Conservation Status Assessment of Vertebrate Species of the Dinaric Arc Ecoregion

Final Report

Protected Areas for a Living Planet – Dinaric Arc Ecoregion project

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Contents

INTRODUCTION

In the era that has been widely recognized as the era of the global biodiversity crisis, great importance should be given to assessment of conservation status of species. The International Union for Conservation of Nature (IUCN) maintains a database that lists species that fall into the risk categories with the probability of extinction as the primary consideration. It represents the primary international standard for the conservation status of various species.

At a more local level, many regional, national and state governments also maintain list of species that are threatened within their borders. Usually those lists maintain the same global categories, but often other sets of criteria are used.

Dealing with the Dinaric Arc Ecoregion means dealing with a region of a high biodiversity value which is facing a non optimistic period regarding nature protection. As recognized in the Gap analysis (Glasnović & al., 2009), the level of land designated to be protected areas is too low, and even in those countries where the level of protected areas is relatively high, one can see that biodiversity is not always adequately represented within them.

The aim of this assessment is to determinate the conservation status of vertebrate species of a region that:

- is composed of 5 politically, economically and culturally diverse countries
- has a different level of integration in international communities
- has a different level in nature conservation policies among countries
- has a different level of availability and quality of biodiversity data among countries

The usual practice in conservation assessment of species adopted by many countries is to classify species following the guidelines of The International Union for Conservation of Nature (IUCN) Red list criteria. The criteria to be considered are: **A**. Declining population, **B**. Occurrence and distribution, **C**. Population size and decline, **D**. Very small or restricted population and **E**. Probability of extinction. That means that an appropriate conservation action needs a profound knowledge about the status of species that has to be adequately assessed. Since regionally no such work has been done and no such data are available, we had to consider existing assessments, according to countries and the region. At DAE level three national red data books have been published so far (Slovenia, Croatia and Albania). Regionally, conservation assessments and agreements on species protection and their threat status for the wider Mediterranean area and Europe exist.

In drawing up a regional conservation assessment, a baseline for preparing a list should be the assessment which was prepared for the wider area. In terms of DAE, wider area is at European/Mediterranean level and assessments from the two regions were “adjusted” to the data that are reflected in the DAE.

The following situations received particular attention:
-the species is of conservation concern at the wider (European, Mediterranean) level, but has a favourable conservation status in the DAE region and vice versa,
-the species is of conservation concern only in one (or part of one) of the DAE countries, but has a favourable conservation status in other DAE countries,
-the species has very limited and low population at the very edge of the outer DAE boundaries which might be of particular importance at the national level (i.e. some breeding bird species have been detected in the population of no more than 1-2 pairs at the edge of only country within DAE). Despite being listed in one of the threat categories in that country, these species were not put as one of the DAE regional endangered species as their population is not significant at the regional scale. Explanation to that was given briefly in the text in the table (see for example table on birds, species *Numenius arquata*).

It is also very important not to mix the conservation status of particular species with its distribution pattern. Some species might be rare, their populations could be small, but cannot be considered as highly endangered as their habitat and other ecological requirements do not allow for stronger populations. In other words: if one species is low in numbers it does not mean automatically that it is highly endangered.

Threats to species, and therefore their conservation status, are usually more evident in the habitats that are more inclined to human changes. For example, an owl species, that lives in extensive remote alpine forests (which are still reasonably well preserved and not under threat of industrialised wood cutting or urbanisation) could have reasonable small population, but is under less endangered than another owl species, which is dependent of the mosaic cultural landscape, rapidly disappearing everywhere across the region.

METHODS

Assessment followed three steps:

1. Identification of species to include in the assessment

All species listed in three existing national red books (Slovenia, Croatia and Albania) were included in the analysis. This compilation made a baseline for creation of regional (DAE) assessment.

2. Assessment of the conservation value of the species

For the assessment we used classification of conservation status according to published conservation–related indexes to assign species-specific weights. We focused on those existing agreements and assessments that considered the wider Mediterranean and European area. These include IUCN Mediterranean Assessments, Annexes to the Bird (Annex I) and Habitat Directives (Annex II) and Bern convention (Annex II). For birds SPEC (Species of European conservation concern) categories for European breeding bird species, according to the criteria of BirdLife International, were used. Particular attention was given to species that are endemic to the Dinaric region (In the list signed with *).

- **IUCN Assessment of Mediterranean Mammals, Mediterranean marine mammals, Reptiles, Amphibians, Fresh water fish.**

The Mediterranean Biodiversity Assessment is a review of the conservation status of a wide range of Mediterranean species. It's a Red List publication which summarizes results for selected Mediterranean groups, and provides an overview of the conservation status of species to follow IUCN regional Red List guidelines. It identifies species that are threatened with extinction at the regional level – in order that appropriate conservation action can be taken to improve their status.

- **SPEC (Species of European conservation concern) category for European breeding bird species**

The book "Birds in Europe – Their conservation status" from 1994 was the first review of the conservation status of all birds in Europe aiming to identify species which are in need of conservation measures in order that action might be targeted towards them. It was published by BirdLife international in collaboration with the European Ornithological Atlas project. Criteria were developed to identify Species of European conservation concern according to their global and European status, and to the proportion of their total population that occurs in Europe. The SPECs are divided into the following four categories.

1) Species of global conservation concern, i.e. classified as Globally Threatened, Conservation Dependent or Data Deficient.
2) Species whose global population is concentrated in Europe and with an Unfavorable Conservation Status.
3) Species whose global population are not concentrated in Europe but with an Unfavorable Conservation Status.
4) Species whose global population is concentrated in Europe and with a Favorable Conservation Status.

- **EU Wild Birds Directive (Council Directive 79/409/EEC on the conservation of wild birds)**

The Wild Birds Directive relates to the conservation of all species of naturally occurring birds in the wild state in the territory of the European community. It covers the protection, management and control of these species and lays down rules for their exploitation.

Member States shall take the requisite measures to maintain the population of the species at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements, or to adapt the population of these species to that level. In the same light, Member States shall take the requisite measures to preserve, maintain or re-establish a sufficient diversity and area of habitats for the bird species.

Annex I

The Directive requires that species listed in Annex I "shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution" and that "member States shall classify in particular the most suitable territories in number and size as special protection areas for the conservation of these species, taking into account their protection requirements in the geographical sea and land area where this Directive applies".

In addition, "Member States shall take similar measures for regularly occurring migratory species not listed in Annex I, bearing in mind their need for protection in the geographical sea and land area where this Directive applies, as regards their breeding, moulting and wintering areas and staging posts along their migratory routs".

- **The Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora)**

The conservation purpose of this Directive is a series of measures required to maintain or restore the natural habitats and the populations of species of wild fauna and flora at a favourable status.

A coherent European ecological network of special areas of conservation is set up under the title Natura 2000. This network, composed of sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II, enable the maintaining of natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored at a favourable conservation status in their natural range. The Natura 2000 network includes the special protection areas classified by the Wild Birds Directive 79/409/EEC.

Natural habitat types of Community interest means those which, within the communitarian territory are in danger of disappearance in their natural range, have a small natural range following their regression or by reason of their intrinsically restricted area, present outstanding examples of typical characteristics of one or more of the five following biogeographical regions: Alpine, Atlantic, Black sea, Boreal, Continental, Macaronesian, Mediterranean, Pannonian and Steppic. Such habitat types are listed in Annex I;

Annex II

Animal and plant species of community interest whose conservation requires the designation of special areas of conservation.

Species of Community interest are those animal and plant species which, within the communitarian territory referred are: endangered, except those species whose natural range is marginal in that territory and which are not endangered or vulnerable in the western palearctic region; or vulnerable, i.e. believed likely to move into the endangered category in the near future if the causal factors continue operating; or rare, i.e. with small populations that are not at present endangered or vulnerable, but are at risk. The species are located within restricted geographical areas or are thinly scattered over a more extensive range; or endemic and requiring particular attention by reason of the specific nature of their habitat and/or the potential impact of their exploitation on their habitat and/or the potential impact of their exploitation on their conservation status. Such species are listed in Annex II and/or Annex IV or V.

- **Convention on the Conservation of European Wildlife and Natural Habitats CETS No.: 104 (Bern Convention)**

The Bern Convention is a binding international legal instrument in the field of nature conservation, which covers most of the natural heritage of the European continent

and extends to some States of Africa. The aims of this Convention are to conserve wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the co-operation of several States, and to promote such co-operation. Particular emphasis is given to endangered and vulnerable species, including endangered and vulnerable migratory species.

Parties undertake to take appropriate and necessary measures for the conservation of the habitats of wild flora and fauna, especially those on Appendices I (plants) and II, and to give special attention to the protection of areas of importance for migratory species on Appendices II and III, and to prohibit the deliberate damage or destruction of sites for species listed in Appendix II. Parties undertake to regulate any exploitation of the wild fauna specified in appendix III and prohibit blameworthy means of capture and killing.

Additionally, we prepared a list of species included in **The Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** which is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. It has to be highlighted that there is a low level of acceptance of important multilateral environmental agreements, as CITES is, among some countries of the region (see ANNEX 2).

Each species were scored according to category in which the species is classified. The two table's bellow, represent the assessment scheme adopted in step 2 of the assessment.

Table 1. Assessment scheme for mammals, reptiles, amphibians and freshwater fishes

IUCN Mediterranean assessment		Habitat Directive (Annex II) or Bern Convention (Annex II)	Habitat Directive (Annex II) or Bern Convention (Annex II) **Species from the priority list**	Endemic Dinaric
Category		1	2	1
LC, DD	0			
NT	1			
VU	2			
E	3			
CR	4			

Table 2. Assessment scheme for birds

Species of European conservation concern		Bird Directive (Annex I) or Bern Convention (Annex II)
SPEC Category		1
Not listed	0	
4	1	
3	2	
2	3	
1	4	

The conservation statuses for particular species were ranked according to the criteria in the tables above. For example, to a species that is listed as Vulnerable (VU) in IUCN Mediterranean assessment, score 2 was assigned. If the species is listed in the Annex II of the Habitat Directive or Bern Convention, 1 point was added to the score. If the same species was listed as priority in the Annex II of the Habitat Directive additional 2 points were given to the final score. If the species was recognized as endemic to the DAE, additional 1 point was added.

For birds, SPEC status was ranked between 1 and 4 points, following the BirdLife criteria for SPEC status. Only Annex I of the Bird Directive, or Annex II of the Bern Convention, was taken into consideration for the assessment.

Basic classification of conservation status of species in DAE was calculated according to the above explained criteria. Species were, at that stage, classified in three categories, which allowed us further steps, explained in the following point 3.

3. Final evaluation of conservation status of species

In order to embrace the particularity of conservation status of DAE species, expert advice and considerations of conservation status (category) in the existing DAE countries Red Data Books were further considered. For example, if one species reached the scores for being listed only as of low conservation concern (0-1 scores according to international agreements and assessments), but was at the same time listed at least in two DAE red data books with a high conservation status (CR, EN or VU), its final conservation status was ranked of higher concern.

In addition, if expert advice and consideration indicated that despite calculation of score points reached too low or too high conservation status, the species was shifted to another threat category. However, all the examples of shifting species from one to

another threat category were explained by short note, expressing the main reasons for the shift between the categories.

Finally, three levels of conservation concern, plus an additional category, were defined.

Species of low conservation concern:
- Species that globally and regionally are not considered as threatened, but are increasingly mentioned as species whose status is potentially becoming unfavourable
- Endemic species that are not mentioned in international conservation assessments or considered with a favourable conservation status

Species of medium conservation concern:
- Species included in almost all international agreements and mainly recognized as Vulnerable (VU) in regional and national Red data books
- Species that globally are not considered as threatened, but are listed in the majority of existing national Red data books as threatened (Critically endangered (CR), Endangered (EN), and Vulnerable (VU))

Species of high conservation concern:
- Species that are of global conservation concern (according to IUCN red data list criteria listed as Endangered (EN) or Critically endangered (CR))
- Species that are restricted to DAE and are listed in regional assessments of high conservation concern (usually as Endangered (EN) or Critically endangered (CR))

Data deficient
As data deficient are considered those – significant – species that according to some authors are considered for the DAE, but absence of data does not allow us to assess their conservation status. In principle, data deficient species should be regarded as species with unfavourable conservation status.

The reason of adoption of a system of assessing the threat status which is based on three categories which do not strictly follow the IUCN Red list categorisation but rather to concentrate on three “conservation concern” categories and data deficient one lies in the fact that data available for different DAE countries are of such different quality that it is not possible to make more precise categorisation. For example, data on threat status of one species is based on only three national Red data books (and even there evident changes in the quality of data can be observed; there are endangered bird species listed in the Albanian Red data book, which are definitively not breeding in the country but are considered as such etc.). By having

relevant data only for two out of five DAE countries, distinction between critically endangered and endangered or vulnerable conservation status would be unrealistic. The same reason excluded the introduction of reliable category of species that are already extinct. There are simply too many unchecked and unreliable data on several species which are (or are not) considered extinct in some countries or the entire region.

RESULTS

1. Mammals

The wider Mediterranean area is inhabited by 319 terrestrial and 15 marine mammal species. The level of endemism among mammals is lower than in several other groups. 89 species of terrestrial mammals, which is 28%, are endemic to the area. None of marine mammal species is endemic. In the Mediterranean context, the Balkan Peninsula has resulted in very high mammal species richness.

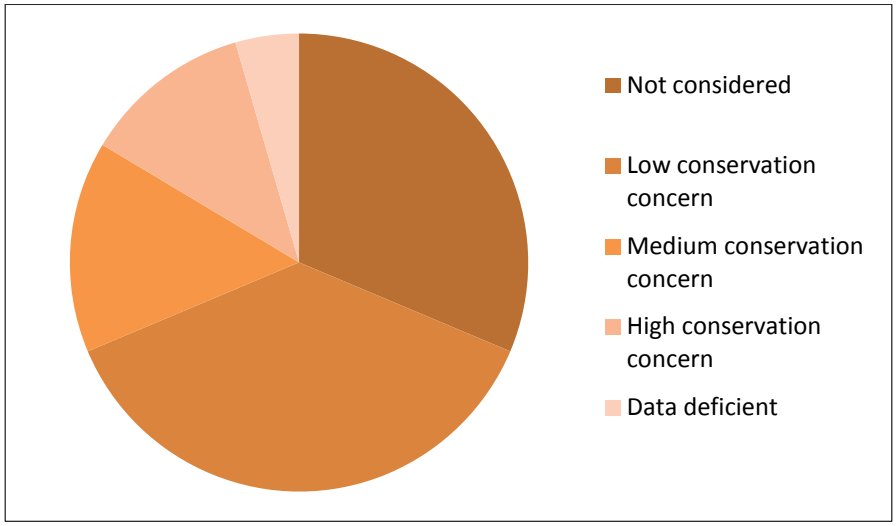
The main threats to mammal species of the Mediterranean are:

- The loss and degradation of habitats;
- Unsustainable agriculture practices;
- Hunting and trapping;
- Introduction of alien species;

According to literature sources 70 species of mammals inhabit the DAE. Presence of two species is a result of a recent introduction (*Herpestes javanicus* and *Oryctolagus cuniculus*). One bat species (*Rhinolphus mehelyi*) is considered as regionally extinct. Thereafter 67 species of mammals can be considered to be found in the DAE. Our assessment took into consideration 46 species. According to the results 25 species have been categorized in the »Low conservation concern« category, 10 in the »Medium conservation concern« and 8 in the »High conservation concern«. 3 species have been categorized as »Data deficient«.

Table 3. Distribution of mammal species according to categories

Category	Not considered	Low conservation concern	Medium conservation concern	High conservation concern	Data deficient	All species
Numerical	21	25	10	8	3	67
Percentual	31,3	37,3	14,9	11,9	4,5	100



Graph 1. Distribution of mammal species according to categories

Table 4. Distribution of mammal species according to categories

Species	Low coservation concern	Medium coservation concern	High coservation concern
Insectivora			
Soricidae			
Neomys anomalus	*i*		
Neomys fodiens	*i*		
Chiroptera			
Rhinolophidae			
Rhinolophus blasii			*i*
Rhinolophus euryale			*i*
Rhinolophus ferrumequinum		*i*	
Rhinolophus hipposideros		*i*	
Rhinolphus mehelyi	*Data deficient*		
Vespertilionidae			
Barbastella barbastellus	*i*		
Eptesicus nilssonii	*i*		
Eptesicus serotinus	*i*		
Miniopterus schreibersii			*i*
Myotis bechsteinii		*i*	
Myotis blythii		*i*	

Species	Low coservation concern	Medium coservation concern	High coservation concern
Myotis brandtii	*i*		
Myotis capaccinii			*i*
Myotis dasycneme	*i*		
Myotis daubentonii	*i*		
Myotis emarginatus	*i*		
Myotis myotis		*i*	
Myotis mystacinus	*i*		
Myotis nattereri	*i*		
Nyctalus lasiopterus	*Data deficient*		
Nyctalus leisleri	*i*		
Nyctalus noctula	*i*		
Plecotus auritus	*i*		
Plecotus austriacus	*i*		
Plecotus kolombatovici	*i*		
Plecotus macrobullaris	*i*		
Vespertilio murinus	*i*		
Molossidae			
Tadarida teniotis	*i*		
Rodentia			
Castoridae			
Castor fiber		*i*	
Arvicolidae			
*Dinaromys bogdanovi**		*i*	
Muridae			
Mus spicilegus	*i*		
Gliridae			
Dryomis nitedula	*i*		
Eliomys quercinus	*i*		
Glis glis	*i*		
Muscardinus avellanarius	*i*		
Cetacea			
Delphinidae			
Delphinus delphis	*Data deficient*		
Tursiops truncatus			*i*

Species	Low coservation concern	Medium coservation concern	High coservation concern
Carnivora			
Ursidae			
Ursus arctos			*i*
Canidae			
Canis lupus		*i*	
Mustelidae			
Lutra lutra		*i*	
Felidae			
Felis silvestris	*i*		
Lynx lynx			*i*
Pinnipedia			
Monachus monachus			*i*
Artiodactyla			
Bovidae			
Rupicapra rupicapra balcanica		*i*	

2. Birds

Avifauna of the Dinaric Arc Ecoregion is very diverse. This diversity is influenced by the elements of neighbouring ecoregions and supported by diverse ecosystems, ranging from the coastal areas, wetlands, cultural landscape, forests and mountains. Very rich avifauna was established in the karstic fields, especially those that are still temporarily flooded, and in the dry grasslands (Štumberger, pers.comm.). But as diverse the fauna is, there is a long list of threats that influence their populations.

In this conservation status assessment, only the breeding birds from the DAE were included.

Changes in the environment and landscape are considered as one of the most severe threats to the breeding avifauna of the region. Waste regions are transferred due to changes in land-uses and land practices, both in agriculture and forestry, urbanisation and industrialisation, major infrastructure and other constructions, water dams and water regulations, tourism developments are considered as one of the major influences. In comparison to the other regions in Europe, there are two threats that pose much higher damages to the breeding birds in the Dinaric Arc Ecoregion than are detected in other regions of Europe: these include pollution and disturbances, including hunting.

