



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**

01

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.1. THE DIVERSITY OF THE FAUNA OF GREECE

*by Dimitra Bobori, B.P. Chondropoulos, P.S. Economidis,  
Vasiliki Flari, S.E. Fragedakis-Tsolis, S. Kazantzidis,  
Maria Lazaridou-Dimitriadou, A. Legakis, E. Valakos and V.P. Vogiatzis*

### E.1.1. Introduction

It is well known that the fauna of Greece is very rich compared to that of the other European States. The number of animal species recorded so far is high in relation to the surface of Greece. This is mainly due to the geographical position of Greece which lies at the crossroads of Europe, Asia and Africa, to the existence of many islands and the fluctuation of the sea level, to the karstic nature of the substrate that resulted in Greece having the highest number of caves in Europe after Yugoslavia and finally due to the fact that the glaciers didn't reach Greece and refuge areas for many species were created in the north. However, the long presence of man has created pressures on many populations and has even led several species and subspecies to extinction. The Habitat Directive, although not as complete as would have been expected, is a good opportunity to conserve what still exists today.

The animal species listed in the Annexes to Directives 92/43/EEC and 79/409/EEC include many of the species encountered in Greece. Among the approximately 200 species of Annex II to Directive 92/43/EEC, 76 have been recorded in Greece, including mammals, reptiles, amphibians, fish and invertebrates. To these we should add 129 species of birds that are included in Annex I to Directive 79/409/EEC (Fig. E.1).

Of the approximately 280 species of Annex IV to Directive 92/43/EEC (species of Community interest that require strict protection), 126 species have been recorded in Greece: 52 mammals, 40 reptiles, 11 amphibians, 2 freshwater fish and 21 invertebrates. Finally, among the approximately 60 species of Annex V (species of Community interest that can be removed from nature or exploited under control), 4 mammals, 2 amphibians, 13 freshwater fish and 8 invertebrates have been recorded in Greece.

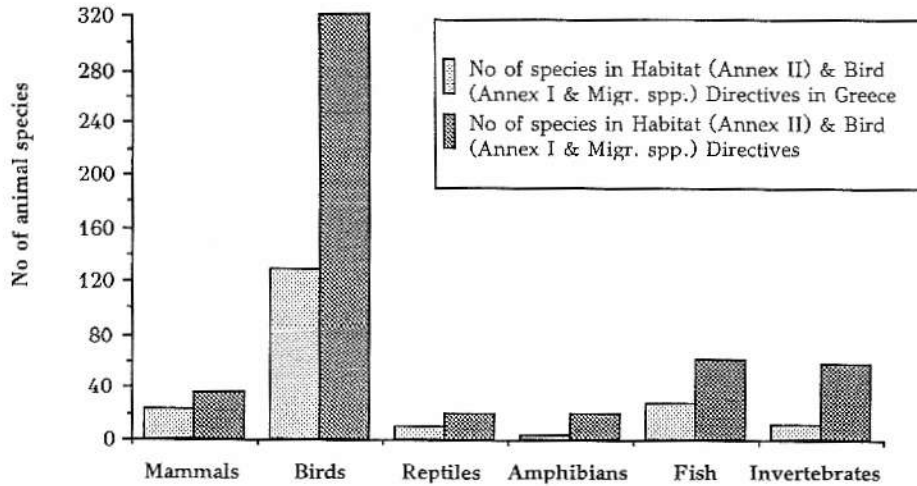


Fig. E.1. Number of species listed in Annex II to Directive 92/43/EEC, species in Annex I to Directive 79/409/EEC and migratory birds of Directive 79/409/EEC, recorded in Greece and Europe.

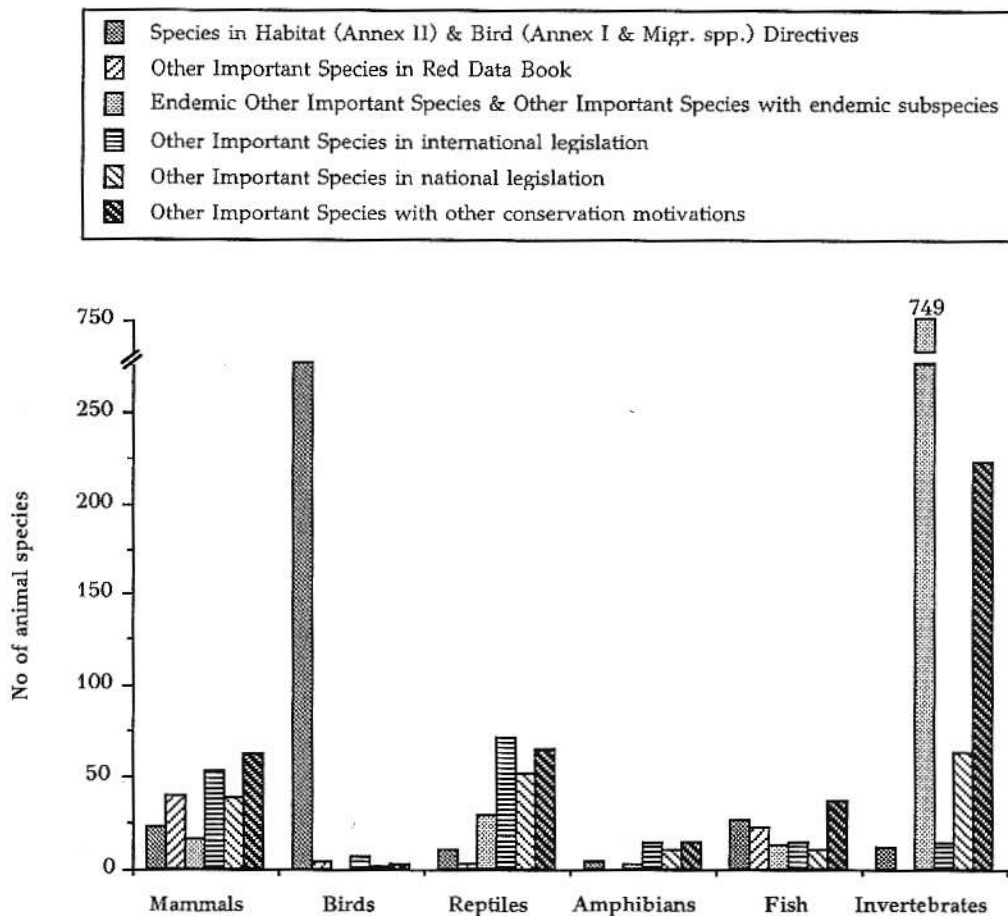


Fig. E.2. Number of species listed in Annex II to Directive 92/43/EEC, species in Annex I to Directive 79/409/EEC and migratory species of Directive 79/409/EEC, recorded in the Red Data Book of Threatened Vertebrates, endemic species and species with endemic subspecies, species in the international and national legislation and other threatened species.

Most of the important vertebrates of Greece are included in the Annexes to Directive 92/43/EEC satisfactorily, one exception being the freshwater fish. Greece hosts many endemic, rare and threatened species and subspecies, a large number of which are not included in the directive. Moreover, the group of invertebrates is the least represented. It is estimated that approximately 25,000 species of invertebrates are found in Greece. Of these, at least 2,000 are endemic to Greece, some of them being very narrowly endemic. For example, many species have been recorded in only one site. Apart from the endemics, a significant number of species have very small populations or are threatened with extinction. However, only 33 species found in Greece have been included in the various Annexes to the Directive. Some of them are not threatened in Greece, whereas, several species that are representative of threatened habitats such as caves or sand dunes, are omitted.

One significant aspect that arose from the collection of data on the fauna was the identification of species that, although not included in Annex II to the Habitat Directive and Annex I to the Bird Directive, were considered as important by the experts. Such species would comprise those included in the Red Data Book of the Threatened Vertebrates of Greece and in various international conventions such as the Bern and Bonn Conventions and CITES or in the national legislation, the endemic species of Greece as well as other species that are rare or threatened with extinction (Fig. E.2). These species were recorded in two fields of the Standard Data Form: field 3.3 "Other Important Species" and field 3.4 "Greek Important Species". For the sake of clarity, species in both fields will be called henceforth Other Important Species. The recording of all these species, which certainly was not complete since it requires a long-term research, gave a better view of the biological diversity and the conservation status of the sites that were studied. The recording of these species will also aid in the adaptation of the Annexes to the Directive 92/43/EEC so that it can become a more useful and effective tool for nature conservation.

### E.1.2. Methods

Most of the data presented in the Standard Data Forms (SDFs) for the proposed sites derive from literature. A small proportion comes from unpublished records of the SDFs' editors and from confirmed reports of local forestry and other officials. Recent literature was mainly scanned for data. Very old references were not taken into account as their data may have changed significantly over time. The majority of the literature on the invertebrates and a significant part of the vertebrate literature came from the archives of the Hellenic Zoological Society and the archives of the Project for the Survey of the Greek Fauna of the Dept. of Biology of the University of Athens. Unpublished data was also supplied by the Hellenic Society for the Conservation of Nature and Cultural Heritage, WWF-Greece, the Hellenic Society for the Study and Protection of the Monk Seal, the Society for the Protection of Sea Turtles and Arcturos, the Bear Protection Society.

SDFs editors reported on the reasons for which they thought that the other important species should be included in the database. These reasons (motivations) were discerned into four categories. Motivation A included all taxa contained in the Red Data Book of Threatened Vertebrates of Greece. Motivation B included all the taxa endemic to Greece. Motivation C included taxa that are mentioned in international conventions, namely the Bern, Bonn and CITES. Finally, motivation D included other reasons, such as national legislation, international lists of threatened species (IUCN, Council of Europe etc.), Balkan endemics, locally endangered taxa etc.

