, IBA, SPA, Biogenetic reserve
	Thessalia	GR1420003	Aesthetic Forest 100%, Controlled hunting area 80%, IBA, SPA
		GR1430004	Marine Park 88%, Controlled hunting area 2%, Game refuge 1%, Barcelona convention, IBA
		GR1430002	Aesthetic Forest 20%, IBA, Biogenetic reserve
		GR1430001	Game refuge 20%, IBA
		GR1440001	Game refuge 29%
		GR1440002	Controlled hunting area 85%, IBA
		GR1440003	Game refuge 7%, Controlled hunting area 1%, IBA, World Heritage site
Kentriki Ellada	Ipeiros	GR2130001	Core strict 27%, Peripheral zone 73%, Game refuge 9%, IBA, SPA
		GR2110001	Ramsar, IBA, Barcelona Convention 49%
		GR2110004	Ramsar, IBA, Barcelona Convention 100%, SPA
		GR2130003	Game refuge 5%, IBA
		GR2130004	IBA
		GR2130005	
	Ionia Nisia	GR2220002	Core strict 100%, Biogenetic reserve, SPA
		GR2210001	
		GR2210002	Biogenetic reserve 49%
		GR2220001	IBA
	Dytiki Ellada	GR2320004	Aesthetic Forest 100%, IBA, SPA
		GR2320001	Ramsar, IBA
		GR2320005	IBA
		GR2320007	Game refuge 20%
		GR2330001	
		GR2320003	Game refuge 27%, IBA
	Sterea Ellada	GR2420004	Natural monument, IBA
		GR2410001	Game refuge 10%
		GR2430001	Game refuge 50%
		GR2420003	Game refuge 8%, IBA
		GR2430002	
		GR2440003	Peripheral zone 35%
		GR2450004	
	Peloponnisos	GR2550006	Game refuge 3%, IBA
		GR2520006	Game refuge 3%, Natural monument
		GR2520001	Game refuge 2%
		GR2530002	Game refuge 7%, IBA
		GR2540002	Game refuge 5%
		GR2510002	
		GR2520003	Game refuge 8%
		GR2530004	Game refuge 9%
		GR2530005	Game refuge 19%

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
		GR2540003	IBA
		GR2540004	IBA
		GR2540005	
		GR2550004	IBA
		GR2550005	
Attiki	Attiki	GR3000007	Game refuge 15%
		GR3000003	
		GR3000004	
Nisia Aigaiou, Kriti	Voreio Aigaio	GR4130001	Game refuge 8%
	Notio Aigaio	GR4210005	Natural monument 1%, Biogenetic reserve 1%
		GR4210008	Game refuge 20%, IBA
		GR4220003	
		GR4220009	Game refuge 10%
		GR4220008	Game refuge 9%, IBA
		GR4220005	
		GR4220010	
		GR4220018	IBA
	Kriti	GR4310002	IBA
		GR4310004	
		GR4310005	IBA
		GR4310006	IBA, Game refuge 12%
		GR4330003	IBA
		GR4340001	
		GR4340006	
		GR4340007	
		GR4340010	IBA
		GR4330004	Game refuge 4%, IBA
		GR4320002	Game refuge 3%, IBA

Status and reasons for decline: It is not threatened in Greece. However, increasing habitat loss (because of expansion of agricultural areas, tourist development, etc.), killing due to ignorance and prejudice, and overcollection, are the reasons possibly explaining the local rarity of this species.

Protective legislation: This species is protected by the Greek Presidential Decree 67/1981 and the Bern Convention (Appendix II).

Selected references:

Arnold, E.N., J.A. Burton and D.W. Ovenden. 1978. A field guide to the Reptiles and Amphibians of Britain and Europe. Harper Collins Publ., London.

Bruno, S. and S. Maugeri. 1990. Serpenti d'Italia e d'Europa. Mondadori, Milano.

Engelmann, W.E., J. Fritzsche, R. Günther and F.J. Obst. 1985. Lurche und Kriechtiere Europas. Neumann, Leipzig.

Gruber, U. 1989. Die Schlangen Europas und rund ums Mittelmeer. Franckh-Kosmos, Stuttgart.

Honegger, R.E. 1981. Threatened Amphibians and Reptiles in Europe. Akademische Verlagsgesellschaft, Wiesbaden.

Matz, G. and D. Weber. 1983. Guide des Amphibiens et Reptiles d'Europe. Delachaux & Niestle, Paris.

Obst, F.J., N. Scerbak and W. Böhme. 1993. *Elaphe situla* (Linnaeus, 1758) Leopardnatter. p. 433-453. In: Böhme W. (ed.). Handbuch der Reptilien und Amphibien Europas, Band 3/I. AULA - Verlag, Wiesbaden.