Level of pollution of the environment is extremely high in some DAE regions. There are few if any sewage systems, there is high pollution from agricultural and industrial lands, standing and running rivers and wetlands are polluted, there are few organised landfills and the awareness of population on environmental issues is extremely low.
Direct disturbance and killing of birds is considered as one of the most severe threats to the avifauna of the region. Despite long tradition of shooting and killing of birds in the past, the situation has drastically become worse in the recent years. Especially in the southern parts of the region and along the Adriatic coast, hunting pressure has become even bigger after the fall of the previous political systems. In the past times, hunting in some countries was allowed only to limited part of the population and so was true for the use of guns. This has dramatically changed recently and shooting of birds has become a massive destructive activity. In addition, economic situation in some countries is not stable in the last years and more people are using hunting as an additional source of food, but also income. Several foreign hunters are coming in groups that are lead by local hunters to kill birds which provides for additional funding source for local population. Several tourism activities that are harmful to breeding birds and cause disturbance are also undertaken by local people and for

others. Such activities caused the decline in the breeding populations in several species, especially in water colonial birds.

All the above mentioned threats were considered in compiling the Dinaric Arc Ecoregion breeding bird conservation assessment. Shifts in the level of the conservation threat status, compiled according to global or European threat statuses were undertaken especially in those species where international conservation assessments place them as species of low or medium concern but are in the Dinaric Arc Ecoregion subjects of high disturbance and hunting pressures or where other regional threat pressures were detected. On the other hand, there are some species that are endangered at the wider European region, but were found numerous and of lower threat pressures and vice versa.

The main threats to bird species of the DAE can therefore be summarised in:

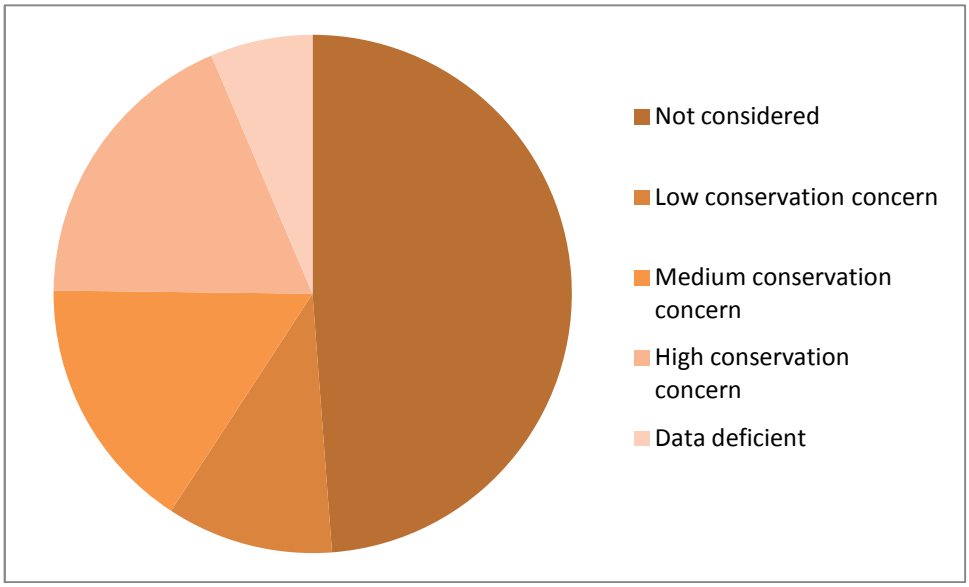
- Loss, degradation and fragmentation of habitats (which include changes in land uses and practices, urbanisation, construction, infrastructure, changes in water regimes and dam construction, tourism developments);
- Hunting, disturbance and trapping;
- Pollution of environment.

There are also several species where information on their breeding status in the countries of the DAE at the regional scale is too scarce and uncertain so that they were listed as data deficient or were found only as possible or probable breeders. Data deficient species should, therefore, be considered as endangered species, too.

According to literature sources 250 bird species can actually be considered breeders of the DAE. According to our assessment, 26 species have been categorized in the »Low conservation concern« category, 40 in the »Medium conservation concern« and 46 in the »High conservation concern«. 16 species have been categorized as »Data deficient«.

Table 5. Distribution of bird species according to categories

Not considered	Low conservation concern	Medium conservation concern	High conservation concern	Data deficient	All species
122	26	40	46	16	250
48,8	10,4	16	18,4	6,4	100



Graph 2. Distribution of bird species according to categories

Table 6. Distribution of bird species according to categories

Species	Low coservation concern	Medium coservation concern	High coservation concern
AVES			
Podicipediformes			
Podicipedidae			
Podiceps nigricollis	*Data deficient*		
Procellariiformes			
Procellariidae			
Calonectris diomedea			*i*
Puffinus yelkouan	*Data deficient*		
Hydrobatidae			
Hydrobates pelagicus	*Data deficient*		
Pelecaniformes			
Pelecanidae			
Pelecanus crispus			*i*
Phalacrocoracidae			
Phalacrocorax pygmeus			*i*
Ciconiiformes			
Ardeidae			

Species	Low coservation concern	Medium coservation concern	High coservation concern
Ardea purpurea			*i*
Ardeola ralloides			*i*
Botaurus stellaris		*i*	
Egretta garzetta		*i*	
Ixobrychus minutus		*i*	
Nycticorax nycticorax			*i*
Ciconidae			
Ciconia ciconia		*i*	
Ciconia nigra		*i*	
Threskiornithidae			
Platalea leucorodia			*i*
Plegadis falcinellus			*i*
Anseriformes			
Anatidae			
Anas querquedula	*Data deficient*		
Aythya nyroca			*i*
Mergus merganser			*i*
Falconiformes			
Accipitridae			
Accipiter brevipes			*i*
Accipiter gentilis	*i*		
Accipiter nisus	*i*		
Aquila chrysaetos		*i*	
Aquila pomarina			*i*
Buteo rufinus	*Data deficient*		
Circaetus gallicus			*i*
Circus aeruginosus		*i*	
Circus pygargus			*i*
Gypaetus barbatus	*Data deficient; but probably already extinct.*		
Gyps fulvus			*i*
Hieraaetus fasciatus			*i*
Hieraaetus penatus			*i*

Species	Low coservation concern	Medium coservation concern	High coservation concern
Milvus migrans	*Data deficient*		
Neophron percnopterus	*Data deficient; but probably already extinct.*		
Pernis apivorus		*i*	
Falconidae			
Falco biarmicus			*i*
Falco eleonorae			*i*
Falco naumanni			*i*
Falco peregrinus		*i*	
Falco subbuteo	*i*		
Falco tinnunculus	*i*		
Galliformes			
Tetraonidae			
Bonasa bonasia	*Data deficient*		
Tetrao tetrix	*Data deficient; especially data in Montenegro are uncertain.*		
Tetrao urogallus			*i*
Phasianidae			
Alectoris graeca		*i*	
Coturnix coturnix			*i*
Perdix perdix			*i*
Gruiformes			
Rallidae			
Crex crex			*i*
Porzana parva	*Data deficient*		
Porzana porzana	*Data deficient*		
Porzana pusilla	*Data deficient*		
Rallus aquaticus		*i*	
Charadriiformes			
Recurvirostridae			
Himantopus himantopus	*i*		
Recurvirostra avosetta			*i*
Burhinidae			

Species	Low coservation concern	Medium coservation concern	High coservation concern
Burhinus oedicnemus			*i*
Glareolidae			
Glareola pratincola			*i*
Charadiidae			
Charadrius alexandrinus			*i*
Charadrius dubius	*i*		
Vanellus vanellus		*i*	
Scolopacidae			
Actitis hypoleucos		*i*	
Gallinago gallinago			*i*
Scolopax rusticola	*Data deficient*		
Tringa totanus			*i*
Laridae			
Larus audouinii			*i*
Sternidae			
Chlidonias hybridus			*i*
Sterna albifrons			*i*
Sterna hirundo		*i*	
Columbiformes			
Columbidae			
Columba livia (only wild populations)			*i*
Streptopelia turtur		*i*	
Cuculiformes			
Cuculidae			
Clamator glandarius	*Data deficient*		
Strigiformes			
Strigidae			
Aegolius funereus	*i*		
Athene noctua			*i*
Bubo bubo		*i*	
Glaucidium passerinum	*i*		
Otus scops		*i*	

Species	Low coservation concern	Medium coservation concern	High coservation concern
Strix uralensis	*i*		
Tytonidae			
Tyto alba		*i*	
Caprimulgiformes			
Caprimulgidae			
Caprimulgus europaeus		*i*	
Apodiformes			
Apodidae			
Apus pallidus	*i*		
Coraciiformes			
Alcedinidae			
Alcedo atthis		*i*	
Meropidae			
Merops apiaster		*i*	
Coraciidae			
Coracias garrulus			*i*
Upupidae			
Upupa epops		*i*	
Piciformes			
Picidae			
Dendrocopos leucotos		*i*	
Dendrocopos medius		*i*	
Dendrocopos minor	*i*		
Dendrocopos syriacus		*i*	
Jynx torquilla		*i*	
Picoides tridactylus		*i*	
Picus canus		*i*	
Picus viridis			*i*
Passeriformes			
Alaudidae			
Alauda arvensis			*i*
Calandrella brachydactyla			*i*
Eremophila alpestris	*i*		

Species	Low coservation concern	Medium coservation concern	High coservation concern
Galerida cristata	*i*		
Lullula arborea			*i*
Melanocorypha calandra			*i*
Hirundinidae			
Hirundo daurica	*i*		
Riparia riparia	*Data deficient; breeding areas of this species in DAE are not verified.*		
Montacillidae			
Anthus campestris		*i*	
Anthus trivialis	*i*		
Motacilla flava	*i*		
Muscicapidae			
Monticola saxatilis	*i*		
Monticola solitarius	*i*		
Oenanthe hispanica		*i*	
Oenanthe oenanthe	*i*		
Phoenicurus phoenicurus			*i*
Saxicola rubetra		*i*	
Sylviidae			
Acrocephalus melanopogon			*i*
Acrocephalus schoenobaenus	*i*		
Hippolais olivetorum	*i*		
Hippolais pallida		*i*	
Locustella luscinioides	*i*		
Phylloscopus bonelli		*i*	
Regulus ignicapillus	*i*		
Sylvia borin		*i*	
Sylvia communis	*i*		
Sylvia curruca	*i*		
Sylvia hortensis		*i*	
Sylvia nisoria		*i*	
Timaliidae			

Species	Low coservation concern	Medium coservation concern	High coservation concern
Panurus biarmicus		*i*	
Laniidae			
Lanius collurio		*i*	
Lanius minor			*i*
Lanius senator			*i*
Emberizidae			
Emberiza citrinella	*i*		
Emberiza hortulana			*i*
Emberiza melanocephala		*i*	
Miliaria calandra		*i*	

3. Reptiles

The Mediterranean basin countries are home to 335 species of reptiles (marine turtles excluded), of which 170 are endemic to the region. 13% of reptile species are listed as being threatened with extinction. According to the results of the IUCN study "The Status and Distribution of Reptiles and Amphibians of the Mediterranean Basin", the greatest diversity of species is found in the eastern Mediterranean, characterized by semi-arid landscapes. In Europe, species diversity is much higher in the Balkan Peninsula than elsewhere.

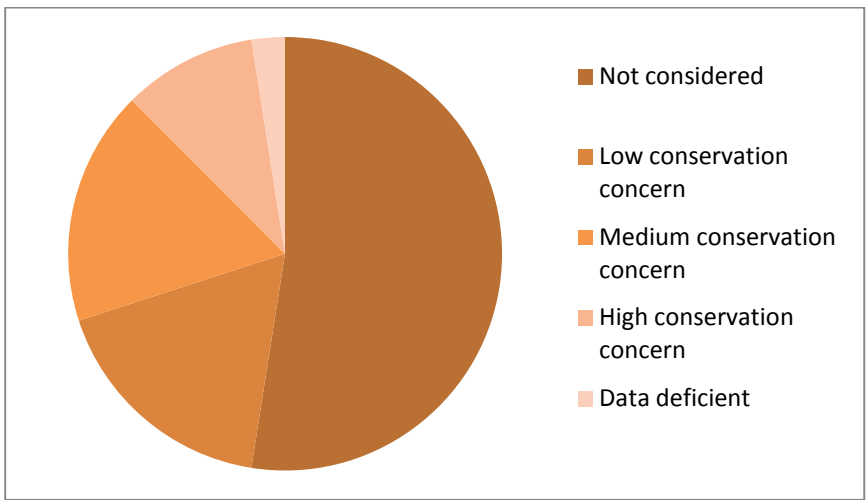
The main threats to reptile species of the Mediterranean are:

- The loss and degradation of habitats;
- Introduction of alien species;
- Overharvesting;
- Persecution;
- Collision with vehicles.

According to sources 40 reptile species are found in the DAE. Our assessment showed that 7 species should be categorized in the »Low conservation concern« category, 7 in the »Medium conservation concern« and 4 in the »High conservation concern«. 1 species has been categorized as »Data deficient«.

Table 7. Distribution of reptile species according to categories

Category	Not considered	Low conservation concern	Medium conservation concern	High conservation concern	Data deficient	All species
Numerical	21	7	7	4	1	40
Percentual	52,5	17,5	17,5	10,0	2,5	100



Graph3. Distribution of reptile species according to categories

Table 8. Distribution of reptile species according to categories

Species	Low coservation concern	Medium coservation concern	High coservation concern
Emydidae			
Emys orbicularis		*i*	
Mauremys rivulata		*i*	
Testudinidae			
Testudo hermanni		*i*	
Dermochelydae			
Dermochelys coriacea			*i*
Cheloniidae			
Caretta caretta			*i*
Chelonia mydas			*i*
Lacertidae			
*Algyroides nigropunctatus**	*i*		
*Dalmatolacerta oxycephala**	*i*		
*Dinarolacerta montenegrina**	*Data Deficient*		
*Dinarolacerta mosorensis **		*i*	
*Iberolacerta horvathi **		*i*	
Lacerta agilis	*i*		
*Podarcis melisellensis**		*i*	
Podarcis sicula	*i*		
Colubridae			
Elaphe quatuorlineata		*i*	
Hierophis gemonensis	*i*		
Zamenis situla	*i*		
Viperidae			
Vipera berus	*i*		
Vipera ursinii			*i*

4. Amphibians

Within countries of the Mediterranean basin, 115 of amphibian species can be found, which is a much higher number than in central and northern Europe. Of these, 64% of species were found to be endemic and 28,7% threatened with extinction. According to the results of the IUCN study "The Status and Distribution of Reptiles and Amphibians of the Mediterranean Basin", the greatest diversity of species is found in areas with higher humidity, especially in the western Mediterranean. A high diversity of species was also identified in some areas of northern Italy, in western Slovenia and western Croatia. Areas with a higher rate of threatened amphibian species were identified in Sardinia, northern Algeria, western Slovenia and south-western Turkey.

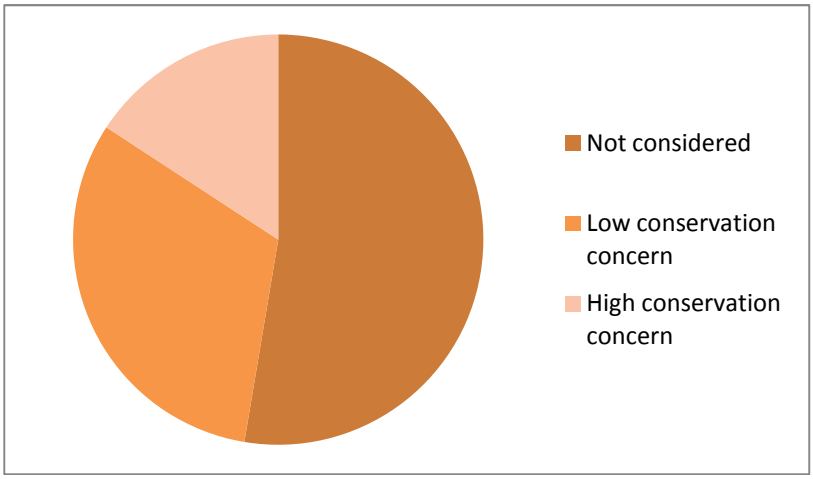
The main threats to amphibian species of the Mediterranean are:

- The loss and degradation of habitats;
- Introduction of alien species;
- Harvesting still has a considerable negative impact on amphibian populations (especially green frogs) of the region;
- Some disease, as chytridiomycosis, has been recognized as a serious threat for amphibians of the region, particularly in relation to global warming.

According to existing sources 19 species of amphibians inhabit the DAE. Our assessment showed that 6 species should be categorized in the »Low conservation concern« category and 3 in the »High conservation concern«.

Table 9: Distribution of amphibian species according to categories

Category	Not considered	Low conservation concern	High conservation concern	All species
Numerical	10,00	6	3	19
Percentual	52,6	31,6	15,8	100



Graph 4. Distribution of amphibian species according to categories.

Table 10: Distribution of amphibian species according to categories

Species	Low coservation concern	Medium coservation concern	High coservation concern
Proteidae			
*Proteus anguinus**			*i*
Salamandridae			
Salamandra atra	*i*		
Triturus carnifex	*i*		
Triturus macedonicus	*i*		
Triturus vulgaris	*i*		
Bombinatoridae			
Bombina variegata	*i*		
Hylidae			
Hyla arborea	*i*		
Raniade			
Rana latastei			*i*

Species	Low coservation concern	Medium coservation concern	High coservation concern
Rana shqiperica			*i*

5. Freshwater fish

Species richness of the Dinaric freshwater fish is amongst the highest in the Mediterranean basin. 253 endemic fish species occur in the Mediterranean basin, of which 56% are threatened with extinction. According to studies carried out by IUCN, within the Red List of Mediterranean Endemic Freshwater fish, the highest rate of endemic species is found in the south-western Iberian Peninsula, northern Italy with western Slovenia, central and southern Dalmatia, some areas of central Greece, south-western Turkey and in the Middle East.
The DAE has been identified as particularly important in freshwater fish richness. The Krka and Neretva river systems are particularly rich with species within rivers of the Adriatic basin. The same pattern appears within the regional distribution of threatened Mediterranean endemic freshwater fish species.

The main threats to fresh water fish species of the Mediterranean are:

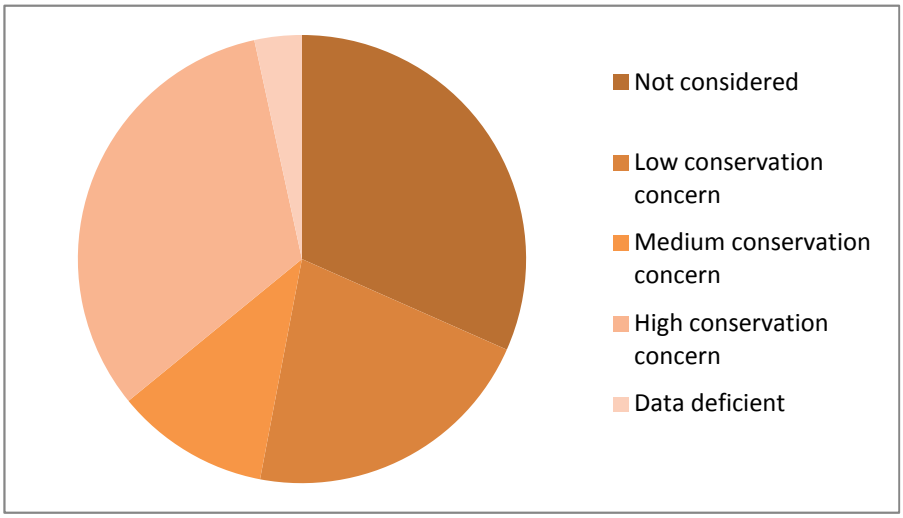
- The loss and degradation of habitats;
- Water pollution;
- Activities connected with water extraction, which is exacerbated with the increasing prevalence of droughts in the region. Dams are one of the main threats to habitats and freshwater fish in the Mediterranean region;
- Introduction of alien species.