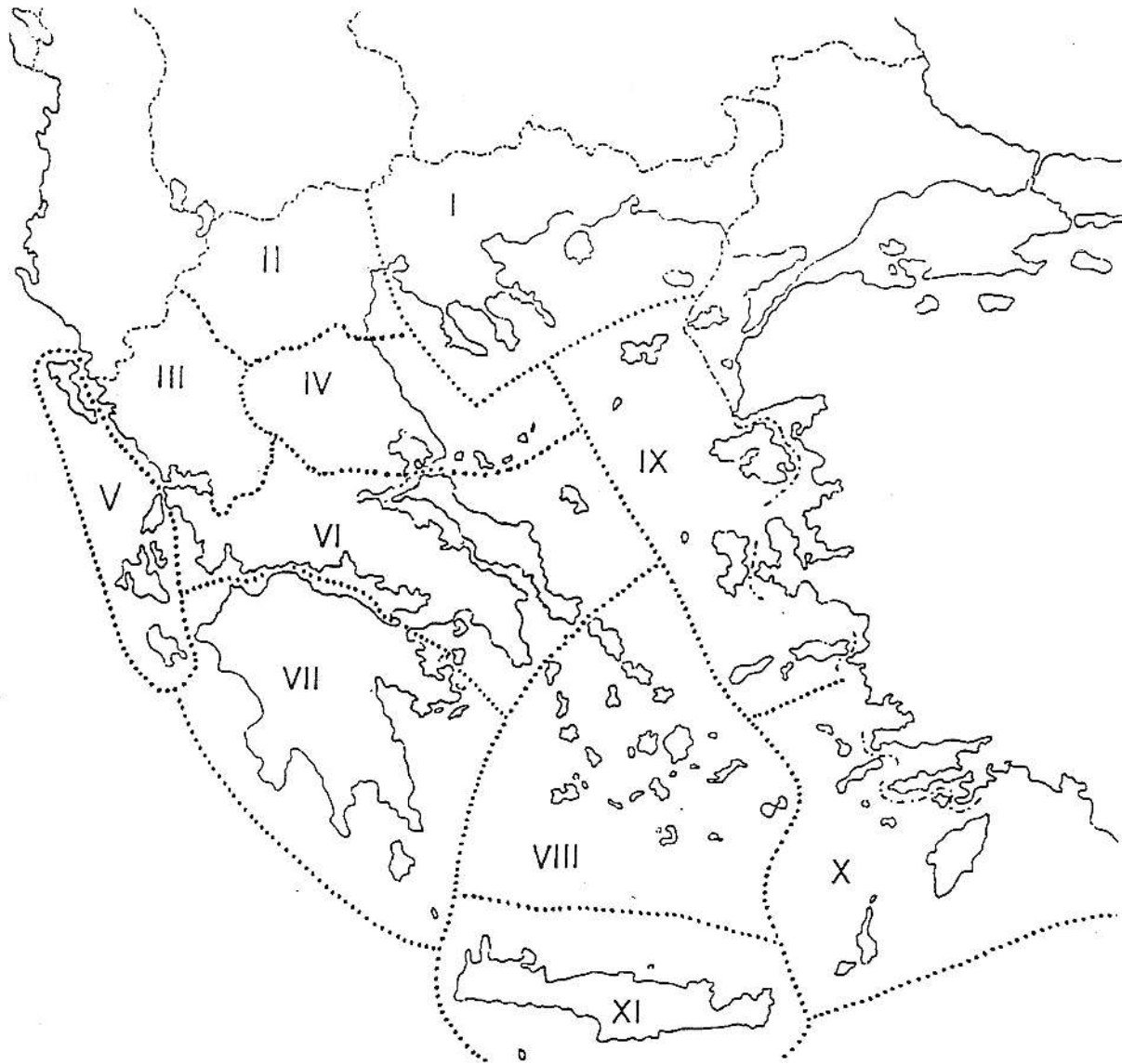
Of the 296 proposed sites, 274 were taken into consideration during data processing since the rest 22 sites were parts of larger designated sites.

It was decided to use zoogeographical regions for the analysis of the data instead of NUTS divisions because the latter are not meaningful for the distribution of animals in Greece. However, the NUTS divisions are used when presenting the sites where the Directives species were recorded. The zoogeographical regions of Greece are those accepted by many researchers (Map E.1). In Table E.1 the regions and the corresponding NUTS divisions are listed.

Table E.1. Zoogeographical regions of Greece.

Zoogeographical region	NUTS 1	NUTS 2	NUTS 3
I: Voreia Anatoliki Ellada (VAE)	Voreia Ellada	Anatoliki Makedonia, Thraki, Kentriki Makedonia (part)	Evros, Xanthi, Rodopi, Drama, Kavala, Serres, Kilkis, Thessaloniki, Chalkidiki
II: Voreia Dytiki Ellada (VDE)	Voreia Ellada	Kentriki Makedonia (part), Dytiki Makedonia	Pella, Imathia, Pieria, Florina, Kozani, Kastoria, Grevena
IV: Thessalia (TH)	Voreia Ellada	Thessalia	Karditsa, Larisa, Magnisia, Trikala
III: Ipeiros (IP)	Kentriki Ellada	Ipeiros	Arta, Thesprotia, Ioannina, Preveza
V: Ionia nisia (IOL)	Kentriki Ellada	Ionia nisia	Zakynthos, Kefallinia, Kerkyra, Lefkada
VI: Sterea Ellada (STE)	Kentriki Ellada, Attiki (part), Peloponnisos (part)	Dytiki Ellada (part), Sterea Ellada, Attiki (part), Peloponnisos (part)	Aitoloakarnania, Voiotia, Evvoia, Evrytania, Fthiotida, Fokida, Attiki (part), Korinthia (part)
VII: Peloponnisos (PE)	Kentriki Ellada, Attiki (part)	Peloponnisos, Dytiki Ellada (part), Attiki (part)	Achaia, Ileia, Argolida, Arkadia, Korinthia (part), Lakonia, Messinia, Attiki (part)
IX: Voreio Aigaio (VAi)	Nisia Aigaiou, Kriti	Voreio Aigaio	Lesvos, Samos, Chios
X: Dodekanisa (DO)	Nisia Aigaiou, Kriti	Notio Aigaio	Dodekanisos (part)
VIII: Kyklades (KYK)	Nisia Aigaiou, Kriti	Notio Aigaio	Kyklades, Dodekanisos (part)
XI: Kriti (KR)	Nisia Aigaiou, Kriti	Kriti	Irakleio, Lasithi, Rethymni, Chania

In the text that follows, names of places were mentioned using the Greek Standards Organization (ELOT) rules.



**Map E.1.** Zoogeographical regions of Greece. Modified after (a) W. Kuehnelt, 1965. *Catalogus Faunae Graeciae. Pars I. Tenebrionidae*, and (b) F. Willemse, 1984. *Catalogue of the Orthoptera of Greece. Fauna Graeciae I. Hellenic Zoological Society*. (I: Voreia Anatoliki Ellada, II: Voreia Dytiki Ellada, III: Ipeiros, IV: Thessalia, V: Ionia nisia, VI: Sterea Ellada, VII: Peloponnisos, VIII: Kyklades, IX: Voreio Aigaio, X: Dodekanisa, XI: Kriti)

### E.1.3. General comments

A total of 1532 species and subspecies (the latter concern vertebrates only), covering a large number of animal groups, were recorded in the proposed sites (Fig. E.3). Of these, 351 are listed in Annex II to the Habitat Directive and in Annex I to Bird Directive or are migratory species, while 1183 were recorded as Other Important Species (fields 3.3 and 3.4 of the SDF). Of all the 1532 recorded animal species only 23% are species of the two Directives, and 3% are priority species.

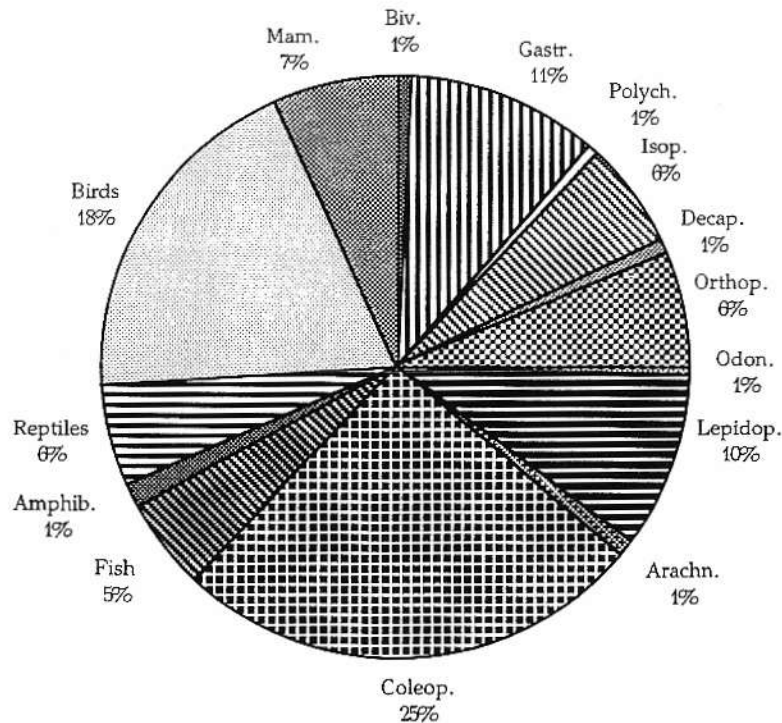


Fig. E.3. Percentage of each animal group in the total number of Annex II to Directive 92/43/EEC and Other Important Species. (Biv.=Bivalvia, Gastr.=Gastropoda, Polych.=Polychaeta, Arachn.=Arachnidia, Isop.=Isopoda, Decap.=Decapoda, Orthop.=Orthoptera, Odon.=Odonata, Lepidop.=Lepidoptera, Coleop.=Coleoptera, Amphib.=Amphibia, Mam.=Mammalia). Groups Porifera, Cnidozoa, Polyplacophora, Amphipoda, Diplopoda, Diplura, Heteroptera, Trichoptera, Echinoderma and Ascidia are represented by a percentage less than 1; therefore, they are not shown on the graph.

The majority of the recorded species are invertebrates most of which are registered in fields 3.3 and 3.4 of the SDFs as Other Important Species. The bird species are also numerous but almost all of them are included in Directive 79/409/EEC (Fig. E.2).

The taxa recorded were distributed in all the zoogeographical regions of Greece. The lowest number of taxa was recorded in the North Aegean (Voreio Aigaiio) islands and the highest in Sterea Ellada and Peloponnisos (Fig. E.4).

