University of Primorska
Science and Research Centre of Koper
Institute for Biodiversity Studies

WWF Project Reference No 9Z1387.05
"Protected Areas for a Living Planet – Dinaric Arc Ecoregion Project"

Protected Area Gap Analysis

(Final Report)

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December 2009

The Final Report by:

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Acknowledgments:

Dragan Kovačević, Banja Luka (Bosnia and Herzegovina); Dejan Kulijer, Sarajevo (Bosnia and Herzegovina); Ozren Laganin, Banja Luka (Bosnia and Herzegovina); Matt Merrifield, PhD, TNC San Francisco (USA); Tihomir Predić, MSc, Banja Luka (Bosnia and Herzegovina); Dragan Rončević, National Park Kozara (Bosnia and Herzegovina); Ivica Udovičić, Sarajevo (Bosnia and Herzegovina); Branko Vučijak, PhD, Sarajevo (Bosnia and Herzegovina)

List of Abbreviations

CBD	Convention on Biological Diversity
BiH	Bosnia and Herzegovina
DAE	Dinaric Arc Ecoregion
NSC	National Scientific Coordinator
PA	Protected Area
PoWPA	Programme of Work on Protected Areas
RSC	Regional Scientific Coordinator

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0. FOREWORD

One of basic goals of the scientific part of the PoWPA Dinaric Arc Ecoregion Project activities was a protected area Gap Analysis. Activities surrounding this task included the creation of a network of institutions endorsed by their respective governments, which were committed to providing information and collaborating in the development of the Gap Analysis. To that end, each of the five countries appointed a National Scientific Coordinator who actively participated in the process of the definition of the study area, provided data when feasible, and verified the output. The list of the National Scientific Coordinators is as follows:

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Where appropriate, the project relied upon information on specific biodiversity targets obtained from the experts. Information on cave biodiversity was provided by Professor Boris Sket, PhD, and Dr. Maja Zagmajster, PhD, who were contracted by the project. We collaborated with Mr. Borut Stumberger, who provided information on the bird biodiversity target, and who was part of a partnership on the DAE project between the WWF and EuroNatur. Dr. Matt Merrifield, PhD, provided expert advice and helped at various stages of data processing and evaluation, and also modeled a freshwater target. His contribution was within the partnership of the DAE project between the WWF and TNC.

Spatial cartographic and digital data were processed and analyzed by the contracted GIS and Gap Analysis expert (hereafter GIS expert) Mr. Mileta Bojović, BSc. Among authors, Mr. Bojović attained training at the TNC between August 8 and 16, 2008.

The project was coordinated by the Regional Scientific Coordinator (hereafter RSC) at the Institute for Biodiversity Studies, Science and Research Center Koper, University of Primorska. Between March 1, 2007 and September 30, 2009, this work was conducted by Professor Boris Krystufek, PhD, and afterwards by Mr. Andrej Sovinc MSc, who was assisted by Mr. Peter Glasnović, BSc. In executing his tasks, the Regional Scientific Coordinator closely collaborated with Ms. Stella Šatalić, MSc, who acted as Project Leader, and the WWF Director of Conservation, Dr. Deni Porej, PhD.

1. INTRODUCTION

1.1. Executive Summary

Biodiversity Values of the DAE

The Dinaric Arc region remained poorly known and studied by both European and international naturalists for a long time. Previously, the region was generally thought to be savage and too wild, with the additional wrong attribution bestowed during the decades of political instability. However, times are changing and the world is becoming increasingly aware of the importance of this area, one of Europe's biodiversity hotspots, which is becoming a kind of a promised land for researchers from all over the world.

The Dinaric Arc, extending from its border area with the Alps in Slovenia through Croatia and covering a large part of Bosnia and Herzegovina and Montenegro, ends in the north of Albania. The Dinarides also partly penetrate into Serbia, Kosovo, and Macedonia. The area is characterized by a central mountain range that extends towards the Adriatic coast and borders on the north with the Pannonian Plain. However, the region is not uniform. Different authors have divided the region into several biogeographical subunits, mainly running from the northwest to the southwest. For our purposes, the only regional division is represented by each DAE country, which doesn't provide any biogeographical information, but which is appropriate for analyzing and comparing of the systems of the existing protected areas.