According to most recent literature sources we identified 117 native species of freshwater fishes inhabiting the DAE. Our assessment showed that 25 species should be categorized in the »Low conservation concern« category, 13 in the »Medium conservation concern« category and 38 in »High conservation concern«. 4 species have been categorized as »Data deficient«.
Of 80 species and subspecies assessed, 49 were identified as endemic for the region. Of these, 5 were classified in the »Low conservation concern« category, 5 in the

»Medium conservation concern« while 35 in the »High conservation concern«. 4 endemic species have been categorized as »Data deficient«.

Table 11. Distribution of freshwater fish species according to categories

Category	Not considered	Low conservation concern	Medium conservation concern	High conservation concern	Data deficient	All species
Numerical	37	25	13	38	4	117
Percentual	31,6	21,4	11,1	32,5	3,4	100



Graph 5. Distribution of species according to categories

Table 11. Distribution of freshwater fish species according to categories

Species	Low coservation concern	Medium coservation concern	High coservation concern
Petromyzontidae			
Eudontomyzon mariae	*i*		
*Eudontomyzon stankokaramani**		*i*	
Lampetra fluviatilis	*i*		
Lethenteron zanandreai			*i*
Petromyzon marinus	*i*		

Species	Low coservation concern	Medium coservation concern	High coservation concern
Acipenseridae			
Acipenser naccarii			*i*
Acipenser sturio			*i*
Salmonidae			
Hucho hucho		*i*	
*Salmo dentex**			*i*
*Salmo farioides**			*i*
*Salmo marmoratus**			*i*
*Salmo montenigrinus**	*Data deficient*		
*Salmo taleri**	*Data deficient*		
Salmo trutta		*i*	
*Salmo visovacensis**			*i*
*Salmo obtusirostris (=Salmothymus obtusirostris)**			*i*
*Salmothymus obtusirostris krkensis**			*i*
*Salmothymus obtusirostris oxyrhinchus**			*i*
*Salmothymus obtusirostris salonitana**			*i*
Thymallidae			
Thymallus thymallus	*i*		
Lotidae			
Lota lota	*i*		
Cyprinidae			
Alburnus albidus		*i*	
*Alburnus scoranza**	*i*		
Aspius aspius	*i*		
*Aulopyge huegelii**			*i*
Barbus plebejus		*i*	
*Chondrostoma knerii**			*i*
*Chondrostoma phoxinus**			*i*
*Chondrostoma scodrense**	*Data deficient*		
Gobio kesslerii	*i*		
Gobio uranoscopus	*i*		
*Gobio skadarensis**			*i*

Species	Low coservation concern	Medium coservation concern	High coservation concern
Leuciscus delineatus	*i*		
Leuciscus idus	*i*		
Leuciscus souffia	*i*		
*Leuciscus svallize**			*i*
*Pelasgus minutes**	*Data deficient*		
*Phoxinellus adspersus**			*i*
*Phoxinellus alepidotus**			*i*
*Phoxinellus croaticus**			*i*
*Phoxinellus dalmaticus**			*i*
*Phoxinellus fontinalis**			*i*
*Phoxinellus ghetaldii**			*i*
*Phoxinellus jadovensi s **			*i*
*Phoxinellus krbavensis**			*i*
Rutilus basak	*i*		
*Rutilus karamani**	*i*		
*Rutilus ohridanus**	*i*		
*Scardinius dergle**		*i*	
*Scardinius plotizza**	*i*		
*Scardinius knezevici**		*i*	
*Squalius illyricus**			*i*
*Squalius microlepis**			*i*
*Squalius tenellus**			*i*
*Squalius zrmanjae**			*i*
*Telestes croaticus**			*i*
*Telestes fontinalis**			*i*
*Telestes metohiensis (=Phoxinellus metohiensis)**			*i*
*Telestes polylepis**			*i*
*Telestes turskyi**			*i*
*Telestes ukliva**			*i*
Vimba vimba	*i*		
Cobitidae			
Misgurnus fossilis	*i*		
*Barbatula zetensis**	*i*		

Species	Low coservation concern	Medium coservation concern	High coservation concern
*Cobitis dalmatina**			*i*
Cobitis elongata		*i*	
*Cobitis narentana**			*i*
Cobitis taenia	*i*		
*Oxynoemacheilus pindus**		*i*	
Sabanejewia balcanica	*i*		
Gasterosteidae			
Gasterosteus aculeatus (=G.gymnurus)	*i*		
Percidae			
Zingel streber	*i*		
Zingel zingel	*i*		
Cottidae			
Cottus gobio	*i*		
Gobiidae			
*Knipowitschia croatica**			*i*
*Knipowitschia mrakovcici**			*i*
*Knipowitshia radovici**		*i*	
Pomatoschistus canestrinii		*i*	
Cyprinodontidae			
Aphanius fasciatus		*i*	
Clupeidae			
Alosa sp. Skadar		*i*	

RECOMMENDATIONS

The Dinaric Arc Ecoregion has been recognised as a region of a high biodiversity value but also a region under severe threat. The following recommendations could be outlined following the preparation of the Conservation Status Assessment of Vertebrate Species of the Dinaric Arc Ecoregion:

1. Despite very valuable information on biodiversity in the DAE, there are big differences on availability of data between the countries; extensive efforts should be made to obtain data on species and habitats and changes in their distribution trends.

2. National red data lists should be produced and updated in the DAE countries where at present there are no such information available or it is of poor quality; these lists should pay particular attention to the extensive numbers of endemic and only locally dispersed species and subspecies that are not already mentioned at the international or regional conservation assessment lists or directives.

3. The level of monitoring of the changes in species and habitats distribution and trends is still too low to be able to predict their future ecological status and to address properly the issue of the biodiversity loss, so a concerted approach to monitoring at the national and regional level is required.

4. Several threats have been identified to different vertebrate groups in the DAE, but loss of habitats, including changes in the water regimes and agricultural practices, and invasive alien species have been identified as the most severe threats to all the vertebrate groups; a political action at the national and regional level is needed to reverse the negative impacts of identified threats to the biodiversity of the DAE.

5. In the times when hunting and trapping of animals, together with overharvesting, is not ranked high on the lists of threats in several EU countries, these pressures are becoming even more prominent in the countries of the DAE. The gradient of pressures is increasing from the north-western to southeaster part of the region; an international action to control hunting of all species and to stop killing of species that are considered as endangered at the regional or international level should be launched immediately and supported by the international awareness raising campaign.

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ANNEX 1: ASSESSMENT SCHEMES

1. Assessment scheme for mammal species

	CR	EN	VU	NT	LC	Habitat Directive	Bern convention	Dinaric endemic	Score	Low coservation concern	Medium coservation concern	High coservation concern
Insectivora												
Soricidae												
Neomys anomalus					0				0	*i*		
Regarding to national red lists (Slovenia – vulnerable; Croatia – near threatened) the species should be considered in the assessment as of low conservation concern.												
Neomys fodiens					0				0	*i*		
Regarding to national red lists (Slovenia – vulnerable; Croatia – near threatened) the species should be considered in the assessment as of low conservation concern.												
Chiroptera												
Rhinolophidae												
Rhinolophus blasii				1		1	1		3			*i*
According to best expert opinion the species should be considered in the category of high conservation concern.												
Rhinolophus euryale			2			1	1		4			*i*
Rhinolophus ferrumequinum				1		1	1		3		*i*	
Rhinolophus hipposideros				1		1	1		3		*i*	
Rhinolphus mehelyi			2			1	1		4	*Data deficient*		
Vespertilionidae												
Barbastella barbastellus				1		1	1		3	*i*		
According to best expert opinion the species should be considered in the category of low conservation concern.												
Eptesicus nilssonii					0		1		1	*i*		
Eptesicus serotinus					0		1		1	*i*		
Miniopterus schreibersii				1		1	1		3			*i*
Myotis bechsteinii				1		1	1		3		*i*	
Myotis blythii				1		1	1		3		*i*	
Myotis brandtii					0		1		1	*i*		
Myotis capaccinii			2			1	1		4			*i*
Regarding to national red lists (Slovenia – endangered; Croatia – endangered) the species should be considered in the assessment as of low conservation concern.												
Myotis dasycneme					0 NA	1	1		2	*i*		
Myotis daubentonii					0		1		1	*i*		

	CR	EN	VU	NT	LC	Habitat Directive	Bern convention	Dinaric endemic	Score	Low coservation concern	Medium coservation concern	High coservation concern
Myotis emarginatus					0	1	1		2	*i*		
Myotis myotis					0	1	1		2		*i*	
According to best expert opinion the species should be considered in category of medium conservation concern.												
Myotis mystacinus					0		1		1	*i*		
Myotis nattereri					0		1		1	*i*		
Nyctalus lasiopterus				1			1		2	*Data deficient*		
Nyctalus leisleri					0		1		1	*i*		
Nyctalus noctula					0		1		1	*i*		
Plecotus auritus					0		1		1	*i*		
Plecotus austriacus					0		1		1	*i*		
Plecotus kolombatovici					0		1		1	*i*		
Plecotus macrobullaris				1			1		2	*i*		
Vespertilio murinus					0 NA		1		1	*i*		
Molossidae												
Tadarida teniotis					0		1		1	*i*		
Rodentia												
Castoridae												
Castor fiber					0	1			1		*i*	
Regarding to national red lists (Slovenia – endangered; Croatia – near threatened) the species should be considered in the category of medium conservation concern.												
Arvicolidae												
*Dinaromys bogdanovi**			2					1	3		*i*	
Muridae												
Mus spicilegus					0				0	*i*		
Gliridae												
Dryomis nitedula					0				0	*i*		
According to best expert opinion the species should be considered in the category of low conservation concern.												
Eliomys quercinus					0				0	*i*		
According to best expert opinion the species should be considered in the category of low conservation concern.												
Glis glis					0				0	*i*		
According to best expert opinion the species should be considered in the category of low conservation concern.												
Muscardinus avellanarius					0				0	*i*		

	CR	EN	VU	NT	LC	Habitat Directive	Bern convention	Dinaric endemic	Score	Low coservation concern	Medium coservation concern	High coservation concern
According to best expert opinion the species should be considered in the category of low conservation concern.												
Cetacea												
Delphinidae												
Delphinus delphis					0		1		1	*Data deficient*		
Tursiops truncatus			2			1	1		4			*i*
Carnivora												
Ursidae												
Ursus arctos			2			2	1		5			*i*
Canidae												
Canis lupus					0	2	1		3		*i*	
Mustelidae												
Lutra lutra				1		1	1		3		*i*	
Felidae												
Felis silvestris					0		1		1	*i*		
Lynx lynx		3				1			4			*i*
The last surviving Balkan lynxes (endemic subspecies *L. l. martinoi*) are still found in the mountains of the Albanian-Macedonian border, in Kosovo and possibly in eastern Montenegro. There are perhaps only 100 animals left in the wild, consequently the population is below the minimum viable population threshold. The mountains between Slovenia and west-central Montenegro are populated by the Carpathian subspecies, which was introduced to Slovenia in mid-1970s and spread afterwards.												
Pinnipedia												
Monachus monachus	4					2	1		7			*i*
Artiodactyla												
Bovidae												
Rupicapra rupicapra balcanica					0	1			1		*i*	
The chamois is represented by two subspecies in the Dinaric Arc Ecoregion: the Alpine (*R. r. rupicapra*), and the endemic Balkan subspecies (*R. r. balcanica*). The north-western Dinaric region is populated by the Alpine subspecies, Bosnia and Herzegovina predominantly has the Balkan subspecies, although the Alpine subspecies was also introduced to some mountains in the past, and the rest of the region has pure Balkan populations. Populations in Montenegro and Albania are traditionally small, due to the poor regulation of hunting. On the other hand, chamois herds were badly decimated during 1990s in Bosnia and Herzegovina.												

2. Assessment scheme for bird species

Species	SPEC categories				Bird directive	Bern convention	Score	Low coservation concern	Medium coservation concern	High coservation concern
	1	2	3	4						
AVES										
Podicipediformes										
Podicipedidae										
Podiceps grisegena						1	1			
The species breeding population in the DAE region is limited to no more than a few pairs at one locality at the outer border of the region, and they do not represent significant contribution to the species population which is estimated between 32.000 and 56.000 pairs; the DAE population is not considered as an isolated population which means that the species is not listed in one of the conservation concern categories for the overall DAE region										
Podiceps nigricollis						1	1	*Data deficient*		
Data on breeding in Albania are not verified.										
Procellariiformes										
Procellariidae										
Calonectris diomedea		3			1	1	5			*i*
Puffinus yelkouan					1	1	2	*Data deficient*		
Hydrobatidae										
Hydrobates pelagicus					1	1	2	*Data deficient*		
Pelecaniformes										
Pelecanidae										
Pelecanus crispus	4				1	1	6			*i*
Phalacrocoracidae										
Phalacrocorax pygmeus	4				1	1	6			*i*
Ciconiiformes										
Ardeidae										
Ardea purpurea			2		1	1	4			*i*
Species has been shifted to the high conservation concern due high disturbance pressures and habitat loss in the majority of the most important breeding areas which highly affect this colonial breeding bird.										
Ardeola ralloides			2		1	1	4			*i*
Species has been shifted to the high conservation concern due high disturbance pressures and habitat loss in the majority of the most important breeding areas which highly affect this colonial breeding bird.										
Botaurus stellaris			2		1	1	4		*i*	
Egretta garzetta					1	1	2		*i*	
Species has been shifted to the high conservation concern due high disturbance pressures and habitat loss in the majority of the most important breeding areas which highly affect this colonial breeding bird.										

Species	SPEC categories				Bird directive	Bern convention	Score	Low coservation concern	Medium coservation concern	High coservation concern
	1	2	3	4						
Ixobrychus minutus			2		1	1	4		*i*	
Nycticorax nycticorax					1	1	2			*i*
Species has been shifted to the high conservation concern due high disturbance pressures and habitat loss in the majority of the most important breeding areas which highly affect this colonial breeding bird.										
Ciconidae										
Ciconia ciconia		3			1	1	5		*i*	
Conservation status of this species has improved in the last period which contributed to the shift from the high to medium conservation concern. However, populations have not yet recovered to the level that preceded its decline between 1970 - 1990.										
Ciconia nigra		3			1	1	5		*i*	
Conservation status of this species has improved in the last period which contributed to the shift from the high to medium conservation concern. However, its conservation status still can not be regarded as secure.										
Threskiornithidae										
Platalea leucorodia		3			1	1	5			*i*
Plegadis falcinellus			2		1	1	4			*i*
Breeding populations of this species in DAE region are very scarce and limited to only few locations which qualify the species at the DAE scale as species of high conservation concern, although national population estimates for some of the DAE countries are higher at the country level (i.e. Panonian part of the population).										
Anseriformes										
Anatidae										
Anas querquedula			2				2	*DD*		
Anas strepera										
Breeding population of this species in DAE region is very scarce and limited to only few locations which qualify the species at the DAE scale as species of high conservation concern, for example some pairs in Croatia/Pag .										
Aythya nyroca	4				1		5			*i*
Mergus merganser							0			*i*
Breeding population of this species in DAE region is very scarce and limited to only few locations which qualify the species at the DAE scale as species of high conservation concern, especially as those populations can be regarded as isolated (part of Balcanic population, i.e. Montenegro/Plavsko jezero, possibly extinct or at Cetina river/Croatia).										
Falconiformes										
Accipitridae										
Accipiter brevipes		3			1	1	5			*i*
Accipiter gentilis						1	1	*i*		
Accipiter nisus						1	1	*i*		
Aquila chrysaetos			2		1	1	4		*i*	
Aquila pomarina		3			1	1	5			*i*
Buteo rufinus			2		1	1	4	*Data deficient*		

Species	SPEC categories				Bird directive	Bern convention	Score	Low coservation concern	Medium coservation concern	High coservation concern
	1	2	3	4						
Circaetus gallicus			2		1	1	4			*i*
This species, as many of the raptors, have been shifted to the category of high conservation concern also because of high hunting pressure.										
Circus aeruginosus					1	1	2		*i*	
Circus pygargus					1	1	2			*i*
This species, as many of the raptors, have been shifted to the category of high conservation concern also because of high hunting pressure.										
Gypaetus barbatus			2		1	1	4	*Data deficient; probably already extinct.*		
Gyps fulvus					1	1	2			*i*
In comparision to the overall European population and trends of this species, especially in western European range, the DAE population is highly endangered.										
Hieraaetus fasciatus			2		1	1	4			*i*
This species, as many of the raptors, have been shifted to the category of high conservation concern also because of high hunting pressure.										
Hieraaetus penatus			2		1	1	4			*i*
This species, as many of the raptors, have been shifted to the category of high conservation concern also because of high hunting pressure.										
Milvus migrans			2		1	1	4	*Data deficient*		
Neophron percnopterus			2		1	1	4	*Data deficient; probably extinct in the region.*		
Pernis apivorus					1	1	3		*i*	
Falconidae										
Falco biarmicus			2		1	1	4			*i*
This species, as many of the raptors, have been shifted to the category of high conservation concern also because of high hunting pressure.										
Falco eleonorae		3			1	1	5			*i*
Falco naumanni	4				1	1	6			*i*
This species has been listed in the current assessment only according to some data from previous decade. It is most probable that the species has already been extinct in DAE.										
Falco peregrinus					1	1	2		*i*	
This species, as many of the raptors, have been shifted to the category of high conservation concern also because of high hunting pressure. In comparison to some other European countries, its population has not recovered in some parts of the DAE region to the level as it did in other parts of its distribution range.										
Falco subbuteo						1	1	*i*		
Falco tinnunculus			2			1	3	*i*		
Galliformes										
Tetraonidae										
Bonasa bonasia					1		1	*Data deficient*		

Species	SPEC categories				Bird directive	Bern convention	Score	Low coservation concern	Medium coservation concern	High coservation concern
	1	2	3	4						
Tetrao tetrix			2		1		3	*Data deficient; especially data in Montenegro are uncertain.*		
Tetrao urogallus					1		1			*i*
This species is present only in the northern part of the DAE, where its population is significant but is undergoing a significant decline and this is the reason for shifting it in the category of highest conservation concern. In the rest of the region should be considered data deficient.										
Phasianidae										
Alectoris graeca		3			1		4		*i*	
Coturnix coturnix			2				2			*i*
A significant decline, due to changes in agricultural practices and consequently loss of habitats. Hunting also represents a significant threat for this species. For these reasons this species has been shifted to the category of highest conservation concern.										
Perdix perdix			2				2			*i*
A significant decline, due to changes in agricultural practices and consequently loss of habitats. Hunting also represents a significant threat for this species. For these reasons this species has been shifted to the category of highest conservation concern.										
Gruiformes										
Rallidae										
Crex crex	4				1	1	6			*I*
Porzana parva					1	1	2	*Data deficient*		
Porzana porzana					1	1	2	*Data deficient*		
Porzana pusilla			2		1	1	4	*Data deficient*		
Rallus aquaticus							0		*i*	
This species has not been listed of particular conservation concern in several international conservation assessments (i.e. SPEC), but it is considered endangered in DAE due to extensive habitat loss.										
Charadriiformes										
Haematopodidae										
Haematopus ostralegus							0			
The species breeding population in the DAE region is limited to no more than a few pairs at one locality at the outer border of the region, and they do not represent significant contribution to the species population which is highly endangered due to hunting pressure and habitat destruction.										
Recurvirostridae										
Himantopus himantopus					1	1	2	*i*		
Recurvirostra avosetta					1	1	2			*i*
This species has not been listed of particular conservation concern in several international conservation assessments (i.e. SPEC), but it is considered endangered in DAE due to extensive habitat loss.										
Burhinidae										
Burhinus oedicnemus			2		1	1	4			*i*