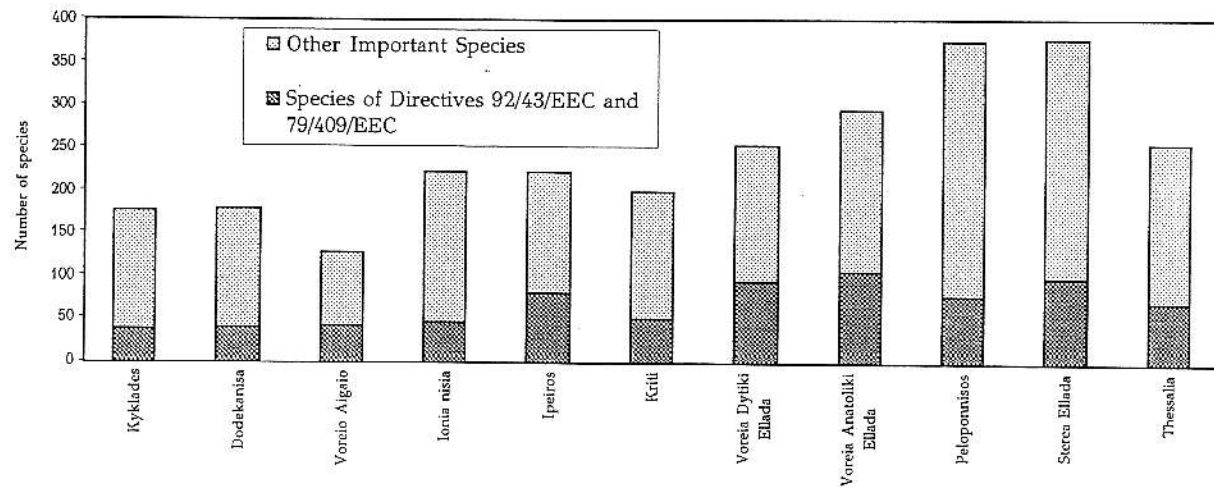


Fig. E.4. Number of Other Important Species and species referred to Directives 92/43/EEC and 79/409/EEC per zoogeographical region.

Fifty six percent of the sites host at least one species in the fields Other and Greek Important Species while 46% of the sites host at least one species mentioned in one of the Directives. Priority species have been recorded in 11% of the sites.

The endemic species which are important for Greece are distributed in the various zoogeographical regions as shown in Fig. E.5 to E.8. Endemic mammals and reptiles are mostly distributed in southern and insular Greece, endemic amphibians (2 subspecies) in central Greece and in Crete and endemic fish in northern and central Greece. There were no endemic birds while the data on invertebrates was considered as incomplete and would not produce meaningful results.

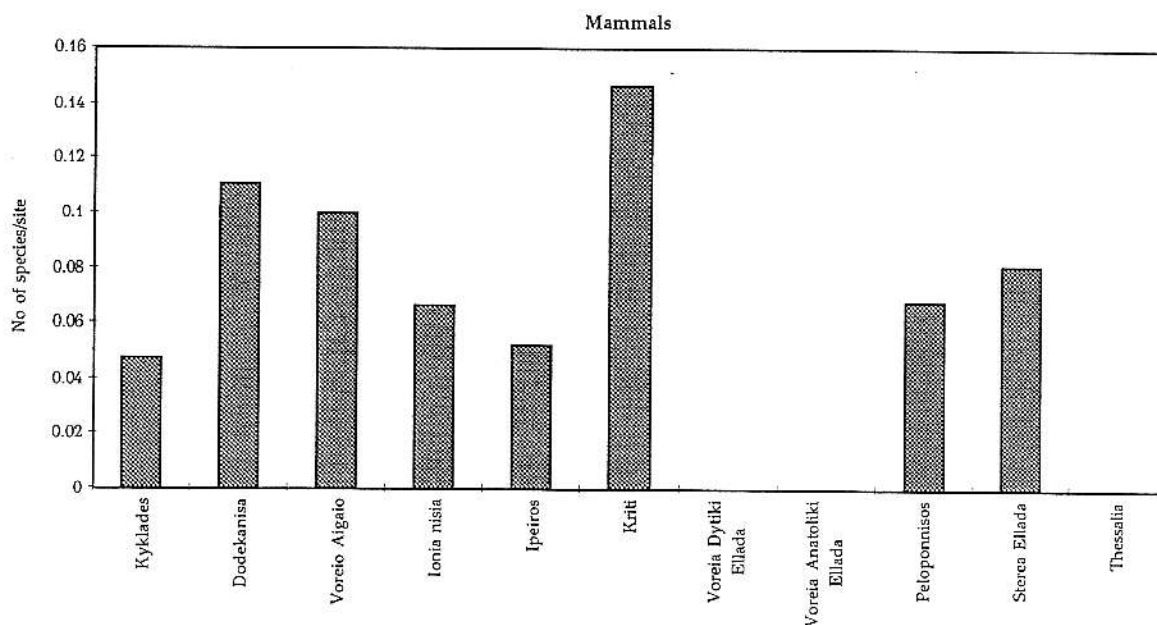


Fig. E.5. Number of endemic mammal species and species with endemic subspecies per site in each zoogeographical region.



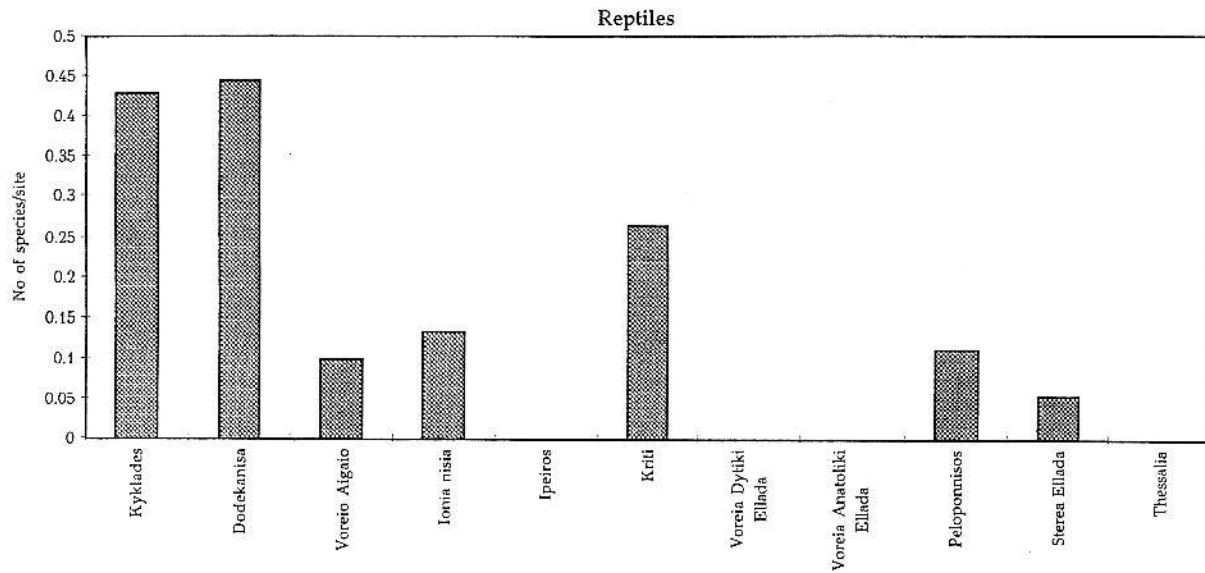


Fig. E.6. Number of endemic reptile species and species with endemic subspecies per site in each zoogeographical region.

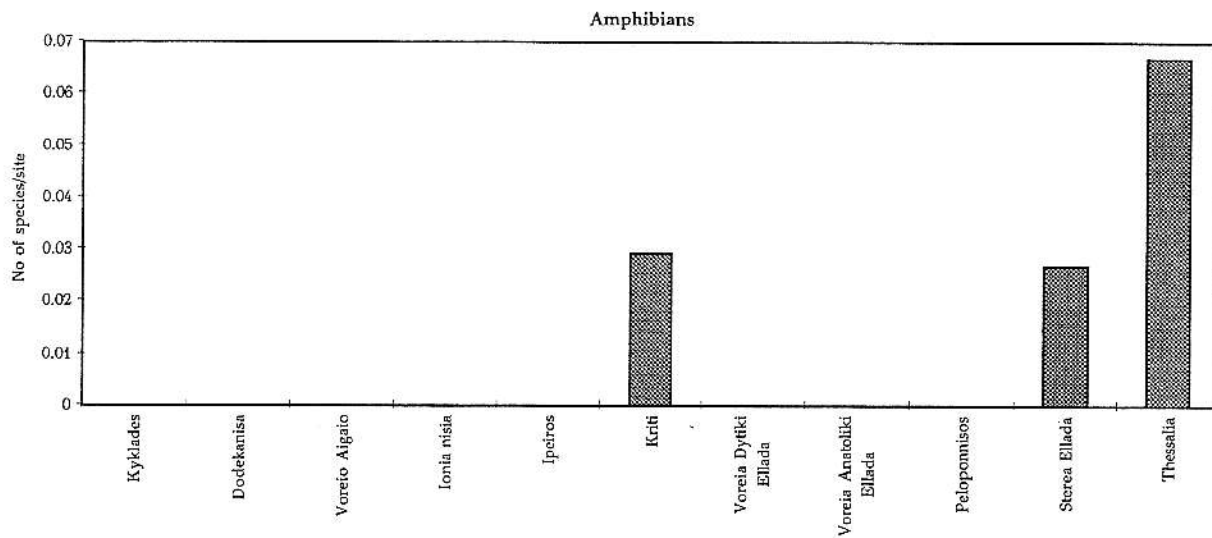


Fig. E.7. Number of endemic amphibian species and species with endemic subspecies per site in each zoogeographical region.