Vipera schweizeri Werner, 1935

Class: Reptilia, Order: Squamata, Family: Viperidae

Synonyms: *Vipera lebetina schweizeri, Macrovipera schweizeri*
Common names: Blunt-nosed viper - Οχιά της Μήλου or Λασπόχεντρα or Θεριό

Description: A middle-sized snake. Its body length is usually 80-100 cm but occasionally up to 120 cm. Like all European vipers, it has a plump body with a short tail. The flattened, rounded, distinct head is covered by many small, almost equal-sized scales. It is easily distinguished from the nose-horned viper, *Vipera ammodytes*, by the lack of a distinct nose horn. The absence of supraocular scales differentiates it from *V. xanthina* which has one large supraocular on the top of the head over each eye. Usually it has 23 (21-25) longitudinal scale rows at mid-body, 126-181 ventral scales, and two rows of 33-58 scales each on the ventral surface of the tail. Colouring varies but usually females are grey-brown and males grey or yellowish-grey. Often there are four rows of rather weakly defined brownish blotches along the body, the two central ones joining on the mid-line. Both sexes are brighter coloured in Spring. Underside is pale with small dark markings, often yellow on tail tips. In some areas of Milos island a rare "red morph" is encountered with an impressive uniform dark red-brown colour without markings. Juveniles are usually grey-blue with four series of dark olive markings along the body.

Ecology - habits: Found in moist habitats, dry torrents, reed-beds and cultivated land. Occasionally in dry places with garrigue and maquis vegetation and on dry-stone walls. A good climber and swimmer. It is a mainly diurnal snake that is also active at dusk or early in the night during the summer. It preys upon small mammals, birds and their nestlings, and small snakes; the young feed on lizards and insects. Mating occurs in May. The female lays 5-12 eggs. Incubation lasts 30-45 days and the young hatch out in August. Hatchlings are 18-25 cm long. It is the only egg-laying viper in Europe. It is not an aggressive snake and whistles before attacking. Its venom is quite toxic compared to other vipers.

Distribution: The Greek populations of this snake are distributed on the islands of Milos (the biggest Greek population, about 90%), Kimolos, Polyaigos and Sifnos, all in the southwest Kyklades archipelago, Aigaio Pelagos (Aegean Sea). According to recent opinion, these populations belong to a distinct species, *Macrovipera schweizeri*, which is endemic to Greece.

Occurrence with a high degree (A or B) for Conservation and/or Global Assessment, in the proposed "Natura 2000" sites:

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
Nisia Aigaiou, Kriti	Notio Aigaio	GR4220005 GR4220006	

Status and reasons for decline: This taxon is threatened in Greece, mentioned in the Red Data Book of Threatened Vertebrates under the category "Endangered". The isolated populations, the ignorance of local communities and the high demand for animals for foreign research centres and collectors, seriously threaten this species that is on the verge of extinction. Greek animals are estimated at 5,000-9,000 individuals and 90% of them are found on the island of Milos.

Protective legislation: It is protected by the Greek Presidential Decree 67/1981 and the Bern Convention (Appendix II).

Selected references:

Arnold, E.N., J.A. Burton, and D.W. Ovenden. 1978. A field guide to the Reptiles and Amphibians of Britain and Europe. Harper Collins Publ., London.

Bruno, S. and S. Maugeri. 1990. - Serpenti d'Italia e d'Europa. Mondadori, Milano.

Engelmann, W.E., J. Fritzsche, R. Günther, and F.J. Obst. 1985. - Lurche und Kriechtiere Europas. Neumann. Leipzig, Stuttgart.

Gruber, U. 1989. Die Schlangen Europas und rund ums Mittelmeer. Franckh-Kosmos, Stuttgart.

Matz, G. and D. Weber. 1983. - Guide des Amphibiens et Reptiles d'Europe. Delachaux & Niestle, Paris.

Paraschi, L. and B. Chondropoulos. 1992. - *Vipera lebetina* (Linnaeus, 1758). p. 103-105. In: Karandinos M. (ed.). The Red Data Book of Threatened Vertebrates of Greece. Hellenic Zoological Society & Hellenic Ornithological Society, Athens. 356 p.

Stubbs, D. 1985. Biogenetic Reserve Assessment for *Vipera lebetina schweizeri* and *Podarcis milensis* in the Western Cyclades. European Committee for the Conservation of Nature and Natural Resources, Council of Europe. Strasbourg, France.