Species	SPEC categories				Bird directive	Bern convention	Score	Low coservation concern	Medium coservation concern	High coservation concern
	1	2	3	4						
This species has been shifted to the category of highest conservation concern due to extensive losses of habitats which made species locally extinct (i.e. in the north-western parts of the region).										
Glareolidae										
Glareola pratincola			2		1	1	4			*i*
This species is found breeding only at some very localised parts of the DAE where is under sever pressure of habitat losses and hunting pressures which is the reason for shifting it to the category of highest conservation concern.										
Charadiidae										
Charadrius alexandrinus			2		1	1	4			*i*
The species is found breeding in the DAE almost exclusively on the coastal areas which are under enormous pressures, especially due tourism and infrastructure developments and other habitat loss reasons which is the reason for shifting it into category of highest conservation concern.										
Charadrius dubius						1	1	*i*		
Vanellus vanellus		3					3		*i*	
Scolopacidae										
Actitis hypoleucos			2				2		*i*	
Gallinago gallinago			2				2			*i*
The species is influenced by rapid changes in the habitat and extensive hunting pressures which are the main reasons for shifting it as species of highest conservation concern in the DAE. Locally has already become extinct (i.e. in its northwestern breeding range within DAE).										
Numenius arquata		3					3			
The species breeding population in the DAE region is limited to no more than a few pairs at one locality at the outer border of the region, and they do not represent significant contribution to the species population which is estimated between up to 360.00.000 pairs; the DAE population is not considered as an isolated population which means that the species is not listed in one of the conservation concern categories for the overall DAE region										
Scolopax rusticola			2				2	*Data deficient*		
Tringa totanus		3					3			*i*
Breeding populations of this species in the DAE region are relatively small in comparison to the species' global distribution and most of the localities are highly endangered due to disturbances and habitat loss which are the reasons for shifting it into the high conservation status category.										
Laridae										
Larus audouinii	4				1	1	6			*i*
Sternidae										
Chlidonias hybridus			2		1	1	4			*i*
The species, very localised breeder, is influenced by rapid changes in the habitat and extensive disturbance pressures which are the main reasons for shifting it as species of highest conservation concern in the DAE.										
Sterna albifrons			2		1	1	4			*i*
Breeding numbers and colonies of this species in DAE are smaller in comparison to the species' other breeding areas and therefore more vulnerable. This is the reason for listing the species as of high conservation concern.										

Species	SPEC categories				Bird directive	Bern convention	Score	Low coservation concern	Medium coservation concern	High coservation concern
	1	2	3	4						
Sterna hirundo					1	1	2		*i*	
This colonial breeding species is under threat of disturbance and habitat loss which already caused serious declines in parts of the DAE region and which are the reasons for shifting is as species of medium conservation concern.										
Columbiformes										
Columbidae										
Columba livia (only wild populations)							0			*i*
Wild populations have been hardly affected by hybridisation with feral domestic forms.										
Streptopelia turtur			2				2		*i*	
Hunting pressures in the DAE as well as in other parts of southern Europe are so extensive that we consider the species as of medium conservation concern.										
Cuculiformes										
Cuculidae										
Clamator glandarius						1	1	*Data deficient*		
Strigiformes										
Strigidae										
Aegolius funereus					1	1	2	*i*		
Athene noctua			2			1	3			*i*
In parts of its European population this species is not listed as critically endangered while in other parts, including the Mediterranean, this species is under severe decline due to various reasons (habitat loss, high mortality of younger birds, food shortage, disturbance...) which caused a shift into the category of high conservation concern.										
Bubo bubo			2		1	1	4		*i*	
Glaucidium passerinum					1	1	2	*i*		
Otus scops		3				1	4		*i*	
Strix uralensis					1	1	2	*i*		
Tytonidae										
Tyto alba			2			1	3		*i*	
Caprimulgiformes										
Caprimulgidae										
Caprimulgus europaeus		3			1	1	5		*i*	
One of the few species where population trends in the DAE are perhaps less negative than in other parts of its distribution range which qualify the species as of medium, and not high conservation concern.										
Apodiformes										
Apodidae										
Apus pallidus						1	1	*i*		

Species	SPEC categories				Bird directive	Bern convention	Score	Low coservation concern	Medium coservation concern	High coservation concern
	1	2	3	4						
Coraciiformes										
Alcedinidae										
Alcedo atthis			2		1	1	4		*i*	
Meropidae										
Merops apiaster			2			1	3		*i*	
Coraciidae										
Coracias garrulus		3			1	1	5			*i*
Upupidae										
Upupa epops			2			1	3		*i*	
Piciformes										
Picidae										
Dendrocopos leucotos					1	1	2		*i*	
This species is considered of medium conservation concern due to its preference for particular habitat types which are easily a subject of major changes and relatively small regional population.										
Dendrocopos medius					1	1	2		*i*	
This species is considered of medium conservation concern due to its preference for particular habitat types which are easily a subject of major changes. Regionally has become endangered, i.e. in its north western parts of the DAE range.										
Dendrocopos minor						1	1	*i*		
Dendrocopos syriacus					1	1	1		*i*	
Jynx torquilla			2			1	3		*i*	
Picoides tridactylus			2		1	1	4		*i*	
Picus canus			2		1	1	4		*i*	
Picus viridis		3				1	4			*i*
This woodpecker species is not found only in forest habitats but also in the cultural landscape. These habitats are considered as one of the most influenced by changes in land uses and practices which cause intensive local declines and caused a shift in its status into high conservation concern.										
Passeriformes										
Alaudidae										
Alauda arvensis			2				2			*i*
This is the cultural landscape species. These habitats are considered as one of the most influenced by changes in land uses and practices which cause intensive local declines and caused a shift in its status into high conservation concern.										
Calandrella brachydactyla			2		1	1	4			*i*
This is the cultural landscape species. These habitats are considered as one of the most influenced by changes in land uses and practices which cause intensive local declines and caused a shift in its status into high conservation concern.										

Species	SPEC categories				Bird directive	Bern convention	Score	Low coservation concern	Medium coservation concern	High coservation concern
	1	2	3	4						
Eremophila alpestris						1	1	*i*		
Galerida cristata			2				2	*i*		
Lullula arborea		3			1		4			*i*
This is the cultural landscape species. These habitats are considered as one of the most influenced by changes in land uses and practices which cause intensive local declines and caused a shift in its status into high conservation concern.										
Melanocorypha calandra			2		1	1	4			*i*
This is the cultural landscape species. These habitats are considered as one of the most influenced by changes in land uses and practices which cause intensive local declines and caused a shift in its status into high conservation concern.										
Hirundinidae										
Hirundo daurica						1	1	*i*		
Riparia riparia			2			1	3	*Data deficient; breeding areas of this species in DAE are not verified.*		
Montacillidae										
Anthus campestris			2		1	1	4		*i*	
This is the cultural landscape species. These habitats are considered as one of the most influenced by changes in land uses and practices which cause intensive local declines and caused a shift in its status into high conservation concern.										
Anthus trivialis						1	1	*i*		
Motacilla flava						1	1	*i*		
Muscicapidae										
Monticola saxatilis			2			1	3	*i*		
In DAE this species is one of very few for which conservation status has been considered as more favourable than in other parts of its distribution range.										
Monticola solitarius			2			1	3	*i*		
In DAE this species is one of very few for which conservation status has been considered as more favourable than in other parts of its distribution range.										
Oenanthe hispanica		3				1	4		*i*	
Oenanthe oenanthe			2			1	3	*i*		
In DAE this species is one of very few for which conservation status has been considered as more favourable than in other parts of its distribution range, which is especially true for the breeding areas that are found in higher mountain areas.										
Phoenicurus phoenicurus		3				1	4			*i*
This is the cultural landscape species. These habitats are considered as one of the most influenced by changes in land uses and practices which cause intensive local declines and caused a shift in its status into high conservation concern.										
Saxicola rubetra									*i*	
This species has not been listed high at international conservation assessments, however it is considered										

Species	SPEC categories				Bird directive	Bern convention	Score	Low coservation concern	Medium coservation concern	High coservation concern
	1	2	3	4						
critically endangered and locally extinct in parts of the DAE regions which qualify this species as one of medium conservation concern in DAE										
Sylviidae										
Acrocephalus melanopogon					1	1	2			*i*
This species is very localised breeder in DAE and under high pressures due habitat loss in those areas which qualify it as species of high conservation concern.										
Acrocephalus schoenobaenus						1	1	*i*		
Hippolais olivetorum					1	1	2	*i*		
Hippolais pallida			2			1	3		*i*	
Locustella fluviatilis										
The species breeding population in the DAE region is limited to no more than a few pairs at one locality at the outer border of the region. The DAE population is not considered as an isolated population which means that the species is not listed in one of the conservation concern categories for the overall DAE region.										
Locustella luscinioides						1	1	*i*		
The species breeding population in the DAE region is limited to no more than a few pairs at one locality at the outer border of the region. The DAE population is not considered as an isolated population which means that the species is not listed in one of the conservation concern categories for the overall DAE region.										
Locustella naevia										
The species breeding population in the DAE region is limited to no more than a few pairs at one locality at the outer border of the region. The DAE population is not considered as an isolated population which means that the species is not listed in one of the conservation concern categories for the overall DAE region.										
Phylloscopus bonelli		3				1	4		*i*	
Regulus ignicapillus						1	1	*i*		
Sylvia borin						1	1		*i*	
This species has very recently undergone serious population decline in parts of DAE which caused a shift to medium conservation concern category.										
Sylvia communis						1	1	*i*		
Sylvia curruca						1	1	*i*		
Sylvia hortensis			2			1	3		*i*	
Sylvia nisoria					1	1	2		*i*	
This species has very recently undergone serious population decline in parts of DAE which caused a shift to medium conservation concern category.										
Timaliidae										
Panurus biarmicus						1	1		*i*	
This species is very localised breeder in DAE and under high pressures due habitat loss in those areas which qualify it as species of high conservation concern. Panonian parts of its population, for example, might not be so endangered as dinaric population.										
Laniidae										
Lanius collurio			2		1	1	4		*i*	

Species	SPEC categories				Bird directive	Bern convention	Score	Low coservation concern	Medium coservation concern	High coservation concern
	1	2	3	4						
Lanius minor		3			1	1	5			*i*
Lanius senator		3				1	4			*i*
This is the cultural landscape species. These habitats are considered as one of the most influenced by changes in land uses and practices which cause intensive local declines and caused a shift in its status into high conservation concern.										
Emberizidae										
Emberiza citrinella						1	1	*i*		
Emberiza hortulana		3			1		4			*i*
This species has very recently undergone serious population decline in parts of DAE which caused a shift to high conservation concern category.										
Emberiza melanocephala		3				1	4		*i*	
Miliaria calandra		3					3		*i*	

3. Assessment scheme for reptile species

Species	IUCN Assessment of Mediterranean Reptiles					Habitat Directive	Bern convention	Dinaric endemic	Score	Low coservation concern	Medium coservation concern	High coservation concern
	CR	EN	VU	NT	LC							
Emydidae												
Emys orbicularis				1		1	1		3		*i*	
Mauremys rivulata					0	1	1		2		*i*	
Testudinidae												
Testudo hermanni				1		1	1		3		*i*	
Cheloniidae												
Caretta caretta		3				2	1		6			*i*
No reproductive sites in the DAE. The Adriatic sea is an important wintering site for this species.												
Lacertidae												
*Algyroides nigropunctatus**				1			1	1	3	*i*		
*Dalmatolacerta oxycephala**				1				1	2	*i*		
*Dinarolacerta montenegrina**								1		*Data deficient*		

Species	IUCN Assessment of Mediterranean Reptiles					Habitat Directive	Bern convention	Dinaric endemic	Score	Low coservation concern	Medium coservation concern	High coservation concern
	CR	EN	VU	NT	LC							
This is a recently discovered species, endemic to the Prokletije massif on the Montenegro – Albanian border.												
*Dinarolacerta mosorensis **			2					1	3		*i*	
*Iberolacerta horvathi **				1			1	1	3		*i*	
Lacerta agilis					0		1		1	*i*		
*Podarcis melisellensis**					0		1	1	2		*i*	
Podarcis sicula					0		1		1	*i*		
Colubridae												
Elaphe quatuorlineata				1		1	1		3		*i*	
Hierophis gemonensis					0		1		1	*i*		
Zamenis situla					0	1	1		2	*i*		
Viperidae												
Vipera berus					0				0	*i*		
Vipera ursinii			2			1	1		4			*i*

4. Assessment scheme for amphibian species

Species	IUCN Assessment of Mediterranean Amphibians					Habitat Directive	Bern convention	Dinaric endemic	Score	Low coservation concern	Medium coservation concern	High coservation concern
	CR	EN	VU	NT	LC							
Proteidae												
*Proteus anguinus**			2			2	1	1	6			*i*
Salamandridae												
Salamandra atra					0		1		1	*i*		
Triturus carnifex					0	1	1		2	*i*		
Triturus macedonicus										*i*		

Species	IUCN Assessment of Mediterranean Amphibians					Habitat Directive	Bern convention	Dinaric endemic	Score	Low coservation concern	Medium coservation concern	High coservation concern
	CR	EN	VU	NT	LC							
These species was recently recognized as an independent lineage of the *Triturus carnifex* group. The species is present in the southernmost part of the DAE and according to best expert opinion should be considered of same conservation concern as previous one.												
Triturus vulgaris					0					*i*		
Regarding to national red lists the species should be considered in the assessment as of low conservation concern.												
Bombinatoridae												
Bombina variegata					0	1	1		2	*i*		
Hylidae												
Hyla arborea					0		1		1	*i*		
Raniade												
Rana latastei			2			1	1		4			*i*
Rana shqiperica		3						1	4			*i*

5. Assessment scheme for fresh water fish species

Species	IUCN Assessment of Mediterranean Fresh water fish					*Habitat Directive*	*Bern convention*	*Dinaric endemic*	*Score*	Low coservation concern	Medium coservation concern	High coservation concern
	CR	EN	VU	NT	LC							
Petromyzontidae												
Eudontomyzon mariae						1			1	*i*		
*Eudontomyzon stankokaramani**					0	1		1	2		*i*	
Conservation status category according to Kottelat & Freyhof, 2007.												
Lampetra fluviatilis						1			1	*i*		
Lethenteron zanandreai					0	1	1		2			*i*
Regarding to national red lists (Slovenia – Endangered; Croatia – Endangered) the species should be considered in the assessment as of high conservation concern												

Species	IUCN Assessment of Mediterranean Fresh water fish					*Habitat Directive*	*Bern convention*	*Dinaric endemic*	*Score*	Low coservation concern	Medium coservation concern	High coservation concern
	CR	EN	VU	NT	LC							
Petromyzon marinus						1			1	*i*		
Acipenseridae												
Acipenser naccarii	4					2	1		7			*i*
Acipenser sturio						2	1		3			*i*
Regarding to national red lists (Slovenia – Endangered; Croatia – Regionaly extinct) the species should be considered in the assessment as of high conservation concern												
Salmonidae												
Hucho hucho						1			1		*i*	
Salmo cenerinus	DD									*Data deficient*		
Conservation status category according to Kottelat & Freyhof, 2007.												
*Salmo dentex**				1				1	2			*i*
Regarding to national red lists (Croatia – critically endangered) the species should be considered of high conservation concern.												
*Salmo farioides**				1				1	2			*i*
Regarding to national red lists (Croatia – endangered) the species should be considered of high conservation concern.												
Salmo macrostigma												
The data for the Balcanic trout are still incomplete. Even at European level the taxonomic problems for this species have not been solved. Since it was not included in the latest taxonomical review of European freshwater fishes, we excluded the species from further assessment.												
*Salmo marmoratus**					0	1		1	2			*i*
Regarding to national red lists (Slovenia – endangered; Croatia – critically endangered) the species should be considered of high conservation concern.												
*Salmo montenigrinus**	DD							1	1	*Data deficient*		
Conservation status category according to Kottelat & Freyhof, 2007.												
*Salmo taleri**	DD							1	1	*Data deficient*		
Conservation status category according to Kottelat & Freyhof, 2007.												
Salmo trutta											*i*	
*Salmo visovacensis**								1	1			*i*
As an endemic of a limited area of the Adriatic basin, the species can be considered of high conservation concern. Regarding to national red lists (Croatia – endangered) the species should be also considered of high conservation concern.												
*Salmo zrmanjaensis**												
In the Croatian red list of fresh water fishes this species was assessed as endangered. According to new taxonomy this species is included in the *Salmo farioides* complex and not recognized as an indipendent species. Therefor we excluded it from further assessment.												
Salmo obtusirostris (=Salmothymus		3						1	4			*i*

Species	IUCN Assessment of Mediterranean Fresh water fish					*Habitat Directive*	*Bern convention*	*Dinaric endemic*	*Score*	Low coservation concern	Medium coservation concern	High coservation concern
	CR	EN	VU	NT	LC							
*obtusirostris)**												
Following subspecies has been recognized in Croatia.												
*Salmothymus obtusirostris krkensis**												*i*
*Salmothymus obtusirostris oxyrhinchus**												*i*
*Salmothymus obtusirostris salonitana**												*i*
Thymallidae												
Thymallus thymallus									0	*i*		
Regarding to national red lists (Slovenia – vulnerable; Croatia – vulnerable) the species should be considered in the category of low conservation concern.												
Lotidae												
Lota lota									0	*i*		
Regarding to national red lists (Slovenia – endangered; Croatia – vulnerable) the species should be considered in the category of low conservation concern.												
Cyprinidae												
Alburnus albidus			2			1			3		*i*	
*Alburnus scoranza**				0				1	1	*i*		
Conservation status category according to Kottelat & Freyhof, 2007.												
Aspius aspius						1			1	*i*		
*Aulopyge huegelii**		3						1	4			*i*
Barbus plebejus					0	1			1		*i*	
Regarding to national red lists (Slovenia – endangered; Croatia – endangered) the species should be considered in the category of medium conservation concern.												
*Chondrostoma knerii**			2					1	3			*i*
Regarding to national red lists (Croatia – endangered) the species should be considered of high conservation concern.												
*Chondrostoma phoxinus**		3						1	4			*i*
*Chondrostoma scodrense**	EX							1		*Data deficient*		
Believed to be extinct. Known only from museum specimens collected in late 19th century.												
Gobio kesslerii						1			1	*i*		
Gobio uranoscopus						1			1	*i*		
*Gobio skadarensis**		3						1	4			*i*
Conservation status category according to Kottelat & Freyhof, 2007.												
Leuciscus delineatus									0	*i*		
Regarding to national red lists (Slovenia – probably extinct; Croatia – vulnerable) the species should be considered in the category of low conservation concern.												