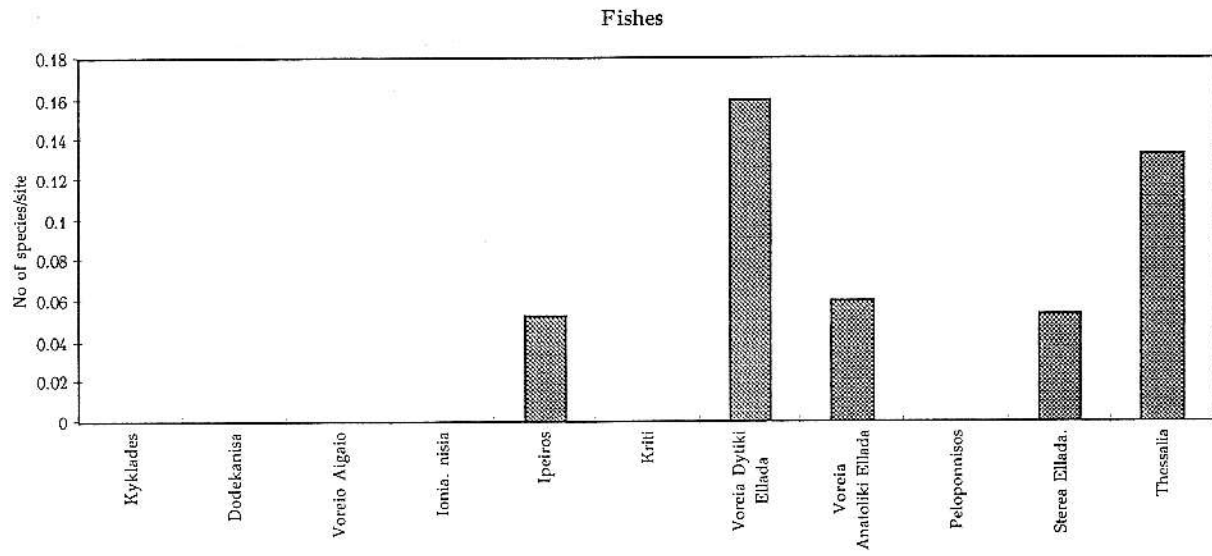


Fig. E.8. Number of endemic fish species and species with endemic subspecies per site in each zoogeographical region.

#### E.1.4. Habitat Directive Annex II species and Birds Directive Annex I and migratory species

Three hundred and fifty one animal species belonging to Annex II to Directive 92/43/EEC, migratory species and species of Annex I to Directive 79/409/EEC were recorded in the sites that have been proposed as Sites of Community Importance. Eleven of them are priority species: 3 fish, 3 mammals, 2 reptiles, and 3 invertebrates. In Table E.2 the scientific names of the species, the number of sites where these were recorded and the motivation (A, B, C, and D) for each one are given.

**Table E.2.** Species of Annex II to Directive 92/43/EEC, Annex I to Directive 79/409/EEC and migratory species of Directive 79/409/EEC recorded in Greece. A, B, C and D correspond to the motivation categories A: Red Data Book, B: Endemic taxa, C: International Convention D: Other reasons. (Detailed explanation of symbols is given at the end of the table).

#### MAMMALS (22 spp.)

Taxa	No of sites	A	B	C	D
<b>Order Chiroptera (12 spp.)</b>					
<i>Barbastella barbastellus</i>	3	R		II	3
<i>Miniopterus schreibersii</i>	11	E		II	1,3
<i>Myotis bechsteinii</i>	4	R		II	3
<i>Myotis blythi</i>	22	V		II	1,3
<i>Myotis capaccinii</i>	7	E		II	1,2,3
<i>Myotis emarginatus</i>	11	E		II	1,3
<i>Myotis myotis</i>	14	E		II	1,2,3,4
<i>Rhinolophus blasii</i>	14	E		II	1,2,3
<i>Rhinolophus euryale</i>	4	E		II	1,2,3
<i>Rhinolophus ferrumequinum</i>	35	V		II	1,3
<i>Rhinolophus hipposideros</i>	22	V		II	1,3
<i>Rhinolophus mehelyi</i>	5	E		II	1,3
<b>Order Rodentia (1 sp.)</b>					
<i>Citellus citellus</i>	28	V		II	1,3
<b>Order Carnivora (4 spp.)</b>					
<i>Canis lupus</i>	5	V		II,II	2,3,4
<i>Lutra lutra</i>	61	V		II,I	1,2,3,4
<i>Lynx lynx</i>	2	E		III	2,3
<i>Ursus arctos</i>	31	E		II,II	2,3
<b>Order Pinnipedia (1 sp.)</b>					
<i>Monachus monachus</i>	68	E		II,I,I/II	1,2,3,4
<b>Order Artiodactyla (2 spp.)</b>					
<i>Capra aegagrus</i>	5	E		II	3
<i>Rupicapra rupicapra balcanica</i>	20	R		III	3
<b>Order Cetacea (2 spp.)</b>					
<i>Phocoena phocoena</i>	1	R		II,II	1,2,3,4
<i>Tursiops truncatus</i>	19			II,II	1,3

**BIRDS** (276 spp.)

Taxa	No of sites	A	B	C	D
<b>Order Gaviiformes</b> (2 spp.)					
<i>Gavia arctica</i>	17			II	3
<i>Gavia stellata</i>	9			II	3
<b>Order Podicipediformes</b> (5 spp.)					
<i>Podiceps auritus</i>	5			II	
<i>Podiceps cristatus</i>	38				
<i>Podiceps griseigena</i>	6	I		II	
<i>Podiceps nigricollis</i>	36	K		II	
<i>Tachybaptus ruficollis</i>	39			III	
<b>Order Procelariiformes</b> (4 spp.)					
<i>Calonectris diomedea</i>	18			III	1,3
<i>Hydrobates pelagicus</i>	6	R		II	1,3
<i>Puffinus puffinus</i>	18			II	
<b>Order Pelecaniformes</b> (5 spp.)					
<i>Pelecanus crispus</i>	20	E1		II,I,II	2,3,4
<i>Pelecanus onocrotalus</i>	14	E1		II	3
<i>Phalacrocorax aristotelis desmarestii</i>	14	V		III	
<i>Phalacrocorax carbo sinensis</i>	35			III	1
<i>Phalacrocorax pygmeus</i>	27	E2		II	2,3,4
<b>Order Ciconiiformes</b> (13 spp.)					
<i>Ardea cinerea</i>	47			III	
<i>Ardea purpurea</i>	44	V		II	1
<i>Ardeola ralloides</i>	45			II	1
<i>Botaurus stellaris</i>	21	I		II	1,3
<i>Bubulcus ibis</i>	5			II	
<i>Ciconia ciconia</i>	50			II	1,3
<i>Ciconia nigra</i>	31	E2		II,II,II	1,3
<i>Egretta alba</i>	35	E2		II	1,3
<i>Egretta garzetta</i>	54			II	1,3
<i>Ixobrychus minutus</i>	42			II	3
<i>Nycticorax nycticorax</i>	41	K		II	1,3
<i>Platalea leucorodia</i>	21	E1		II,II,II	1,3
<i>Plegadis falcinellus</i>	39	E1		II	1,3
<b>Order Phoenicopteriformes</b> (1 sp.)					
<i>Phoenicopus ruber</i>	24	R		II,II,II	1,3
<b>Order Anseriformes</b> (31 spp.)					
<i>Anas acuta</i>	35			III,-,II	
<i>Anas clypeata</i>	34			III,-,II	
<i>Anas crecca</i>	38			III,-,II	
<i>Anas penelope</i>	37			III,-,II	
<i>Anas platyrhynchos</i>	40			III,-,II	
<i>Anas querquedula</i>	36	K		III,-,II	
<i>Anas strepera</i>	26	K		III,-,II	
<i>Anser albifrons</i>	16			III,-,II	1
<i>Anser anser</i>	19	E2		II,-,II	
<i>Anser erythropus</i>	4	E2		II,-,II	2,3,4

**BIRDS** (276 spp.)

Taxa	No of sites	A	B	C	D
<i>Anser fabalis</i>	4			III, -,II	
<i>Aythya ferina</i>	37	K		III, -,II	
<i>Aythya fuligula</i>	24			III, -,II	
<i>Aythya marila</i>	7			III, -,II	
<i>Aythya nyroca</i>	23	V		III, -,II	1,3
<i>Branta bernicla</i>	1			III, -,II	
<i>Branta ruficollis</i>	7	E2		II,II,II	2,3
<i>Bucephala clangula</i>	12			III, -,II	
<i>Clangula hyemalis</i>	3			III, -,II	
<i>Cygnus columbianus bewickii</i>	2			II, -,II	1,3
<i>Cygnus cygnus</i>	16	K		II, -,II	1,3
<i>Cygnus olor</i>	34			III, -,II	
<i>Melanitta fusca</i>	3			III, -,II	
<i>Melanitta nigra</i>	3			III, -,II	
<i>Mergus albellus</i>	7			II, -,II	
<i>Mergus merganser</i>	3	E2		III, -,II	
<i>Mergus serrator</i>	15			III, -,II	
<i>Netta rufina</i>	21	R		III, -,II	
<i>Oxyura leucocephala</i>	6	E2		II,II,II	1,2,3,4
<i>Somateria mollissima</i>	1			III, II	1
<i>Tadorna ferruginea</i>	17	E1		II, -,II	3
<i>Tadorna tadorna</i>	26	V		II, -,II	
<b>Order Accipitriformes (26 spp.)</b>					
<i>Accipiter brevipes</i>	36			II, -,II	3
<i>Accipiter gentilis</i>	41			II, -,II	
<i>Accipiter nisus</i>	58			II, -,II	
<i>Aegypius monachus</i>	17	E1		II, -,II	1,2,3,4
<i>Aquila chrysaetos</i>	80			II	1
<i>Aquila clanga</i>	15	E2		II, -,II	3
<i>Aquila heliaca</i>	15	E1		II, -,I	2,3,4
<i>Aquila pomarina</i>	31	V		II, -,II	3
<i>Buteo buteo</i>	86			II,II	
<i>Buteo lagopus</i>	3			II,II	
<i>Buteo rufinus</i>	47	R		II,II	
<i>Circus gallicus</i>	81			II,II	1,3
<i>Circus aeruginosus</i>	62	V		II,II	1,3
<i>Circus cyaneus</i>	43			II,II	1,3
<i>Circus macrourus</i>	19			II,II	3
<i>Circus pygargus</i>	32	E1		II,II	1,3
<i>Gypaetus barbatus</i>	28	E1		II,II	1,3
<i>Gyps fulvus</i>	66			II,II	1,3
<i>Haliaeetus albicilla</i>	22	E1		II,I	1,2,3,4
<i>Hieraaetus fasciatus</i>	50	V		II,II	1,3
<i>Hieraaetus pennatus</i>	57	V		II,II	1,3
<i>Milvus migrans</i>	33	E1		II,II	1,3
<i>Milvus milvus</i>	13			II,II	1,2,3,4
<i>Neophron percnopterus</i>	45	V		II,II	1,3
<i>Pandion haliaetus</i>	21	I		II,II	1,3
<i>Pernis apivorus</i>	63			II,II	1,3