An extraordinarily fragmented landscape, diverse geological composition, the impacts of different climate types, and the "invasion" of neighboring biogeographical territories all contribute to the high biodiversity of the area, which is (was) favored by the relatively slow economic development and predominantly traditional agricultural practices. Extensive and well-preserved forests still cover a great part of the area, offering shelter to significant resident populations of large carnivores, such as the brown bear, lynx, and wolf.

Due to its geological compositions consisting mainly of carbonates, the whole area is characterized by karst phenomena. Water erosion transformed carbonate bedrock into surface and underground karst features, home to some unique species, including the proteus, an exclusive inhabitant of the Dinaric underground. The cave system of the Dinaric Arc represents the largest underground river system in Europe, and is therefore an extremely important source of water for the entire region.

The corrosive and erosive activity of water on limestone bedrock has resulted in a variety of geological phenomena. Where the erosive power of water dominates over corrosive power, the landscape is characterized by impressive canyons and river valleys. The corrosive activity of water has generated diverse surface and subterranean karst phenomena. The largest are the so-called "poljes", a typical geological feature of karstic areas, referred to internationally by its local name. The poljes represent the only flat land between prevalent mountain ranges and the only land suitable for cultivation; therefore major settlements have developed on their border areas. Poljes, especially those permanently or temporally flooded, are important for migrating and nesting bird populations.

The mountainous region of the central Dinarides is rapidly changing towards the seaside landscapes, where the harsh climate of the interior is mitigated by the influence of the Mediterranean Sea. The Eastern Adriatic coast, with its highly rugged, mainly rocky coast line, is one of the most beautiful and best preserved ones in the whole Mediterranean. Karst

geomorphology is also reflected in marine habitats. Bays, sea caves, and submerged cliffs are specific elements of the eastern Adriatic seascape. Low coastal areas are scarce and mainly limited to the southernmost part of the region. They are all highly influenced by human activities.

The warm Mediterranean climate entering through the river valleys towards the interior has a relevant impact on the diversity of flora and fauna. Frequently, especially on the steepest slopes, different altitude-characterized habitats can be found within short distances of each other.

In the DAE, water drains toward two retention basins: the Black sea – with the Sava River collecting the waters – and the Adriatic basin, where the surface hydrography is poorly developed and confined to few rivers. The rivers belonging to the Adriatic basin are relatively short and isolated. Several water courses have surface parts only in karst poljes, often ending their underground course in the sea, as characteristic submarine freshwater springs called "vrulja". The water level changes throughout the seasons, with the highest water levels in spring and autumn and the lowest in summer. Because they are predominately isolated, a large number of endemic species inhabit the rivers of the Adriatic basin. The fresh water environments have been widely subjected to human activity, which has changed both the geomorphological and the biodiversity aspect of the rivers. The main threats to these sensitive habitats are represented by flow regulations, dam building, and reservoir formations, pollution, the introduction of an alien species, etc. Alien species introduction represents the most significant threat to regional ichthyofauna.

During glacial periods, the major part of this area remained south of the ice shield that used to cover Central Europe. Some animal and plant species previously inhabiting a large part of Europe survived the ice ages in the ice-free refugia throughout the area. Thus, the number of endemic species, i.e. species encountered only here and nowhere else, is very high. Some examples are: the Dinaric Vole, which now resides only on some of the Dinaric mountains; many freshwater fish of the Adriatic basin; certain lizards; the aforementioned proteus; many invertebrates and a number of plant species that have found refuge in the shelter of rocks, especially in river valleys and mountains.

Although the nature of the Dinaric area is relatively well preserved, economic development and inappropriate environmental policies represent a potential concern for regional biodiversity. The protection of nature is insufficient in many places. While some extensive areas of high biodiversity remain unprotected, others, though protected, lack an appropriate form of management which could maintain this diversity.