Species	IUCN Assessment of Mediterranean Fresh water fish					*Habitat Directive*	*Bern convention*	*Dinaric endemic*	*Score*	Low coservation concern	Medium coservation concern	High coservation concern
	CR	EN	VU	NT	LC							
Leuciscus idus									0	*i*		
Regarding to national red lists (Slovenia – endangered; Croatia – vulnerable) the species should be considered in the category of low conservation concern.												
Leuciscus souffia						1			1	*i*		
*Leuciscus svallize**			2					1	3			*i*
Regarding to national red lists (Croatia – vulnerable) the species should be considered of high conservation concern.												
*Pelasgus minutes**	DD							1		*Data deficient*		
Conservation status category according to Kottelat & Freyhof, 2007												
*Phoxinellus adspersus**			2					1	3			*i*
Regarding to national red lists (Croatia – vulnerable) the species should be considered of high conservation concern.												
*Phoxinellus alepidotus**		3						1	4			*i*
*Phoxinellus croaticus**		3						1	4			*i*
*Phoxinellus dalmaticus**	4							1	5			*i*
*Phoxinellus fontinalis**	4							1	5			*i*
*Phoxinellus ghetaldii**			2					1	3			*i*
Regarding to national red lists (Croatia – endangered) the species should be considered of high conservation concern.												
*Phoxinellus jadovensi s **	4							1	5			*i*
*Phoxinellus krbavensis**	4							1	5			*i*
Rutilus basak					0			1	1	*i*		
*Rutilus karamani**					0			1	1	*i*		
Conservation status category according to Kottelat & Freyhof, 2007.												
*Rutilus ohridanus**					0			1	1	*i*		
Conservation status category according to Kottelat & Freyhof, 2007.												
*Scardinius dergle**				1				1	1		*i*	
Conservation status category according to Kottelat & Freyhof, 2007.												
*Scardinius plotizza**					0			1	1	*i*		
Conservation status category according to Kottelat & Freyhof, 2007.												
*Scardinius knezevici**			2					1	3		*i*	
Known only from lakes of Skadar and Ohrid. In Skadar lake is still abundant. Conservation status category according to Kottelat & Freyhof, 2007												
*Squalius illyricus**				1				1	2			*i*
Regarding to national red lists (Croatia – vulnerable) the species should be considered of high conservation concern.												

Species	IUCN Assessment of Mediterranean Fresh water fish					*Habitat Directive*	*Bern convention*	*Dinaric endemic*	*Score*	Low coservation concern	Medium coservation concern	High coservation concern
	CR	EN	VU	NT	LC							
*Squalius microlepis**		3						1	4			*i*
*Squalius tenellus**		3						1	4			*i*
Conservation status category according to Kottelat & Freyhof, 2007												
*Squalius zrmanjae**				1				1	2			*i*
Regarding to national red lists (Croatia – vulnerable) the species should be considered of high conservation concern.												
*Telestes croaticus**		3						1	4			*i*
Conservation status category according to Kottelat & Freyhof, 2007												
*Telestes fontinalis**	4							1	5			*i*
Conservation status category according to Kottelat & Freyhof, 2007												
*Telestes metohiensis (=Phoxinellus metohiensis)**			2					1	3			*i*
Conservation status category according to Kottelat & Freyhof, 2007. Regarding to national red lists (Croatia – regionally extinct) the species should be considered of high conservation concern.												
*Telestes polylepis**	4							1	5			*i*
*Telestes turskyi**	4							1	5			*i*
*Telestes ukliva**			2					1	3			*i*
According to IUCN assessment this species was considered to be extinct. Kottelat & Freyhof (2007) confirmed its presence in the wild classifying its conservation status as vulnerable. Regarding to national red lists (Croatia – critically endagered) the species should be considered of high conservation concern.												
Vimba vimba									0	*i*		
Regarding to national red lists (Slovenia – endangered; Croatia – vulnerable) the species should be considered in the category of low conservation concern.												
Cobitidae												
Misgurnus fossilis						1			1	*i*		
*Barbatula zetensis**					0			1	1	*i*		
Conservation status category according to Kottelat & Freyhof, 2007												
*Cobitis dalmatina**			2					1	3			*i*
Regarding to national red lists (Croatia – vulnerable) the species should be considered of high conservation concern.												
Cobitis elongata						1			1		*i*	
Regarding to national red lists (Slovenia – endangered; Croatia - vulnerable) the species should be considered of medium conservation concern.												
*Cobitis narentana**			2					1	3			*i*
Regarding to national red lists (Croatia – vulnerable) the species should be considered of high conservation concern.												
Cobitis taenia						1			1	*i*		

Species	IUCN Assessment of Mediterranean Fresh water fish					*Habitat Directive*	*Bern convention*	*Dinaric endemic*	*Score*	Low coservation concern	Medium coservation concern	High coservation concern
	CR	EN	VU	NT	LC							
*Oxynoemacheilus pindus**			2					1	3		*i*	
Conservation status category according to Kottelat & Freyhof, 2007												
Sabanejewia balcanica									0	*i*		
Regarding to national red lists (Slovenia – endangered; Croatia – vulnerable) the species should be considered in the category of low conservation concern.												
Gasterosteidae												
Gasterosteus aculeatus (=G.gymnurus)									0	*i*		
Regarding to national red lists (Slovenia – rare; Croatia – endangered) the species should be considered in the category of low conservation concern.												
Percidae												
Zingel streber						1			1	*i*		
Zingel zingel									0	*i*		
Regarding to national red lists (Slovenia – endangered; Croatia – vulnerable) the species should be considered in the category of low conservation concern.												
Cottidae												
Cottus gobio						1			1	*i*		
Gobiidae												
*Knipowitschia croatica**			2					1	3			*i*
Regarding to national red lists (Croatia – critically endangered) the species should be considered of high conservation concern.												
*Knipowitschia mrakovcici**	4							1	5			*i*
Conservation status category according to Kottelat & Freyhof, 2007. The authors considere this species as *Knipowitschia sp*. Visovac.												
*Knipowitshia radovici**			2					1	3		*i*	
Conservation status category according to Kottelat & Freyhof, 2007.												
Pomatoschistus canestrinii						1	1		2		*i*	
Cyprinodontidae												
Aphanius fasciatus					0	1	1		2		*i*	
Clupeidae												
Alosa sp. Skadar			2					1	0		*i*	
Conservation status category according to Kottelat & Freyhof, 2007.												

ANNEX 2: Species from the CITES list

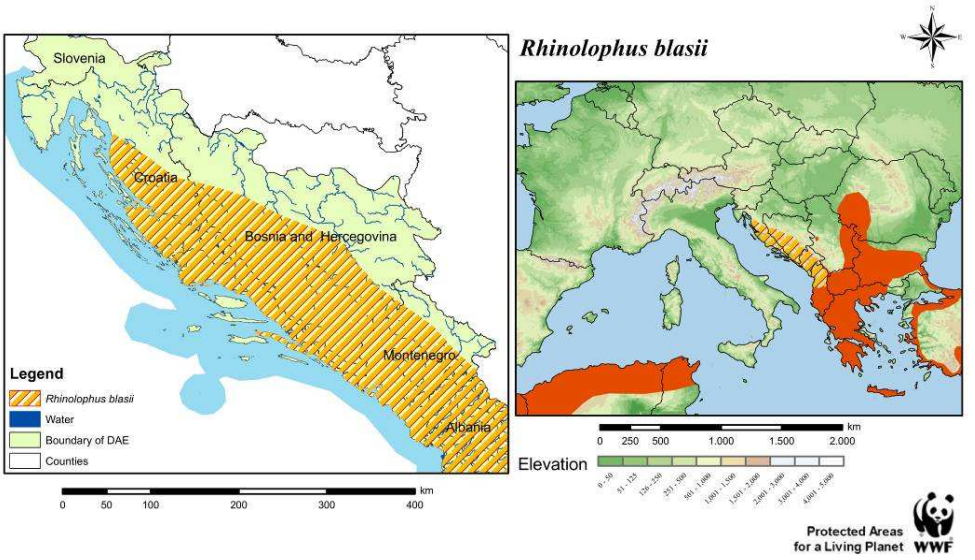
Additionally, we prepared a list of species included in **The Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** which is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. It has to be highlighted that there is a low level of acceptance of important multilateral environmental agreements, as CITES is, among some countries of the region.

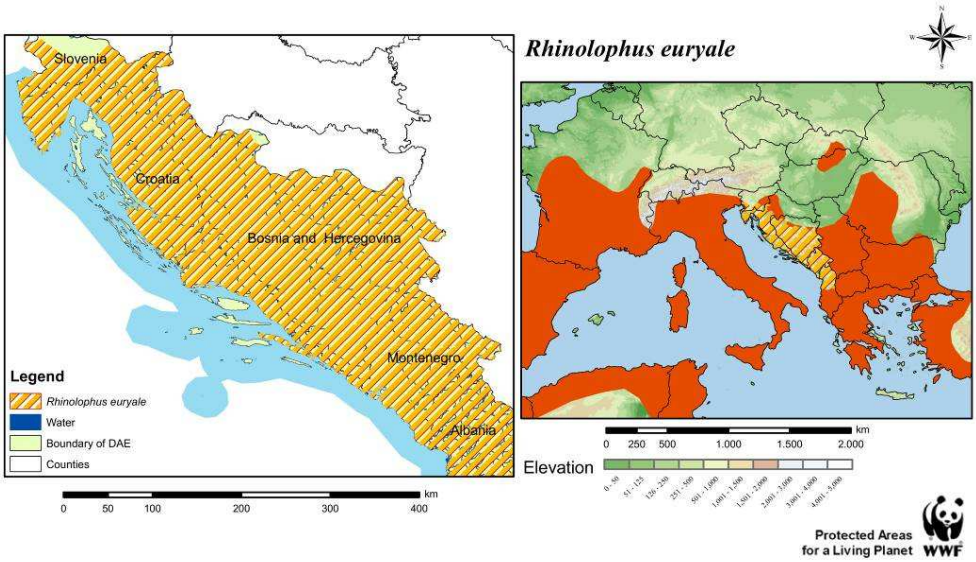
Canis lupus (II Appendix)
Felis silvestris (II Appendix)
Lynx lynx (II Appendix)
Lutra lutra (I Appendix)
Monachus monachus (I Appendix)
Ursus arctos (II Appendix)
Delphinus delphis (II Appendix)
Tursiops truncatus (II Appendix)
Ciconia nigra (II Appendix)
Platalea leucorodia (II Appendix)
Aquila heliaca (I Appendix)
Falco preregrinus (I Appendix)
Tetrax tetrax (II Appendix)
Pelecanus crispus (I Appendix)
Vipera ursinii (I Appendix)
Testudo hermanni (II Appendix)
Anguilla anguilla (II Appendix)

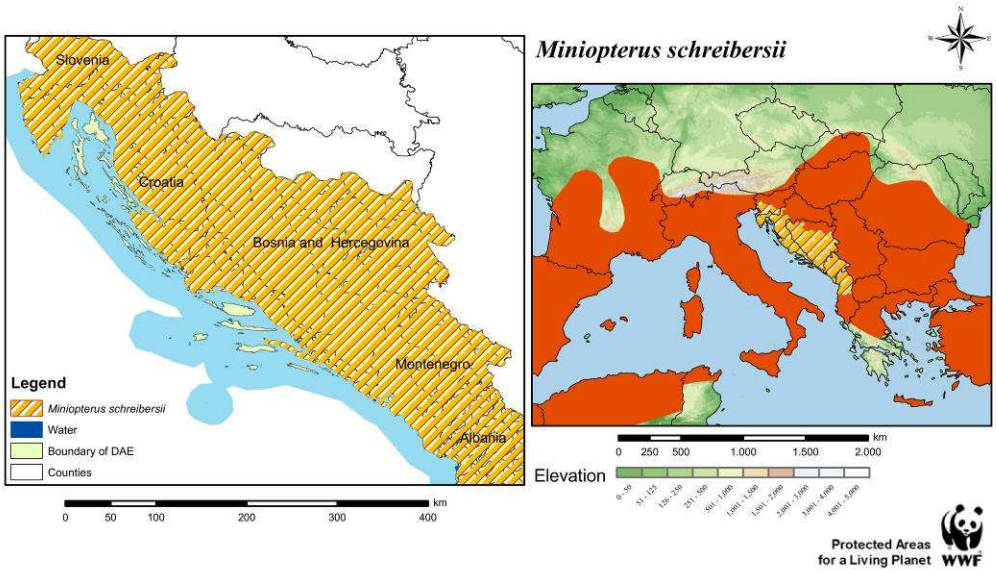
ANNEX 3: Distribution of key species

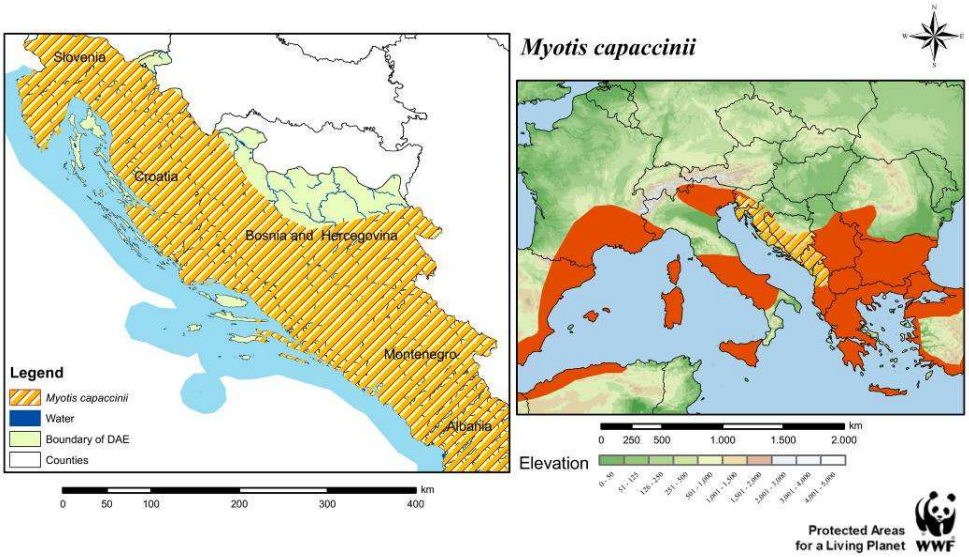
Maps of distribution of key species, in the analysis recognized as of high conservation concern. Distribution in the DAE is marked separetly (yellow striped) from the rest of the Mediterranean range (orange color).

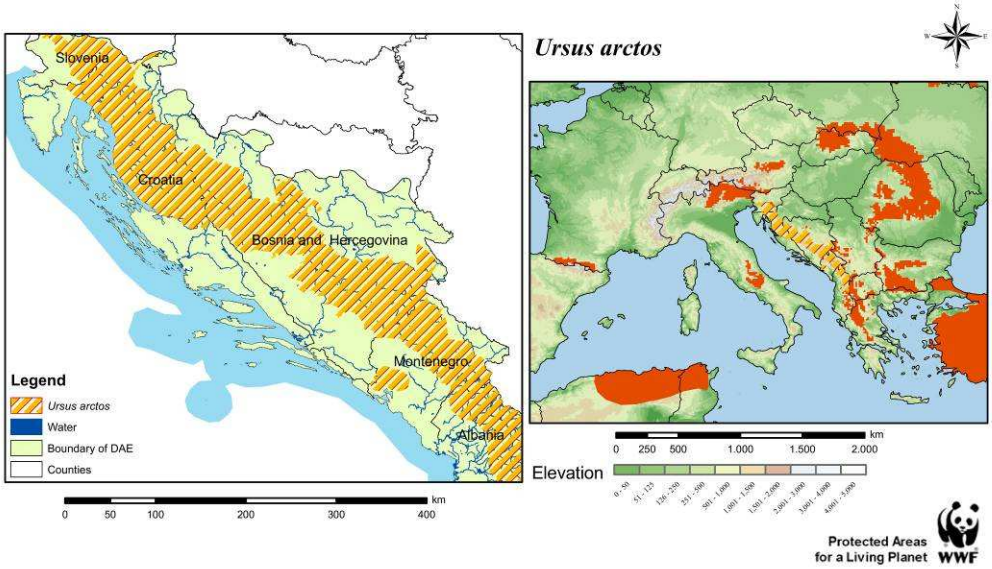
Mammals



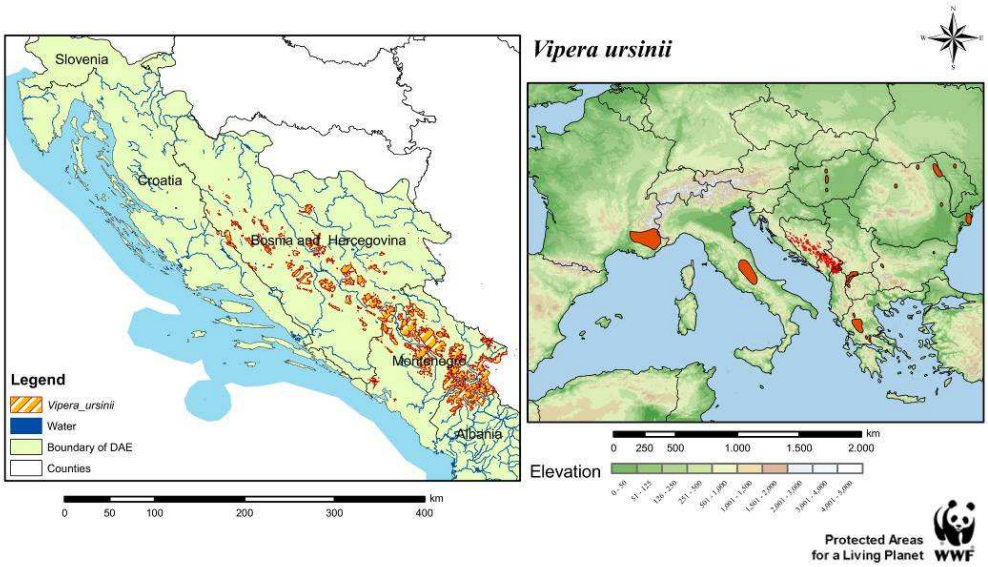



Miniopterus schreibersii
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Miniopterus schreibersii
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

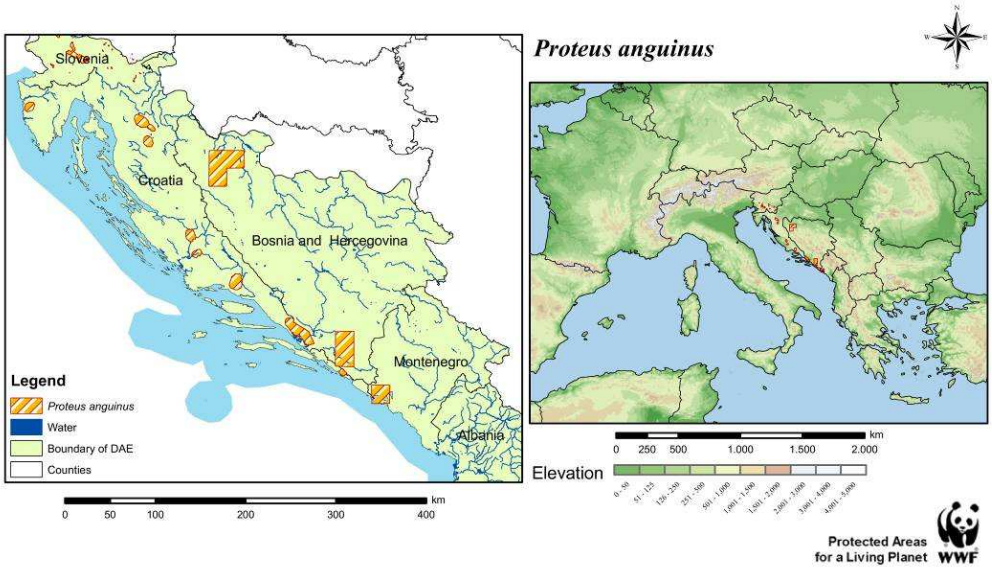

Myotis capaccinii
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Myotis capaccinii
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