**BIRDS** (276 spp.)

Taxa	No of sites	A	B	C	D
<b>Order Falconiformes (7 spp.)</b>					
<i>Falco biarmicus</i>	37	V		II,II	1,3
<i>Falco columbarius</i>	21			II,II	3
<i>Falco eleonorae</i>	54	K		II,II	1,3
<i>Falco naumanni</i>	34	V		II,II	1,3,4
<i>Falco peregrinus</i>	88	K		II,I	1,3
<i>Falco subbuteo</i>	48			II,II	
<i>Falco vespertinus</i>	45			II,II	
<b>Order Galliformes (3 spp.)</b>					
<i>Bonasa bonasia</i>	6	I		III	3
<i>Coturnix coturnix</i>	35	K		III	
<i>Tetrao urogallus</i>	3	R		III	3
<b>Order Gruiformes (7 spp.)</b>					
<i>Crex crex</i>	2			II	
<i>Fulica atra</i>	44			III	
<i>Grus grus</i>	7			II	1,3
<i>Porzana parva</i>	10	R		II	3
<i>Porzana porzana</i>	6			II	3
<i>Porzana pusilla</i>	6			II	3
<i>Tetrax tetrax</i>	1	Ex		II,II	1,2,3,4
<b>Order Charadriiformes (58 spp.)</b>					
<i>Actitis hypoleucos</i>	39			III	
<i>Arenaria interpres</i>	14			II	
<i>Burhinus oedicnemus</i>	36	V		II	1,3
<i>Calidris alba</i>	17			II	
<i>Calidris alpina</i>	27			II	
<i>Calidris canutus</i>	3			II	
<i>Calidris ferruginea</i>	26			II	
<i>Calidris minuta</i>	32			II	
<i>Calidris temminckii</i>	14			II	
<i>Charadrius alexandrinus</i>	27			II	
<i>Charadrius dubius</i>	41			II	
<i>Charadrius hiaticula</i>	24			II	
<i>Charadrius morinellus</i>	3	K			1
<i>Chlidonias hybridus</i>	29	V		II	3
<i>Chlidonias leucopterus</i>	26			II	
<i>Chlidonias niger</i>	34	V		II	1,3
<i>Gallinago gallinago</i>	36			III	
<i>Gallinago media</i>	13				
<i>Gelochelidon nilotica</i>	22	K		II	1,3
<i>Glareola pratincola</i>	31	V		II	1,3
<i>Haematopus ostralegus</i>	22	K		III	
<i>Himantopus himantopus</i>	35	V		II	1,3
<i>Hoplopterus spinosus</i>	6	E2		II	3
<i>Larus audouinii</i>	11	E2		II,-,I	1,2,3,4
<i>Larus canus</i>	13			III	
<i>Larus fuscus</i>	6				
<i>Larus genei</i>	20	E2		II	1,3
<i>Larus marinus</i>	1				

**BIRDS** (276 spp.)

Taxa	No of sites	A	B	C	D
<i>Larus melanocephalus</i>	29	V		II	3
<i>Larus minutus</i>	24			II	
<i>Larus ridibundus</i>	44			III	
<i>Limicola falcinellus</i>	7	K		II	
<i>Limosa lapponica</i>	3			III	
<i>Limosa limosa</i>	27			III	
<i>Lymnocyptes minimus</i>	14			II	
<i>Numenius arquata</i>	26			III	
<i>Numenius phaeopus</i>	11			III	
<i>Numenius tenuirostris</i>	8	E1		II,I	2,3,4
<i>Phalaropus lobatus</i>	7			III	1
<i>Philomachus pugnax</i>	33			III	
<i>Pluvialis apricaria</i>	16			III	1,3
<i>Pluvialis squatarola</i>	27			III	
<i>Recurvirostra avosetta</i>	24	V		II	1,3
<i>Scolopax rusticola</i>	29			III	
<i>Stercorarius parasiticus</i>	4			III	
<i>Stercorarius pomarinus</i>	1			III	
<i>Sterna albifrons</i>	32			II	1,3
<i>Sterna caspia</i>	20	K			3
<i>Sterna hirundo</i>	38			II	1,3
<i>Sterna sandvicensis</i>	26	I		II	1,3
<i>Tringa erythropus</i>	22			III	
<i>Tringa glareola</i>	37			II	1,3
<i>Tringa nebularia</i>	27			III	
<i>Tringa ochropus</i>	33			II	
<i>Tringa stagnatilis</i>	24	K		II	
<i>Tringa totanus</i>	35			III	
<i>Vanellus vanellus</i>	35			III	
<i>Xenus cinereus</i>	3			III	
<b>Order Columbiformes (12 spp.)</b>					
<i>Clamator glandarius</i>	9			II	
<i>Columba oenas</i>	21	R		III	
<i>Columba palumbus</i>	48			II	
<i>Cuculus canorus</i>	50			III	3
<i>Streptopelia turtur</i>	67			III	
<b>Order Strigiformes (5 spp.)</b>					
<i>Aegolius funereus</i>	6	R		II,II	3
<i>Asio flammeus</i>	11			II,II	1,3
<i>Bubo bubo</i>	46			II,II	1,3
<i>Glaucidium passerinum</i>	2			II,II	3
<i>Otus scops</i>	58			II,II	
<b>Order Caprimulgiformes (1 sp.)</b>					
<i>Caprimulgus europaeus</i>	89			II	3
<b>Order Apodiformes (3 spp.)</b>					
<i>Apus apus</i>	64			III	
<i>Apus melba</i>	64			II	
<i>Apus pallidus</i>	21			II	

**BIRDS** (276 spp.)

Taxa	No of sites	A	B	C	D
<b>Order Coraciiformes</b> (4 spp.)					
<i>Alcedo atthis</i>	57			II	1,3
<i>Coracias garrulus</i>	47	V		II	3
<i>Merops apiaster</i>	56			II	
<i>Upupa epops</i>	59			II	
<b>Order Piciformes</b> (7 spp.)					
<i>Dendrocopos leucotos</i>	21	R		II	1,3
<i>Dendrocopos medius</i>	40			II	3
<i>Dendrocopos syriacus</i>	40			II	3
<i>Dryocopus martius</i>	19			II	1,3
<i>Jynx torquilla</i>	27			II	
<i>Picooides tridactylus</i>	2	R		II	3
<i>Picus canus</i>	10	R		II	3
<b>Order Passeriformes</b> (82 spp.)					
<i>Acrocephalus arundinaceus</i>	34			II	
<i>Acrocephalus melanopogon</i>	19	R		II	3
<i>Acrocephalus paludicola</i>	2				2
<i>Acrocephalus palustris</i>	10			II	
<i>Acrocephalus schoenobaenus</i>	21			II	
<i>Acrocephalus scirpaceus</i>	29			II	
<i>Alauda arvensis</i>	47			III	
<i>Anthus campestris</i>	58			II	
<i>Anthus cervinus</i>	11			II	
<i>Anthus pratensis</i>	47			II	
<i>Anthus spinoletta</i>	31			II	
<i>Anthus trivialis</i>	47			II	
<i>Calandrella brachydactyla</i>	56			II	3
<i>Carduelis spinus</i>	33			II	
<i>Cercotrichas galactotes</i>	31			II	
<i>Coccothraustes coccothraustes</i>	38			II	
<i>Corvus frugilegus</i>	19				
<i>Delichon urbica</i>	74			II	
<i>Emberiza caesia</i>	35			II	3
<i>Emberiza cineracea</i>	2	R		II	3
<i>Emberiza citrinella</i>	24			II	
<i>Emberiza hortulana</i>	53			III	3
<i>Emberiza melanocephala</i>	53			II	
<i>Emberiza pusilla</i>	2			II	
<i>Emberiza schoeniclus</i>	24			II	
<i>Erithacus rubecula</i>	66			II	
<i>Ficedula albicollis</i>	28			II	3
<i>Ficedula hypoleuca</i>	21			II	
<i>Ficedula parva</i>	4			II	3
<i>Ficedula semitorquata</i>	22	R		II	3
<i>Fringilla coelebs</i>	78			III	
<i>Fringilla montifringilla</i>	23			III	
<i>Hippolais icterina</i>	22			II	
<i>Hippolais olivetorum</i>	30			II	3
<i>Hippolais pallida</i>	43			II	
<i>Hirundo daurica</i>	68			II	