Gap Analysis

Gap Analysis can help throw light upon gaps in the system of protected areas. It is a method for identifying the degree to which biodiversity is represented in a mosaic of conservation lands in order to provide land managers and policy makers with the information they need to make appropriate decisions. In its simplest form, a Gap Analysis involves comparing the distribution of biodiversity with the distribution of protected areas and finding the localities where species and ecosystems are left unprotected or under-protected. Species and communities that are not adequately represented in the existing network of conservation lands constitute conservation "gaps".

By identifying areas with little or no protection, one can make more sound management decisions in planning a protected area network. The importance of protected areas has been widely recognized, and numerous national and international agreements and laws consider protected areas as the core of any conservation strategy. Namely, one of the most efficient ways to protect biodiversity is to maintain viable populations in natural ecosystems. However, a number of studies have demonstrated that protected areas often do not adequately represent the biodiversity of a region which also refers to the DAE.

From the beginning, the purpose of the project was to collect publicly accessible data. The quality of available data for the analysis differs a great deal between countries. Some countries have provided comprehensive and accurate data, while for others, data was of a very poor quality or does not exist at all. Therefore, in order to present as relevant a situation as possible, it was required to work with data that are representative at the regional level. In other words, this means that even data that were either too precise or too poor for a country could reflect a wrong image for the entire region.

On basis of existing data, range maps of each biodiversity target were made. Gap Analysis is based on three main sets of data components: spatial orientation of various habitats, the distribution of biodiversity components, and map of areas already protected. The Gap Analysis was executed using GIS software. Distributional maps were overlaid with shapes of protected areas. The result was the statistical representation of targets in protected areas within countries. Gaps among countries were analyzed and discussed separately, according to each group of biodiversity targets. A separate analysis of distribution of protected areas throughout different altitudinal belts was carried out and maps, with relevant hotspots of each of the animal species groups, were interpreted and built.

Target species and habitats that are not adequately represented in PAs are gaps. For our purpose, gaps are defined as targets the range of which (or surface) is less then 10 % represented in a PA. Targets that are not represented at all in PAs are considered total gaps. Targets represented more than 10 % in PAs are considered covered. The choice of the 10 % threshold value is on the one hand, a reasonable consideration of the IUCN suggestion, and on the other, it is a value used by previous similar studies.

For purposes of the Gap Analysis, data on the occurrence of species and habitats relevant for the biodiversity of the region – biodiversity targets - were collected. On the regional level, 157 biodiversity targets were identified.

According to our analysis, in not one of the countries (only the DAE part) the IUCN threshold rate of land under PAs is not achieved. In Albania and Croatia 9.86 % and 8.24 % of the region, respectively (total, terrestrial and marine PAs) is under a PA. In Croatia, the terrestrial part of the DAE is better covered with PAs (13.87 %), while marine PAs cover only 3.17 % of the surface area. The coverage with PAs in Slovenia and Montenegro is even lower, 6.79 % and 6.20 %, respectively. The most significant lack of PA coverage was found in Bosnia and Herzegovina, with only 2.63 % of the surface area covered with PAs. This lack is even more significant when it is considered that Bosnia and Herzegovina occupies major portion of the central part of the DAE region, encompassing 40.39 % of the total area of the DAE.

Results

The findings of an analysis of singular biodiversity targets were the following:

Targets are not fully covered in Slovenian PAs. Of a total of 85 targets identified in Slovenia, only 15 (17.6 %) were adequately covered with PAs, 68 (80.0 %) targets resulted as a gap and 2 (2.4 %) as a total gap. Gaps occur equally in all analyzed groups of targets.

Altogether, 133 targets were identified in Croatia. 78 targets (58.6 %) were covered, 52 (39.1 %) resulted as a gap and 3 (2.3 %) as a total gap. According to the results obtained, the system of terrestrial PAs of Croatia should be considered efficient for the protection of biodiversity. However, some important gaps were identified. According to the results, Croatia's PAs system adequately covers land at higher altitudes, while lowlands and hilly areas (between 0 and 600 m.a.s.l.) were not adequately covered with PAs. This is indicated also in the distribution of gaps that predominantly occur in lowland targets. Forests of the coastal areas (evergreen forests) and higher mountain areas are adequately covered, while those of lower hilly areas result in gaps.