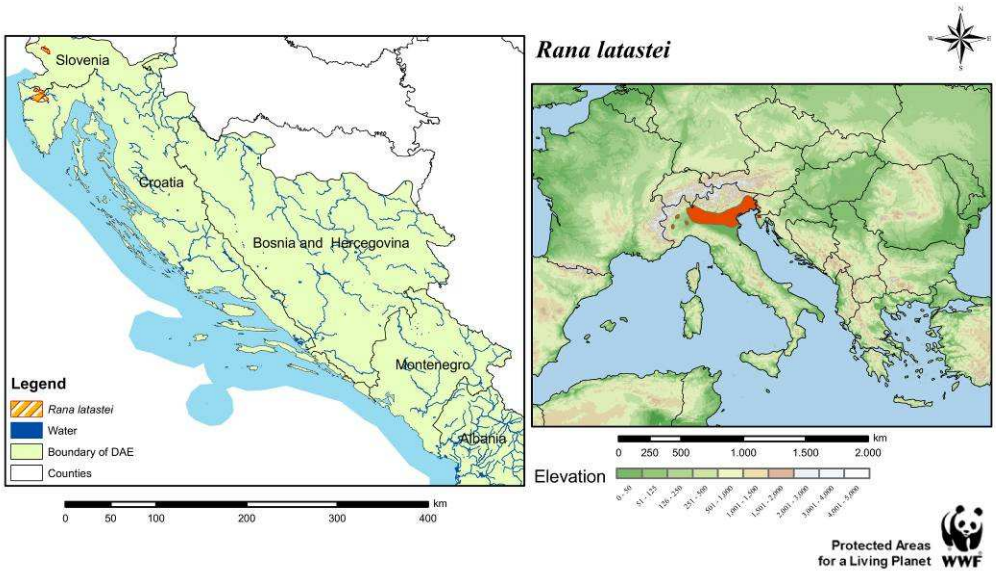

Ursus arctos
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Ursus arctos
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

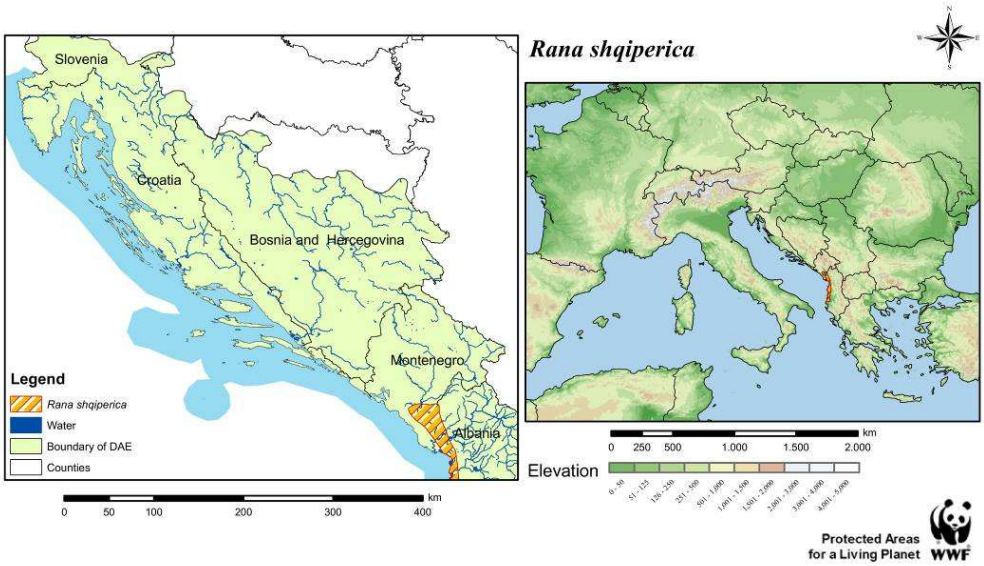
Reptiles



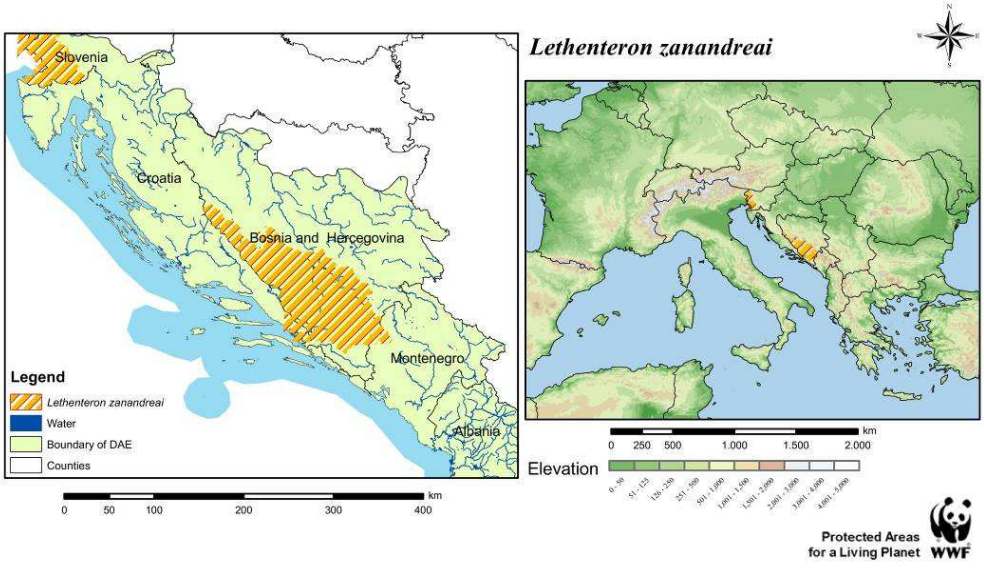
Amphibians

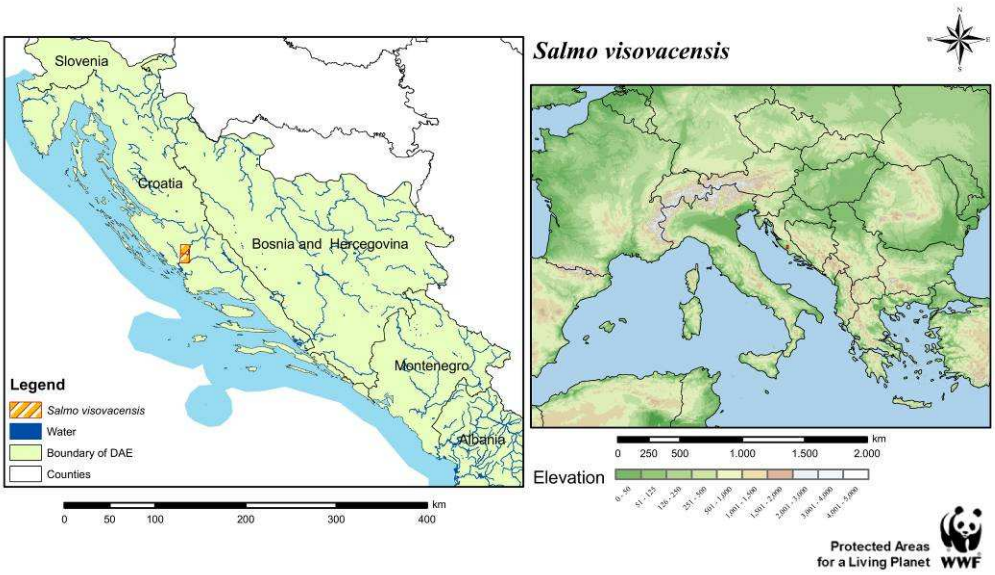


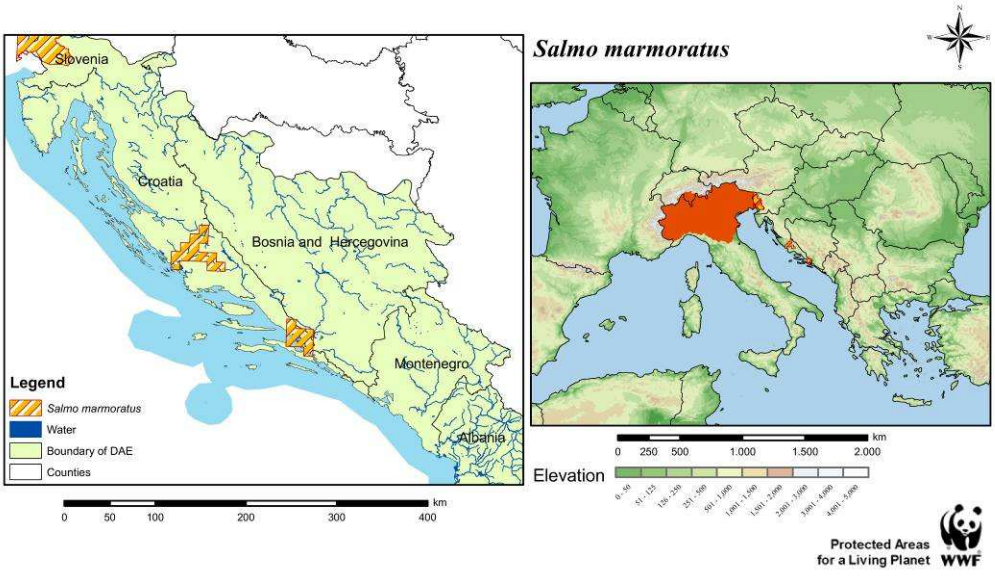


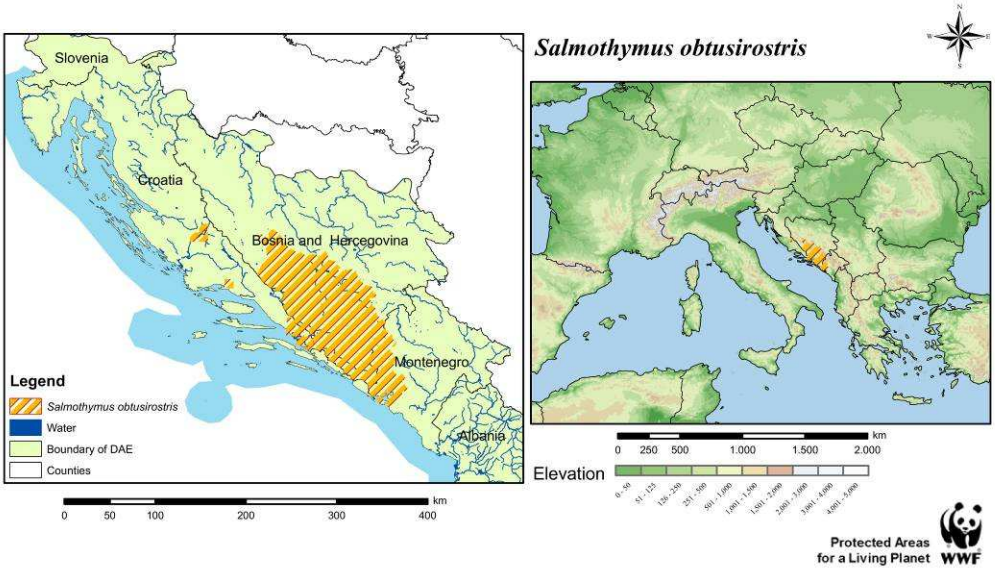


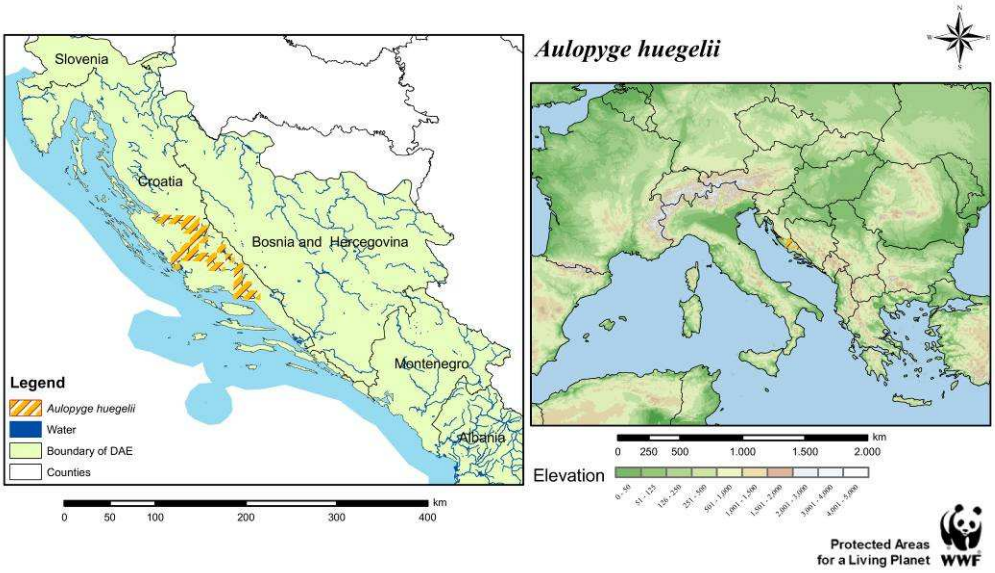
Freshwater fish

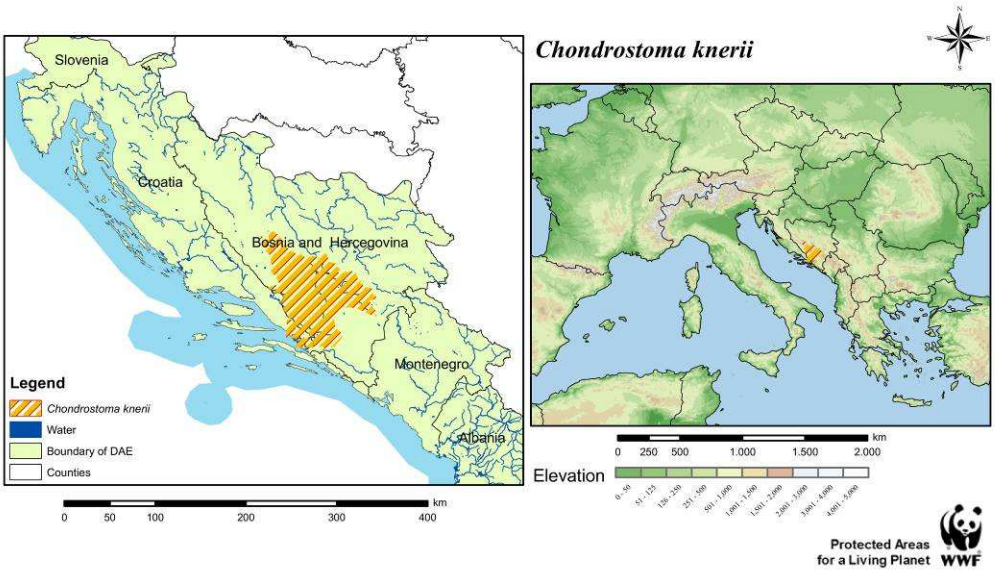


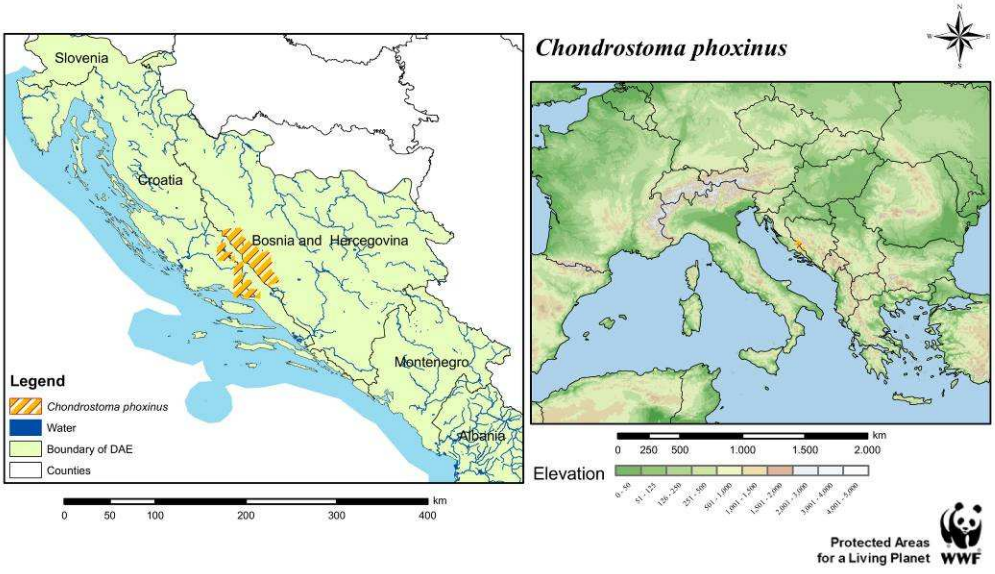

Salmo visovacensis
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Salmo visovacensis
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

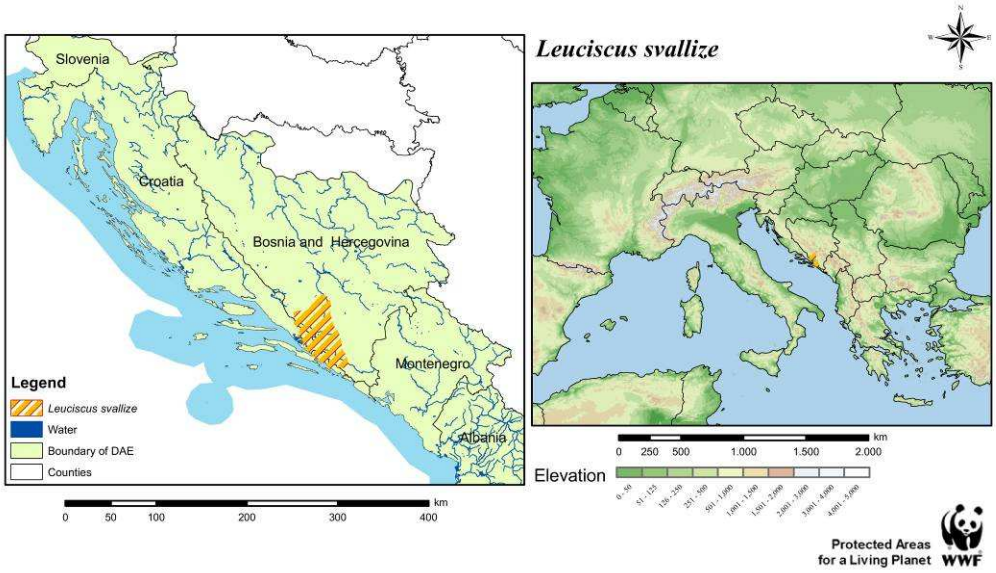

Salmo marmoratus
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Salmo marmoratus
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