## BIRDS (276 spp.)

Taxa	No of sites	A	B	C	D
<i>Hirundo rustica</i>	75			II	
<i>Lanius collurio</i>	87			II	3
<i>Lanius excubitor</i>	8			II	
<i>Lanius minor</i>	55	K		II	3
<i>Lanius nubicus</i>	12	R		II	
<i>Lanius senator</i>	61			II	
<i>Locustella fluviatilis</i>	4			II	
<i>Locustella luscinioides</i>	14	K		II	
<i>Locustella naevia</i>	7			II	
<i>Lullula arborea</i>	82			III	3
<i>Luscinia luscinia</i>	2			II	
<i>Luscinia megarhynchos</i>	62			II	
<i>Luscinia svecica</i>	3			II	1,3
<i>Melanocorypha calandra</i>	21			II	3
<i>Monticola saxatilis</i>	19			II	
<i>Motacilla alba</i>	56			II	
<i>Motacilla cinerea</i>	54			II	
<i>Motacilla flava</i>	55			II	
<i>Muscicapa striata</i>	60			II	
<i>Oenanthe hispanica</i>	57			II	
<i>Oenanthe isabellina</i>	10	R		II	
<i>Oenanthe oenanthe</i>	71			II	
<i>Oriolus oriolus</i>	50			II	
<i>Panurus biarmicus</i>	18			II	
<i>Passer hispaniolensis</i>	44			III	
<i>Phoenicurus ochruros</i>	49			II	
<i>Phoenicurus phoenicurus</i>	35			II	
<i>Phylloscopus bonelli</i>	33			II	
<i>Phylloscopus collybita</i>	61			II	
<i>Phylloscopus sibilatrix</i>	35			II	
<i>Phylloscopus trochilus</i>	40			II	
<i>Prunella modularis</i>	48			II	
<i>Ptyonoprogne rupestris</i>	51			II	
<i>Pyrhhorax pyrrhhorax</i>	30			II	2,3
<i>Regulus regulus</i>	34			II	
<i>Riparia riparia</i>	42			II	
<i>Saxicola ruberta</i>	59			II	
<i>Sitta krueperi</i>	2	R		II	
<i>Sturnus roseus</i>	6			II	
<i>Sturnus vulgaris</i>	43				
<i>Sylvia atricapilla</i>	50			II	
<i>Sylvia borin</i>	22			II	
<i>Sylvia cantillans</i>	50			II	
<i>Sylvia communis</i>	52			II	
<i>Sylvia conspicillata</i>	1			II	
<i>Sylvia curruca</i>	33			II	
<i>Sylvia hortensis</i>	32			II	
<i>Sylvia nisoria</i>	9			II	1,3
<i>Sylvia rueppelli</i>	25			II	3
<i>Turdus iliacus</i>	23			III	
<i>Turdus philomelos</i>	52			III	
<i>Turdus pilaris</i>	27			III	

BIRDS (276 spp.)

Taxa	No of sites	A	B	C	D
<i>Turdus torquatus</i>	9	R		III	

REPTILES (10 spp.)

Taxa	No of sites	A	B	C	D
<i>Caretta caretta</i>	33	E		II,I	1,2,3,4
<i>Elaphe quatuorlineata</i>	77			II	1,3
<i>Elaphe situla</i>	96			II	1,3
<i>Emys orbicularis</i>	54			II	1,3
<i>Mauremys caspica</i>	76			II	1,3
<i>Testudo graeca</i>	48			II,II	1,2,3,4
<i>Testudo hermanni</i>	109			II,II	1,2,3,4
<i>Testudo marginata</i>	57			II,II	1,2,3
<i>Vipera schweizeri</i>	3	V	+	II	1,2,3,4
<i>Vipera ursinii</i>	5	R		II,I	3

AMPHIBIANS (4 spp.)

Taxa	No of sites	A	B	C	D
<i>Bombina bombina</i>	2			II	3
<i>Bombina variegata</i>	62			II	3
<i>Mertensiella luschani</i>	4	R		II	1,2,3
<i>Triturus cristatus</i> *	45			II	3

\* Includes *T. karelinii* and *T. carnifex*

FISH (28 spp.)

Taxa	No of sites	A	B	C	D
<i>Acipenser sturio</i>	1			III,I	1,2,3,4
<i>Alosa alosa</i> <sup>1</sup>	1				
<i>Alosa fallax</i>	7			III	3
<i>Aphanius fasciatus</i>	18			III	
<i>Aspius aspius</i>	4			III	3
<i>Barbus capito</i> <sup>2</sup>	15				
<i>Barbus meridionalis</i> <sup>3</sup>	29				
<i>Barbus plebejus</i> <sup>4</sup>	28				
<i>Chalcalburnus belvica</i>	1		+		
<i>Chalcalburnus chalcoides</i>	5	V		III	3
<i>Cobitis taenia</i> <sup>5</sup>	21				
<i>Cobitis trichonica</i>	5	L/V	+	III	
<i>Eudontomyzon spp.</i> <sup>6</sup>	4				
<i>Gobio albipinnatus</i>	1			III	
<i>Gobio uranoscopus</i>	2	L/V		III	
<i>Ladigesocypris ghigii</i>	2	V/E			1
<i>Leuciscus souffia</i> <sup>7</sup>	1				
<i>Phoxinellus spp.</i> <sup>8</sup>	23				

**FISH** (28 spp.)

Taxa	No of sites	A	B	C	D
<i>Pomatoschistus canestrini</i> <sup>9</sup>	2				
<i>Rhodeus sericeus amarus</i>	14			III	3
<i>Rutilus alburnoides</i> <sup>10</sup>	9				
<i>Rutilus rubilio</i> <sup>11</sup>	11				
<i>Sabanejewia aurata</i>	6	V		III	
<i>Salmo macrostigma</i>	19				
<i>Scardinius graecus</i>	1		+		
<i>Silurus aristotelis</i>	5			III	1
<i>Valencia hispanica</i> <sup>12</sup>	9				
<i>Zingel streber</i>	1			III	2,3

- 1 Includes *A. macedonica* and *A. caspia vistonica*
- 2 Includes *B. albanicus* and *B. graecus*
- 3 Includes *B. peloponnesius*
- 4 Includes *B. euboicus*, *B. cycloplepis* and *B. prespensis*
- 5 Includes *C. arachthosensis*, *C. hellenica*, *C. meridionalis*, *C. punctilineata*, *C. stephanidisi*, *C. strumicae* and *C. vardarensis*
- 6 Includes *E. hellenicus*
- 7 Includes *L. keadicus*
- 8 Includes *P. pleurobipunctatus*, *Paraphoxinus epiroticus*, *Pseudophoxinus beoticus* and *P. stymphalicus*
- 9 Includes *Economidichthys pygmaeus*
- 10 Includes *Tropidophoxinellus hellenicus* and *T. spartiaticus*
- 11 Includes *R. ohridanus* and *R. ylikiensis*
- 12 Includes *V. letourneuxi*

Because of the recent conception on fish taxonomy and distribution it was not possible to present the motivations of the fish species included in cases 1 to 12 mentioned above.

**INVERTEBRATES****INSECTS (11 spp.)**

Taxa	No of sites	A	B	C	D
<b>Odonata (2 spp.)</b>					
<i>Lindenia tetrphylla</i>	1			II	3,5,7,10
<i>Ophiogomphus cecilia</i>	2			II	2,3,4,5,6,7,10
<b>Lepidoptera (4 spp.)</b>					
<i>Callimorpha quadripunctaria</i>	27				5
<i>Eriogaster catax</i>	2			II	2,3,4,5,6,10
<i>Euphydryas aurinia</i>	7			II	3,5,8
<i>Lycaena dispar</i>	17			II	2,3,4,5,6,8,10
<b>Coleoptera (5 spp.)</b>					
<i>Cerambyx cerdo</i>	3			II	2,3,4,5,6,9,10
<i>Lucanus cervus</i>	14			III	5
<i>Morimus funereus</i>	6				2,3,4,5,6,9,10
<i>Osmoderma eremita</i>	1			II	2,3,4,5,6,9
<i>Rosalia alpina</i>	3			II	1,2,3,4,5,6,10

**MOLLUSCS (1 sp.)**

Taxa	No of sites	A	B	C	D
<i>Unio crassus</i>	5				2,5

**Explanation of symbols**

- A: M. Karandinos (ed.). 1992.- The Red Data Book of Threatened Vertebrates of Greece. Hellenic Zoological Society-Hellenic Ornithological Society, 356 p.
- Ex: Extinct species
- E: Endangered species (E1: Immediately endangered, E2: Not immediately endangered)
- V: Vulnerable species
- R: Rare species
- I: Indeterminate species
- K: Insufficiently known species
- L: Locally threatened species

B: Species and subspecies (for vertebrates only) endemic to Greece.

C: Council of Europe 1979.- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention).

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973.

Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

I: Annex I

II: Annex II

III: Annex III

D:

- 1: Presidential Decree 67/1981. "On the protection of wild flora and fauna and on the determination of procedures for the coordination and control of research". Ministerial Decree 414985/29.11.85. "Measures for the management of wild avifauna".
- 2: Economic Commission for Europe. 1991. European Red List of Globally Threatened Animals and Plants. United Nations. 150 p.
- 3: CORINE-Biotopes project. 1988. Technical Handbook vol. 1.
- 4: IUCN Conservation Monitoring Centre 1988. Red List of Threatened Animals. IUCN. 154 p.
- 5: Koomen, P. and P.J. van Helsdingen. 1996. Listing of biotopes in Europe according to their significance for invertebrates. Council of Europe, Nature and Environment No 77. 74 p.
- 6: Collins, N.M. and S.M. Wells. 1987. Invertebrates in need of special protection in Europe. Council of Europe, Nature and Environment No 34. 162 p.
- 7: Van Tol, J. and M.J. Verdonk. 1988. The protection of dragonflies (Odonata) and their biotopes. Council of Europe, Nature and Environment No 36. 181 p.
- 8: Heath, J. 1981. Threatened Rhopalocera (butterflies) of Europe. Council of Europe, Nature and Environment No 23. 157 p.
- 9: Speight, M.C.D. 1989. Saproxylic invertebrates and their conservation. Council of Europe, Nature and Environment No 42. 72 p.
- 10: European Invertebrate Survey. 1991. Proposed revised list of threatened invertebrates in need of protection of habitat in the community. Manuscript. 7 p.

Looking at the motivations of the various animal groups encountered in Greece, mammals of Annex II to Directive 92/43/EEC have the highest percentage of motivation A (inclusion in the Red Data Book of Threatened Vertebrates of Greece) (Fig. E.9). On the contrary, the other animal groups contain many species that are not considered as threatened in Greece. It must be noted though, that most of the Red Data Book species have been recorded in the NATURA 2000 database either as species of the Directives or as Other Important Species (Fig. E.10).