Vipera ursinii (Bonaparte, 1835)

Class: Reptilia, Order: Squamata, Family: Viperidae

Common names: Orsinis viper - Νανόχεντρα

Description: The smallest viper in Europe. Its total body length is 35-50 cm, occasionally up to 70 cm. Females tend to be longer than males. A rather thick snake with an elongated head. It is easily distinguished from the other Greek vipers by the occurrence of the well-developed frontal and parietal scales on the middle part of the top of its head. These scales also exist in another Greek viper, *Vipera berus*, from which *V. ursinii* differs by its smaller adult size, in having a narrower head, smaller parietal than frontal, and upper preocular nearly always in

contact with the nasal scale. The dorsal scales of *V. ursinii* are more obviously keeled and arranged at mid-body in 19 longitudinal series instead of usually 21 in *V. berus*. There are 114-152 ventral scales and subcaudal scales are in two rows of 19-41 scales each. The colouring varies; the ground colour is usually light grey, brownish or yellowish with a dark zig-zagged dorsal stripe edged in black, sometimes partly broken into spots. Flanks are darker, with a row of dark spots. Underside is dark grey to black, whitish or pinky, often with spots. Underside of tail tip yellow or dark with small, yellow spots. Melanistic animals are rare. As with all vipers, it is a solenoglyphic snake.

Ecology - habits: A montane species being found up to 2500 m but lowland populations are also known to occur in some parts of the species' range. It occurs in dry, rocky areas with low vegetation. Also found in meadows, edges of woodland or clearings, as well as near water or in moist places. A diurnal snake feeding on small lizards, beatles, crickets, grasshoppers and occasionally on small rodents. The hibernation period is long (up to 6 months in the north) and takes place under rocks, in vole galleries or under snow. It is an ovoviviparous species. The mating period starts in mid-April to May and the first juveniles appear in August and through September. A gravid female usually gives birth to 3-8 young (in extraordinary cases, up to 27) that are 12-18 cm long. It is not an aggressive snake and its venom is less toxic than that of the other European vipers.

Distribution: This species has a discontinuous distribution area in Greece. Its populations are always loose, confined to mountainous areas of Makedonia, Ipeiros and Thessalia, and they are the southernmost populations of this species in Europe.

Occurrence with a high degree (A or B) for Conservation and/or Global Assessment, in the proposed "Natura 2000" sites:

NUTS I	NUTS II	SITE CODE	DESIGNATION TYPE
Voreia Ellada	Dytiki Makedonia	GR1310003	Core strict 49%, Peripheral zone 51%, Game refuge 21%, SPA, IBA, Biogenetic reserve 49%
		GR1310002	Core strict 100%,Game refuge 6%, Biogenetic reserve 100%, IBA, SPA
Kentriki Ellada	Ipeiros	GR2130001	Core strict 27%, Peripheral zone 73%, Game refuge 9%, IBA, SPA
		GR2110002	Game refuge 11%, IBA
		GR2130007	Game refuge 13%

Status and reasons for decline: This species is threatened throughout its distribution. In Greece, it is characterized as "Rare" according to the Red Data Book of Threatened Vertebrates of Greece. The real status of the Greek populations is unknown but they are small and isolated, thus being vulnerable to even mild human interference within their habitats. Collection for scientific or trading purposes also possibly has a critical effect on populations.

Protective legislation: It is protected by the Bern Convention (Appendix II) and the CITES (Appendix I).

Selected references:

Arnold, E.N., J.A. Burton and D.W. Ovenden. 1978. A field guide to the Reptiles and

Amphibians of Britain and Europe. Harper Collins Publ., London.

Bruno, S. and S. Maugeri. 1990. Serpenti d'Italia e d'Europa. Mondadori, Milano.

Dimitropoulos, A. and B. Chondropoulos. 1992. *Vipera ursinii* (Bonaparte, 1835). p. 108-109. In: Karandinos M. (ed.). The Red Data Book of Threatened Vertebrates of Greece. Hellenic Zoological Society & Hellenic Ornithological Society, Athens. 356 p.

Engelmann, W.E., J. Fritzsche, R. Günther and F.J. Obst. 1985. Lurche und Kriechtiere Europas. Neumann, Leipzig.

Gruber, U. 1989. Die Schlangen Europas und rund ums Mittelmeer. Franckh-Kosmos, Stuttgart.

Honegger, R.E. 1981. Threatened Amphibians and Reptiles in Europe. Akademische Verlagsgesellschaft, Wiesbaden.

Matz, G. and D. Weber. 1983. Guide des Amphibiens et Reptiles d'Europe. Delachaux & Niestle, Paris.