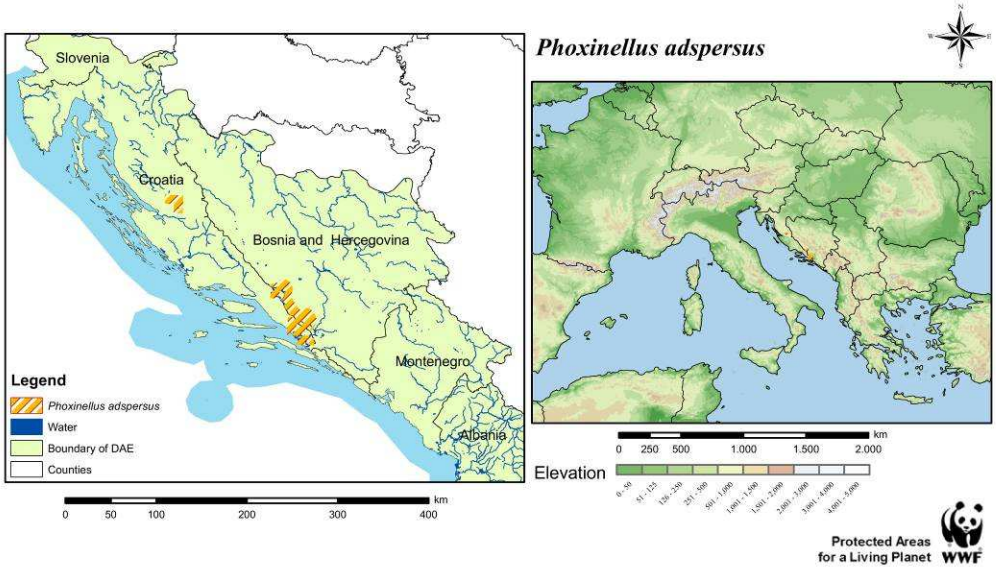

Salmothymus obtusirostris
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Salmothymus obtusirostris
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

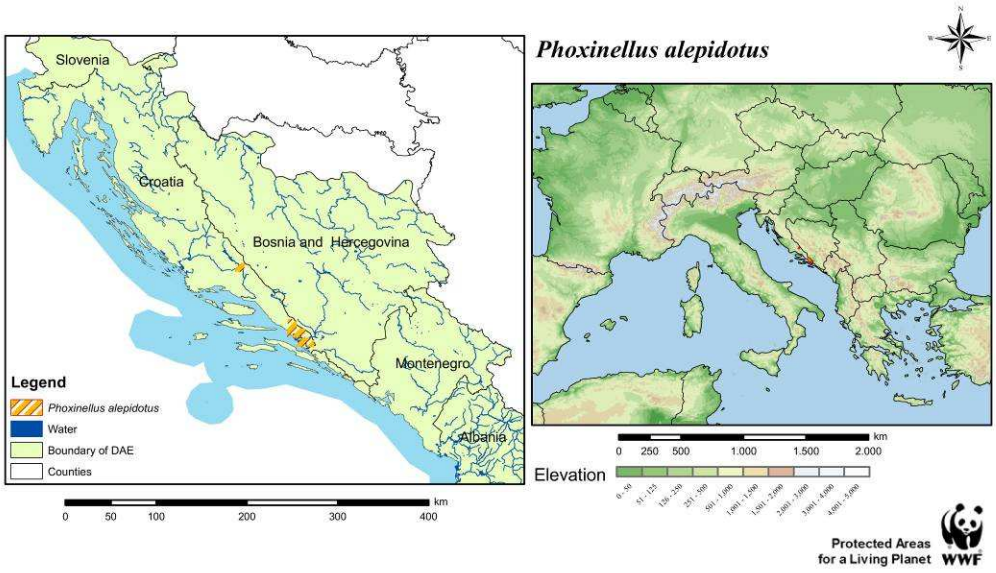

Aulopyge huegelii
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Aulopyge huegelii
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

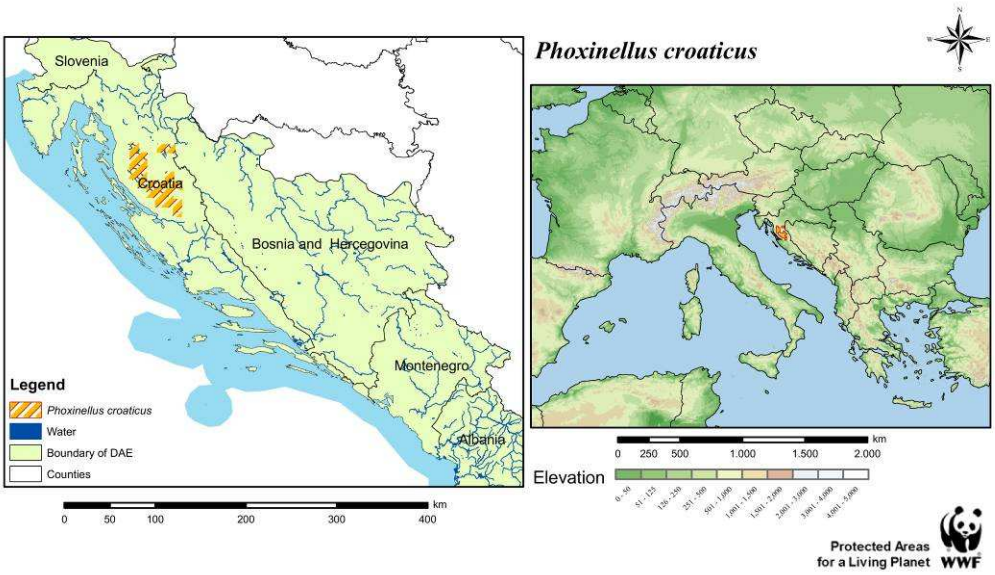

Chondrostoma knerii
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Chondrostoma knerii
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

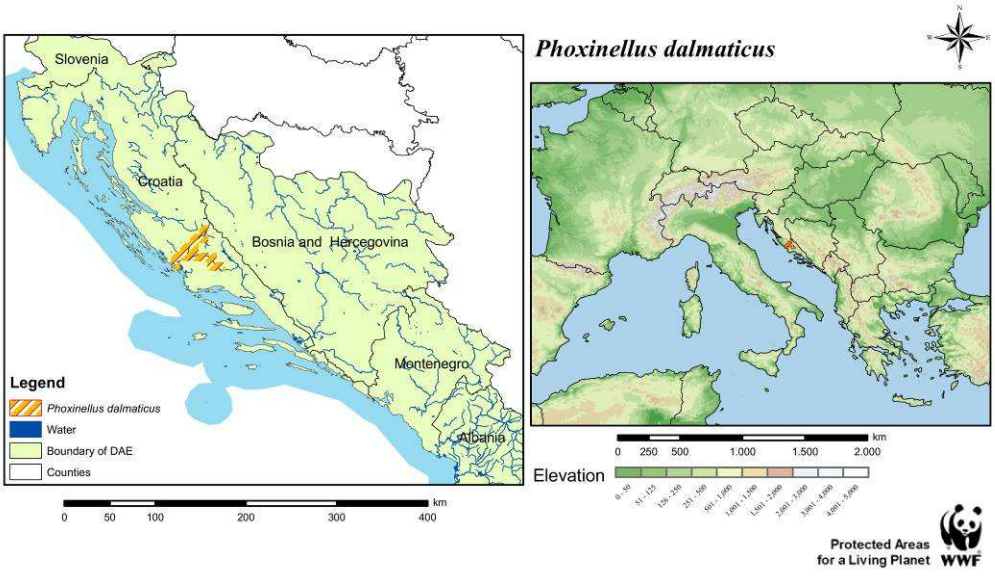

Chondrostoma phoxinus
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Chondrostoma phoxinus
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

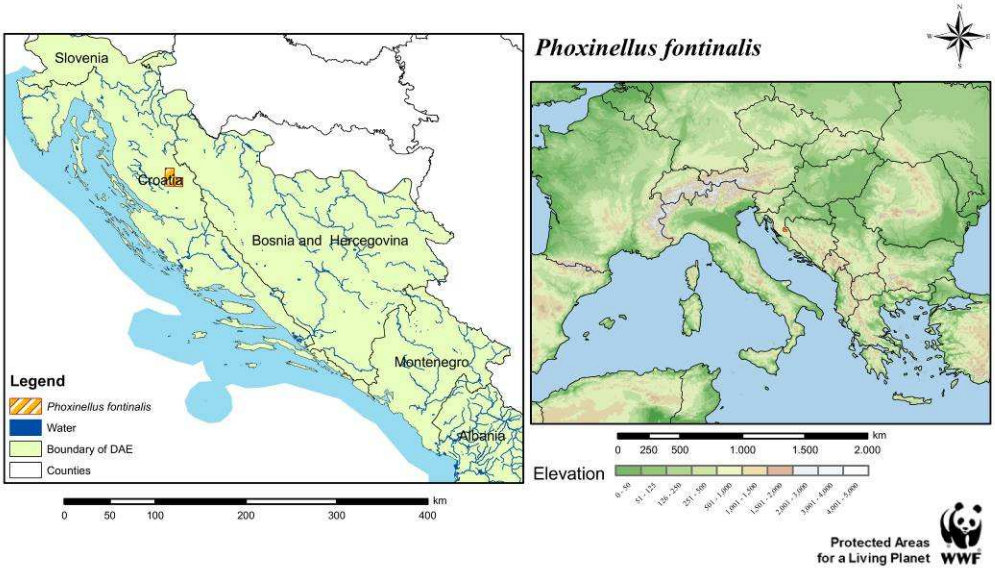

Leuciscus svallize
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Leuciscus svallize
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

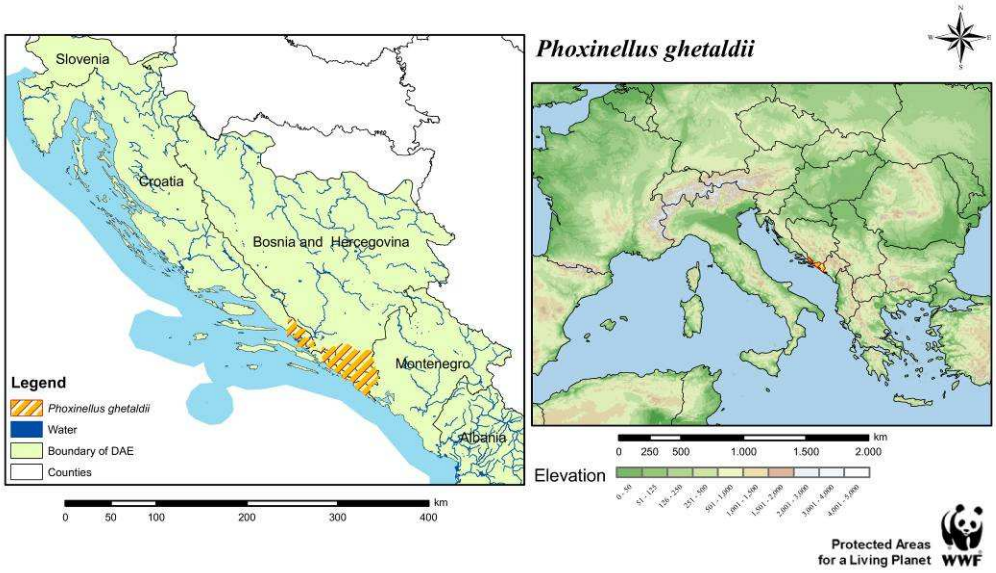

Phoxinellus adspersus
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Phoxinellus adspersus
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

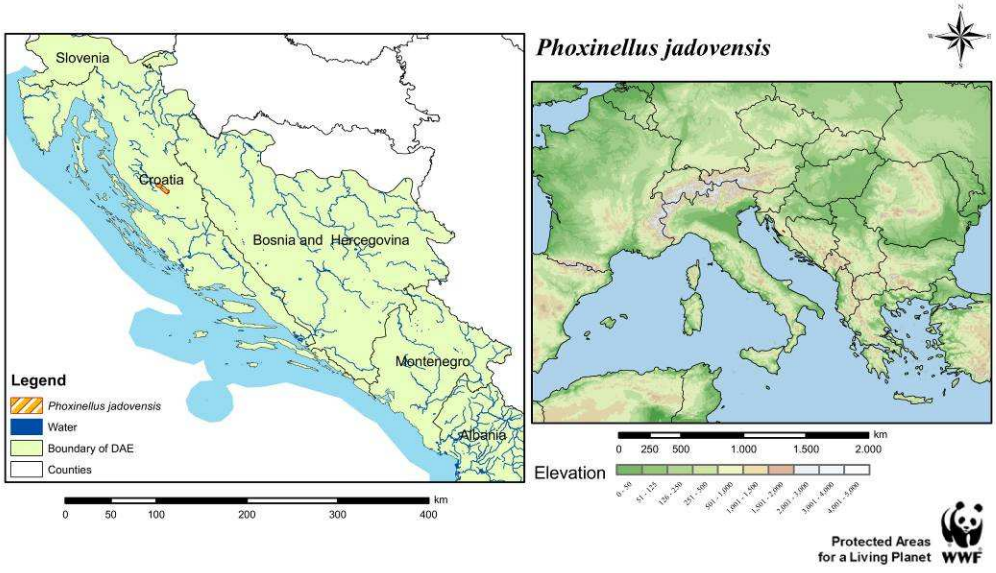

Phoxinellus alepidotus
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Phoxinellus alepidotus
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

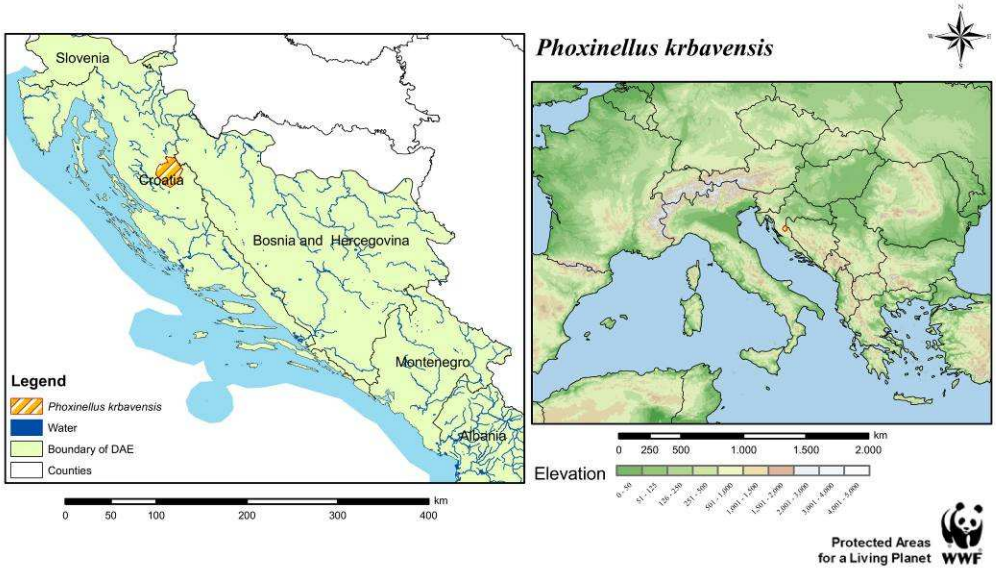

Phoxinellus croaticus
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Phoxinellus croaticus
Water
Boundary of DAE
Counties
0 50 100 200 300 400 km
0 250 500 1.000 1.500 2.000 km
Elevation
Protected Areas
for a Living Planet
WWF

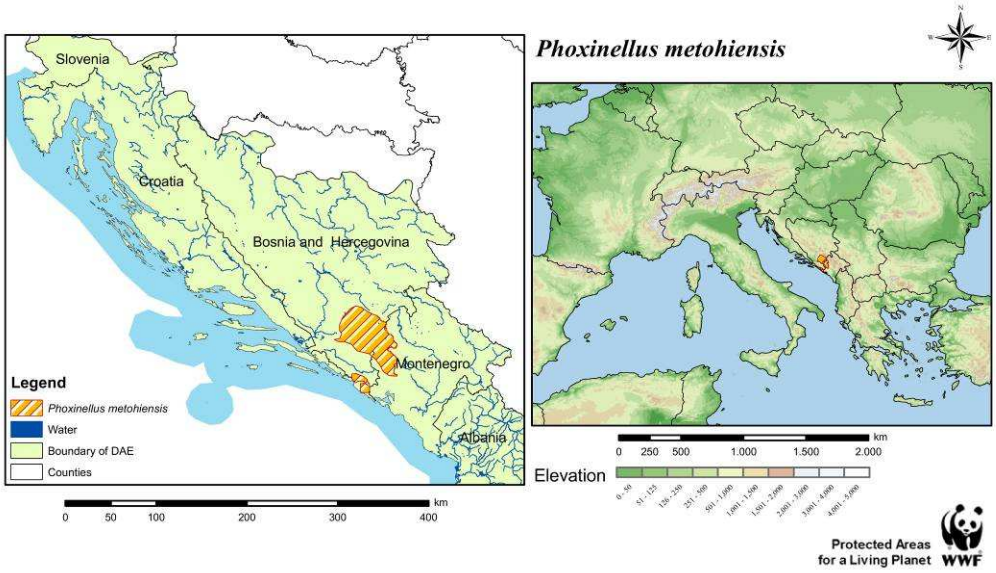

Phoxinellus dalmaticus
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Phoxinellus dalmaticus
Water
Boundary of DAE
Counties
0 50 100 200 300 400 km
0 250 500 1.000 1.500 2.000 km
Elevation
Protected Areas
for a Living Planet
WWF

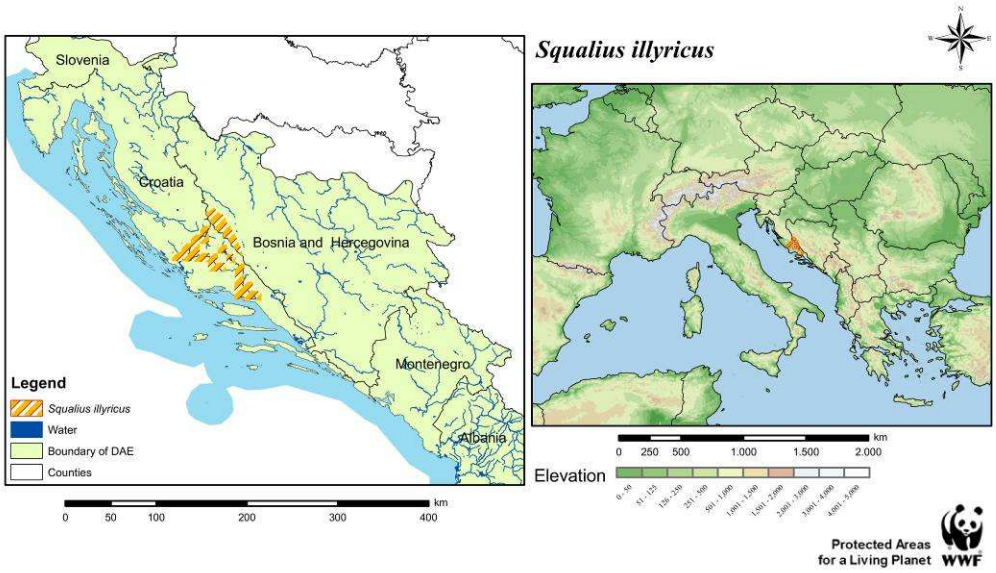

Phoxinellus fontinalis
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Phoxinellus fontinalis
Water
Boundary of DAE
Counties
0 50 100 200 300 400 km
0 250 500 1.000 1.500 2.000 km
Elevation
Protected Areas
for a Living Planet
WWF