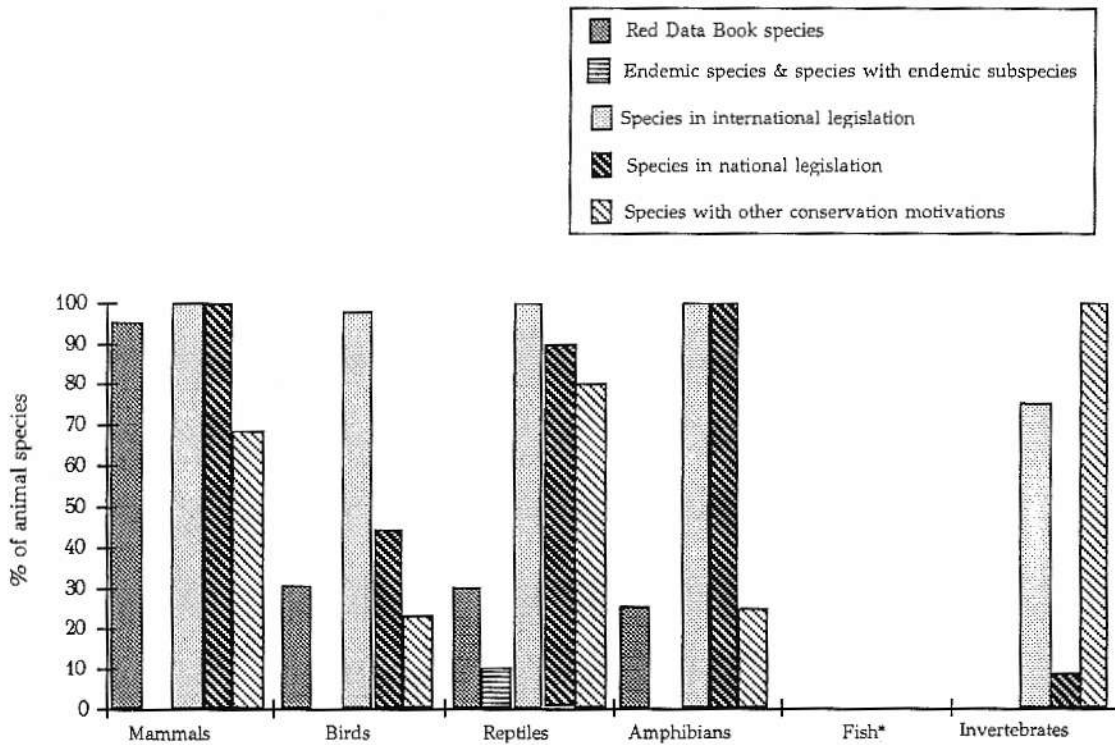


Fig. E.9. Percentage of animal species in Annex II to Directive 92/43/EEC and Annex I to Directive 79/409/EEC and migratory species to Directive 79/409/EEC, recorded in Natura 2000 sites in Greece, according to their conservation motivation (Red Data Book species, endemic species & species with endemic subspecies, species in international conventions, species in national legislation, species with other conservation motivations).

\* The percentages of different motivations for fish species are not quoted (see section E.6.)

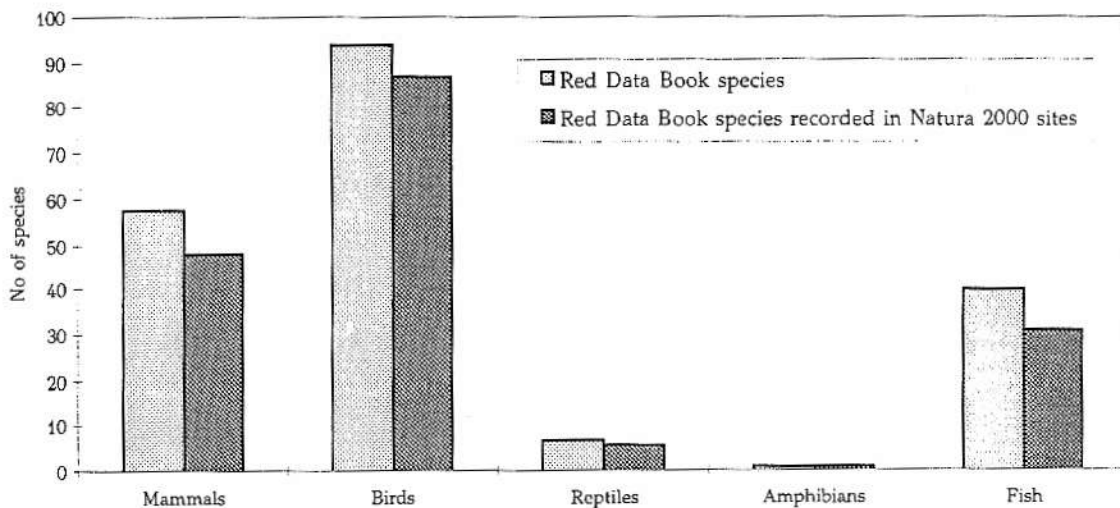


Fig. E.10. Comparison of the number of species in the Red Data Book with the number of Red Data Book species recorded in the Natura 2000 sites.

The Habitat and Bird Directives lack in Greek endemics (Fig. E.9) apart from a limited number of endemic reptiles. On the contrary, most of the species protected by international conventions that are present in Greece are listed in the Directives. As it concerns the species protected by the national legislation, they are also well represented in the Annexes to the Directives, with the exception of invertebrates. In particular, less than 10% of the invertebrate species recorded in the sites are protected by national legislation.

Among the various animal groups, mammals and reptiles are more often encountered in the studied sites (Fig. E.11). Approximately 70% of the sites host species from these two groups with a mean number of c. 2-3 species from each one per site (Fig. E.12). Bird Directive species have been recorded in half of the sites with a mean number of 60 species per site. However, it must be noted that only Important Bird Areas were surveyed for birds. Amphibians, fish and invertebrates are present in less than 1/3 of the sites. From the species listed in the two Directives, those referred also in the Red Data Book are present in 26% of the sites; endemic taxa are present in only 0.2%; species protected by international conventions in 47%, and those with motivation D (other reasons) in 48% of the sites.

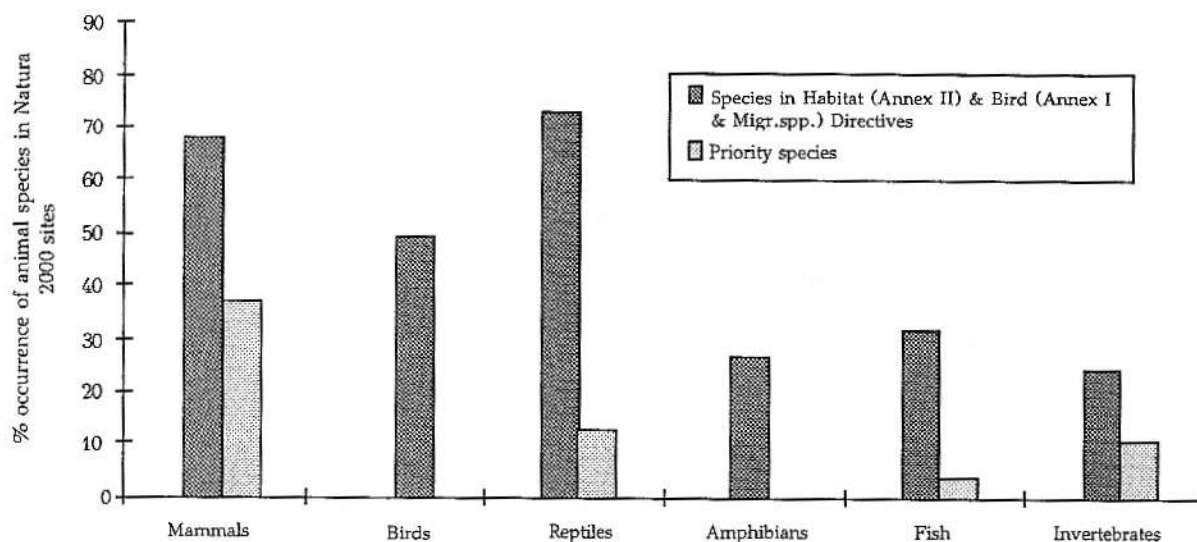


Fig. E.11. Percentage of sites in which the different animal groups (species of Annex II to Directive 92/43/EEC and Annex I to Directive 79/409/EEC and migratory species to Directive 79/409/EEC) are present.

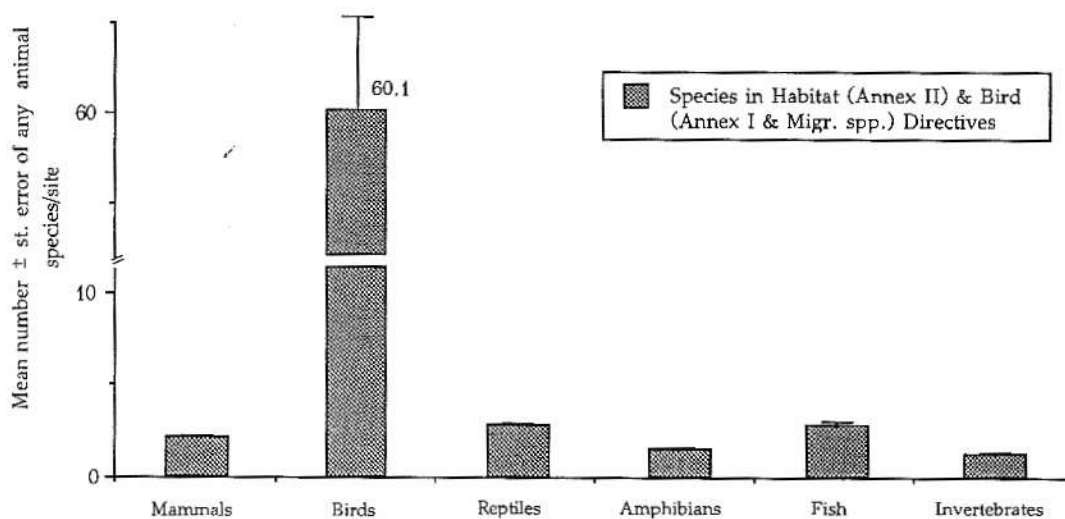


Fig. E.12. Mean number ( $\pm$ st. error) of animal species in Annex II to Directive 92/43/EEC and Annex I to Directive 79/409/EEC and migratory species to Directive 79/409/EEC per site, where they occur.

Comparing the proportion of sites where each animal group is present (Fig. E.11) with the mean number of species per site (Fig. E.12) we note that many animal groups which are present in a high proportion of sites are represented by a low number of species (from 3-5) with the exception of birds.