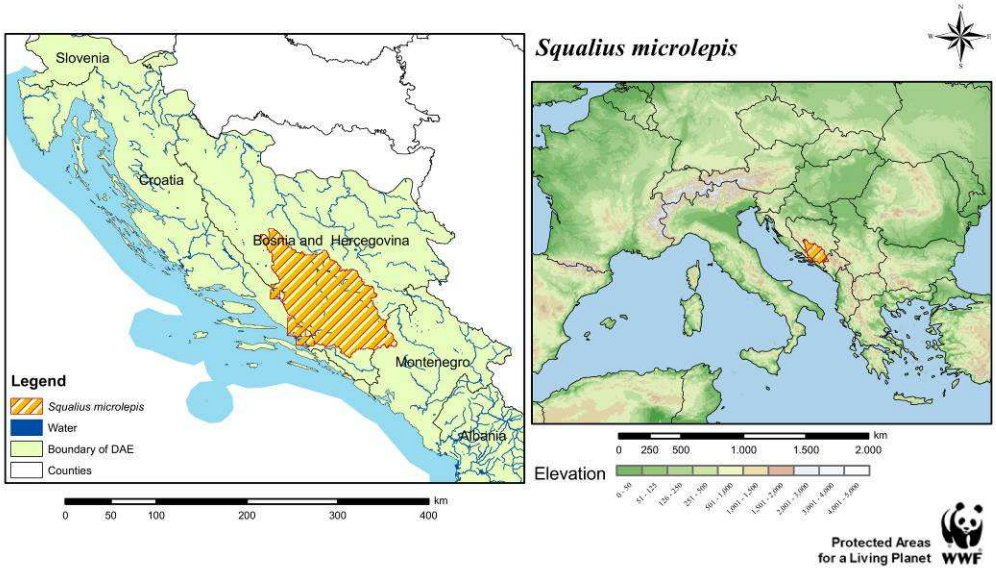

Phoxinellus ghetaldii
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Phoxinellus ghetaldii
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
Elevation
km
0 250 500 1.000 1.500 2.000
Protected Areas
for a Living Planet
WWF

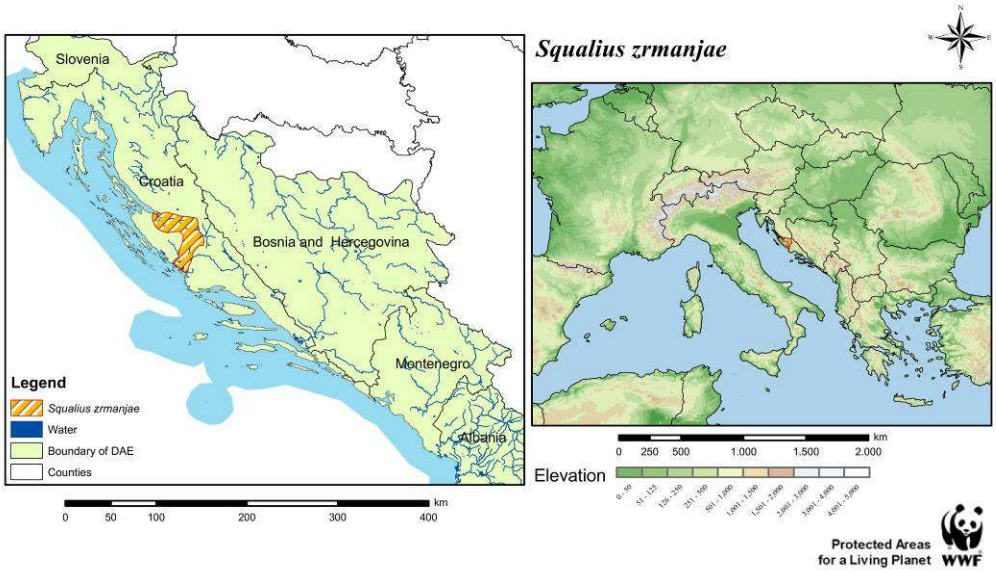

Phoxinellus jadovensis
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Phoxinellus jadovensis
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
Elevation
km
0 250 500 1.000 1.500 2.000
Protected Areas
for a Living Planet
WWF

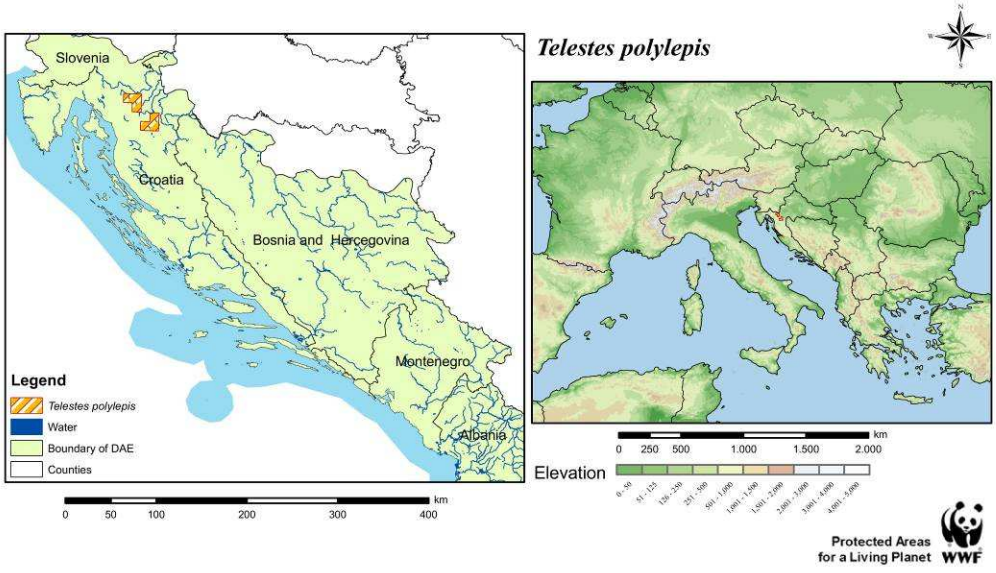

Phoxinellus krbavensis
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Phoxinellus krbavensis
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
Elevation
km
0 250 500 1.000 1.500 2.000
Protected Areas
for a Living Planet
WWF

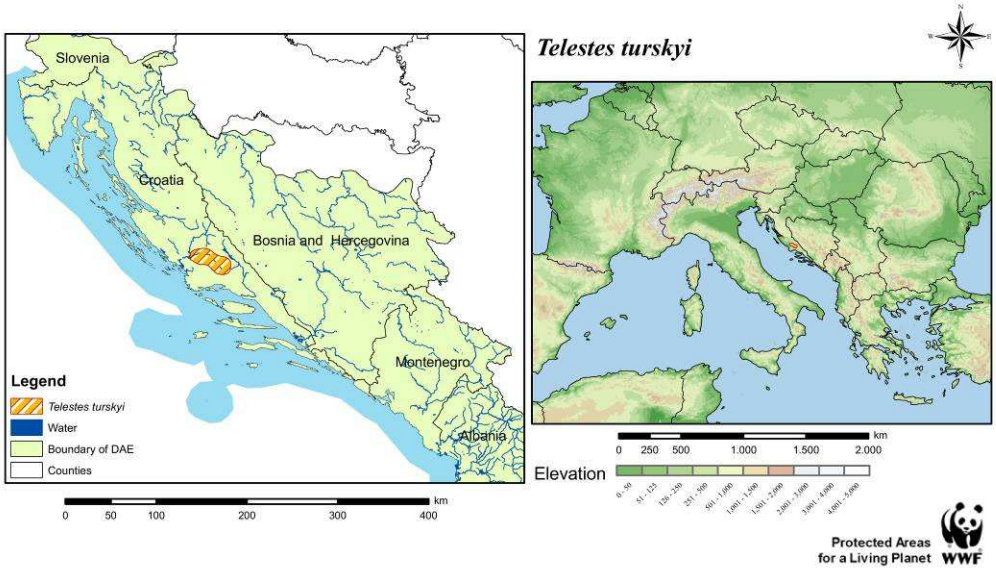

Phoxinellus metohiensis
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Phoxinellus metohiensis
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

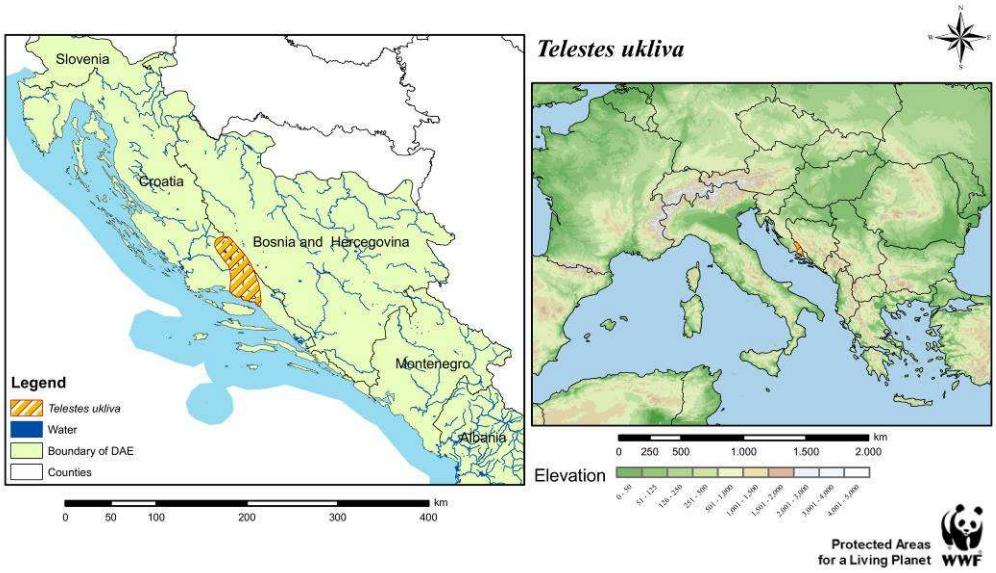

Squalius illyricus
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Squalius illyricus
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

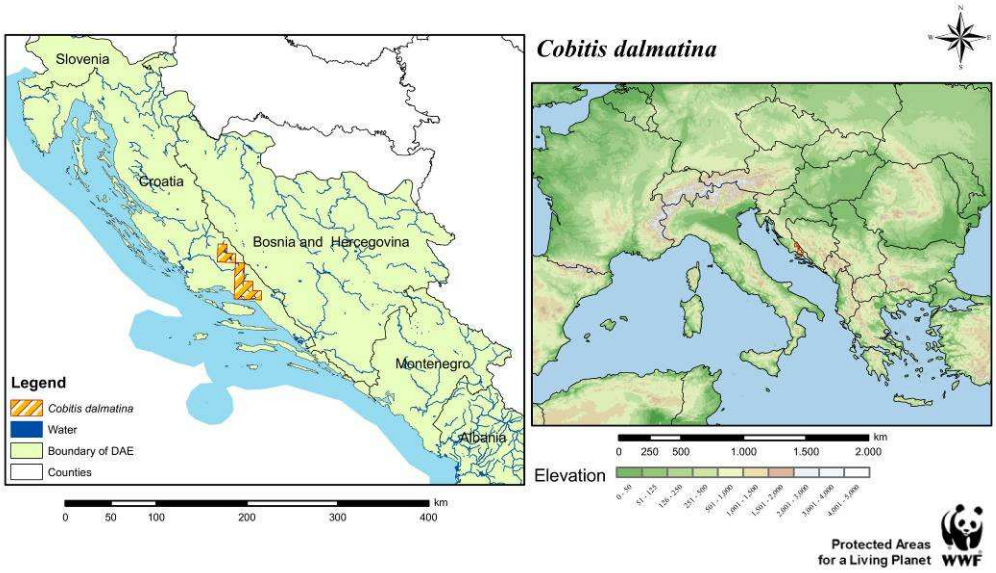

Squalius microlepis
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Squalius microlepis
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF

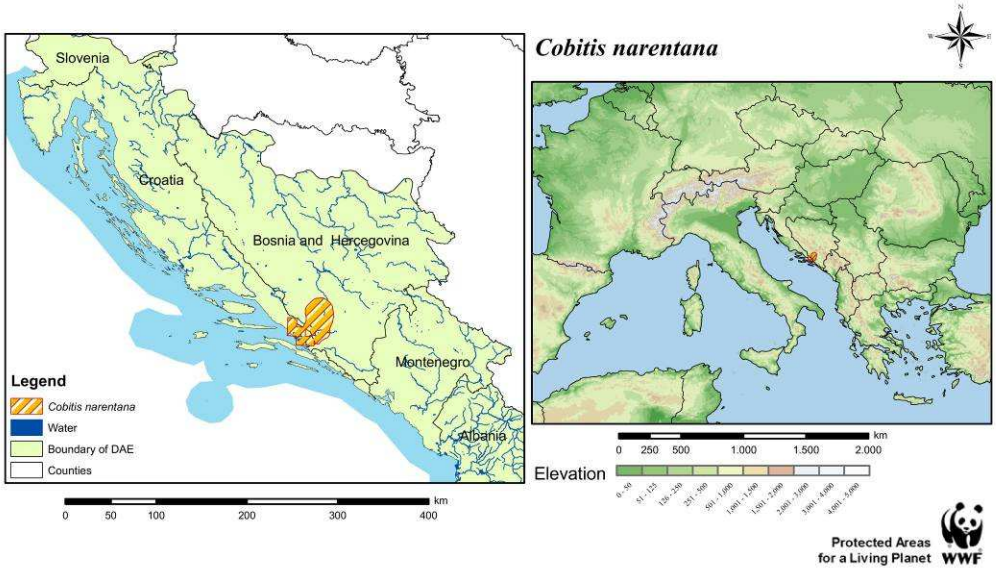

Squalius zrmanjae
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Squalius zrmanjae
Water
Boundary of DAE
Counties
0 50 100 200 300 400 km
0 250 500 1.000 1.500 2.000 km
Elevation
Protected Areas
for a Living Planet
WWF

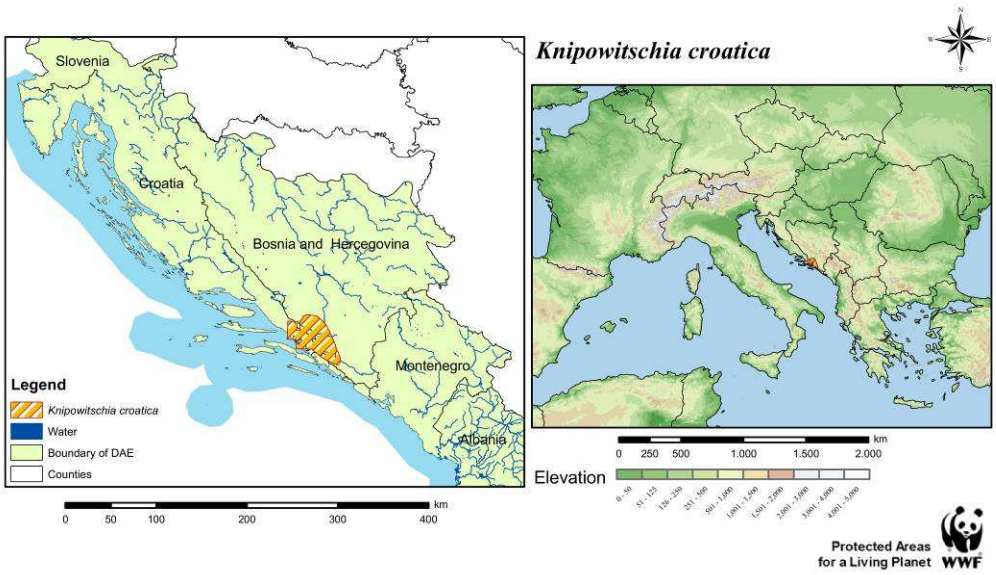

Telestes polylepis
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Telestes polylepis
Water
Boundary of DAE
Counties
0 50 100 200 300 400 km
0 250 500 1.000 1.500 2.000 km
Elevation
Protected Areas
for a Living Planet
WWF

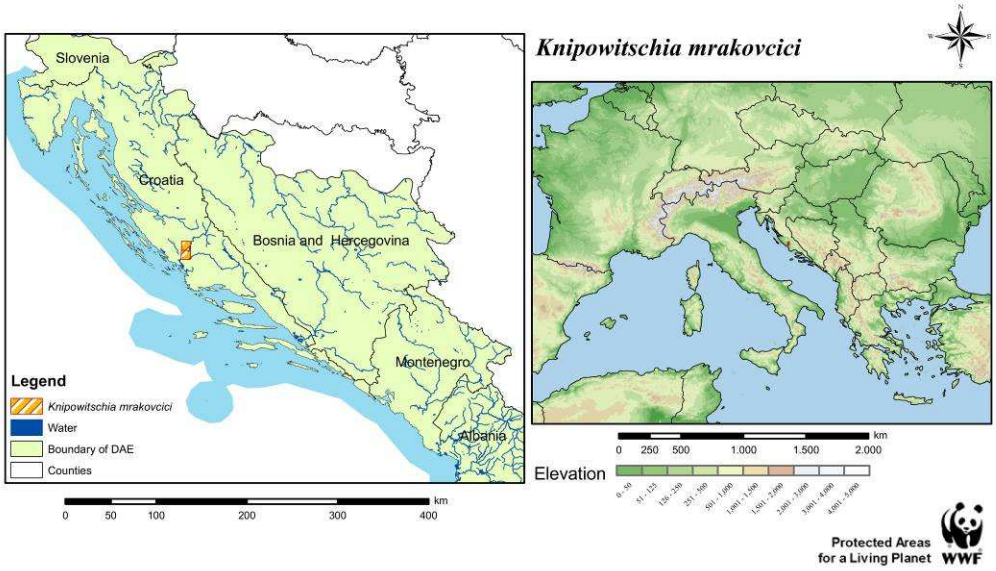

Telestes turskyi
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Telestes turskyi
Water
Boundary of DAE
Counties
0 50 100 200 300 400 km
0 250 500 1.000 1.500 2.000 km
Elevation
Protected Areas
for a Living Planet
WWF


Telestes ukliva
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Telestes ukliva
Water
Boundary of DAE
Counties
0 50 100 200 300 400 km
0 250 500 1.000 1.500 2.000 km
Elevation
Protected Areas
for a Living Planet
WWF


Cobitis dalmatina
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Cobitis dalmatina
Water
Boundary of DAE
Counties
0 50 100 200 300 400 km
0 250 500 1.000 1.500 2.000 km
Elevation
Protected Areas
for a Living Planet
WWF


Cobitis narentana
Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Cobitis narentana
Water
Boundary of DAE
Counties
0 50 100 200 300 400 km
0 250 500 1.000 1.500 2.000 km
Elevation
Protected Areas
for a Living Planet
WWF


Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Knipowitschia croatica
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
Knipowitschia croatica
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF


Slovenia
Croatia
Bosnia and Hercegovina
Montenegro
Albania
Legend
Knipowitschia mrakovcici
Water
Boundary of DAE
Counties
km
0 50 100 200 300 400
Knipowitschia mrakovcici
km
0 250 500 1.000 1.500 2.000
Elevation
Protected Areas
for a Living Planet
WWF