### E.1.5. Other Important Animal Species

A large number of species and subspecies, namely 1183 taxa, not included in the Annexes to the two Directives were considered important and were recorded in the studied sites in fields 3.3. and 3.4 of the Standard Data Form, as Other Important and Greek Important Species, respectively. The distribution of these taxa in the various animal groups is shown in Fig. E.13.

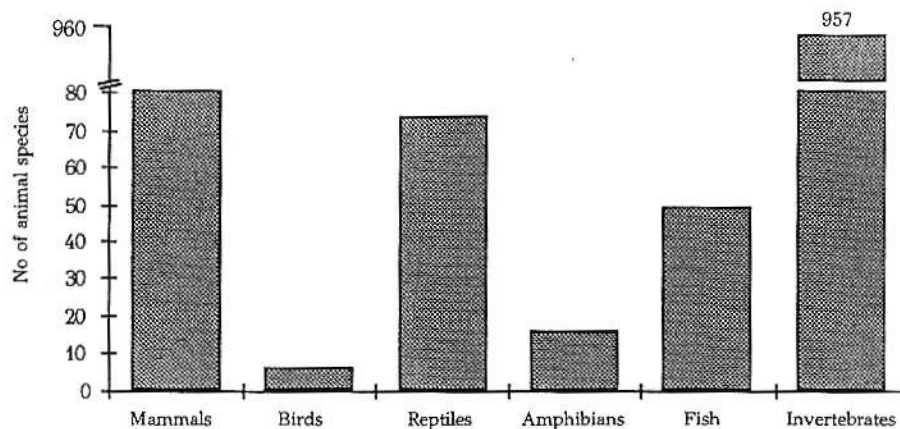


Fig. E.13. Number of Other Important Species in each animal group.

In Appendix 6 to the present publication, the scientific names of species, the number of sites in which these were recorded as well as the conservation motivations for each one are given. Only subspecies of the vertebrates were taken into consideration since invertebrate subspecies are very numerous and of uncertain taxonomic position.

Looking at the motivations of the Other Important Species per animal group (Fig. E.14) we observe that approximately 50% of the fish and mammal taxa are included in the national Red Data Book of Threatened Vertebrates, whereas only 4% of the reptiles and none of the amphibians belong to the same category. Data concerning the avifauna is not representative as only 5 species were recorded as Other Important Species (see also Chap. E.3.).



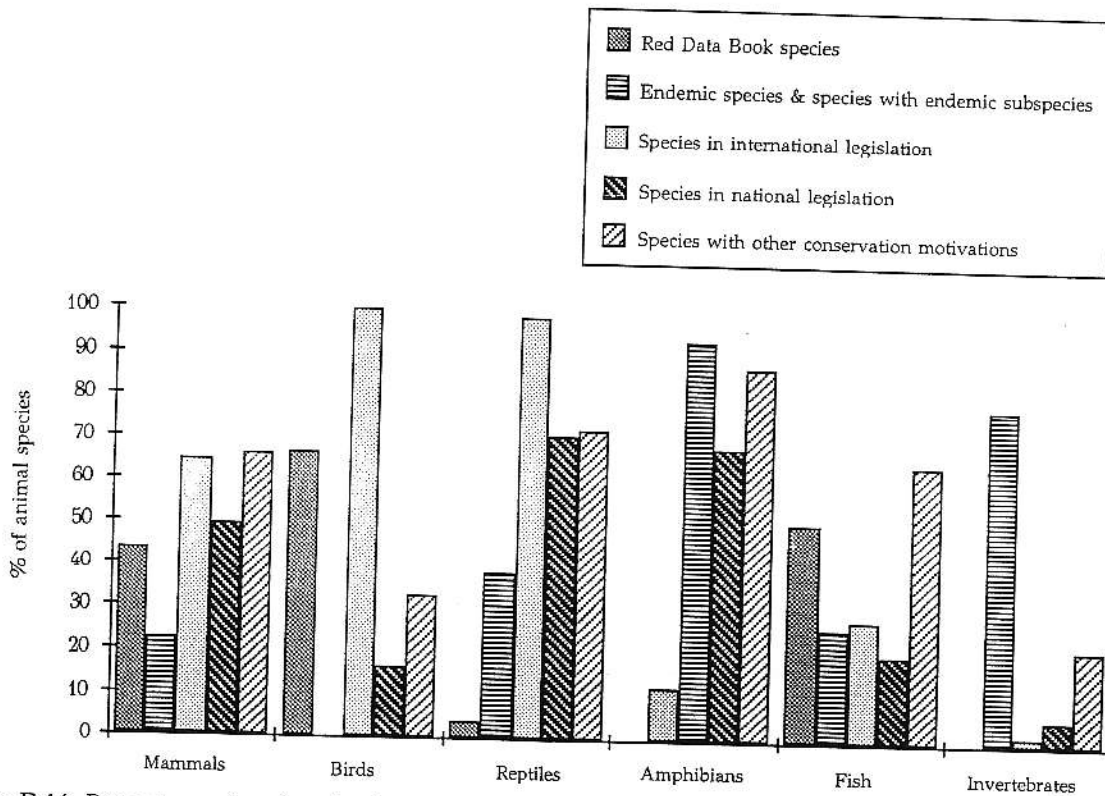


Fig. E.14. Percentage of each animal group of the Other Important Species according to their conservation motivation (species in the Red Data Book, endemic species & species with endemic subspecies, species protected by international conventions, species protected by national legislation, species with other conservation motivations).

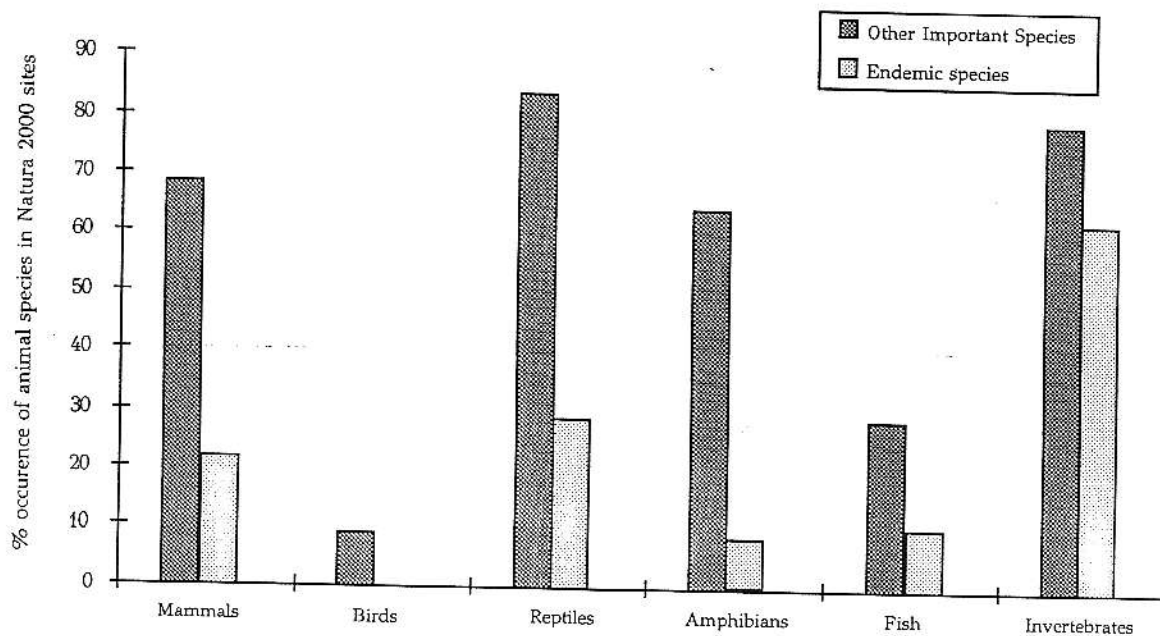


Fig. E.15. Percentage of the occurrences of each animal group of the Other Important Species in the Natura 2000 sites in Greece.

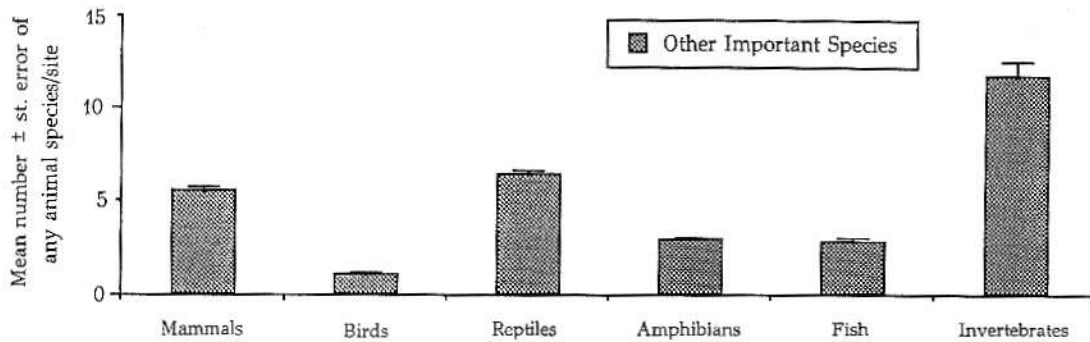


Fig. E.16. Mean number ( $\pm$  standard error) of each animal group of the Other Important Species per site where it occurs.

Other Important Species of reptiles, invertebrates, and mammals have the most frequent occurrence in the proposed Natura 2000 sites (Fig. E.15). Each site has on average more than 10 invertebrate species (Fig. E.16), 7 reptile and 6 mammal taxa. Of all the Other Important Species, those listed in the Red Data Book are present in 14.5% of the sites, endemic taxa in 22%, species in international conventions in 44% and species with other motivation in 39% of the sites. The most frequently occurring endemic taxa belong to the invertebrates. The other groups have medium to low occurring endemic taxa (Fig. E.15).

Comparing the percentage of sites where each animal group is present (Fig. E.15) with the mean number of species per site (Fig. E.16), we note that the animal groups which are present in a high percentage of sites are represented by a low number of species (from 3-5), the group of invertebrates excepted.