Karstic fields, which are widely distributed in the country and are of vital importance for biodiversity, are not adequately covered with PAs.

Gaps were identified among reptile species, especially in those species occurring in the warmest lowland areas.

Significant gaps were also identified in freshwater fish. The great majority of them are endemic to the region, and in most cases they were found to be inadequately covered with PAs.

In Montenegro, 109 targets were identified, of which 60 (55 %) resulted as a gap, while 15 (14 %) resulted as a total gap. 34 targets were found to be covered. In Montenegro, only 1,009.10 km^2 of the land (6.20 %) is covered with PAs.

Even though the majority of PAs occur in the lowlands, a great number of gaps also were found to be lowland targets. This is because the majority of PAs surface is represented by lakes which are not an adequate habitat for terrestrial targets and forests. Gaps are equally distributed in all groups of targets. Only high mountain targets were found to be relatively well covered with PAs. There are no marine PAs in Montenegro.

It must be noted that Prokletije National Park in Montenegro was established at the time when analysis had already been undertaken and therefore it was not included, despite the fact that these PAs will significantly increase the extent of the total PAs in Montenegro.

In Albania, 97 targets were identified, of which 38 (41.2 %) resulted as a gap and 5 (5.2 %) as a total gap. 54 targets (53.6 %) were found to be covered. 1,279.13 km^2 (9.86 %) are covered with PAs. The great majority of PAs occur in the lowlands, therefore lowland targets are more adequately covered than targets of hilly areas and higher altitudes. There are no marine PAs in Albania.

Bosnia and Herzegovina was found to have the most significant number of gaps in the region. This is mainly due to the scarce surface area represented by PAs (1,082.93 km^2 (2.63 %) of the area within the DAE). In total, 111 targets were identified in the country, of which 79

(71.2 %) resulted as a gap and 21 (18.9 %) as total gaps. Only 11 targets (9.9 %) can be considered covered. Gaps occur evenly in all analyzed groups of targets. All marine targets are identified as gaps since there are no marine PAs.

Focus on the nature protection situation in Bosnia and Herzegovina

Nature protection in Bosnia and Herzegovina formerly used to have a (pseudo)capitalist and socialist basis, with more or less sporadic dimensions. In the second half of the previous century, the institutionalization of nature protection was achieved and some real contributions to its implementation started. Therefore, more due to historical and cultural reasons, the first national parks (Kozara, Sutjeska) and forest reserves (Lom, Peručica, Janj) were established. Later, other forms of nature protection were also established (natural monuments, botanical and zoological reserves, arboretums, significant trees, etc.) with corresponding management institutions whose activities were of socio-political nature. This system functioned until the beginning of the political and military aggression of the nineties. In the years during the war, important areas of particular natural value were destroyed.

In the post-Dayton period, the activities of nature protection reached the lowest point in the recent history of the country. Existing institutions are limited to activities on a cantonal or regional level, while the environment is laden with significant pressures. Today, institutions are struggling on the one hand with development which is not always clear, and with a designation of adequate measures for nature protection, aimed at meeting the requirements of international organizations on the other. The existing institutional structure of the country does not have at its disposal a state-level institution for environmental issues. Two ministries operate separately, the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina and the Ministry of Physical Planning, Urbanism, Construction Works and Ecology of the Republika Srpska. Other institutions responsible for protected areas issues are the Ministry of Agriculture, Waterworks and Forestry of the Federation of Bosnia and Herzegovina and the Ministry of Agriculture, Waterworks and Forestry of the Republika Srpska. The lower level of environmental and protected areas management is on a cantonal level, within the Federation of Bosnia and Herzegovina.

At the beginning of the project, only experts from the Federation were provided by the Federal Ministry. Since the country is divided into two autonomous entities, it was of key importance to also involve institutions from the Republika Srpska, therefore efforts have focused on establishing contacts and collaborating with the Republic Institute for the Protection of Cultural, Historical and Natural Heritage from Banja Luka, the Ministry of Urbanism, Construction, Communal Issues and Ecology of the Republika Srpska, which helped with collecting data about traffic, spatial planning and protected areas for the entity. Data availability differs among the two entities, thus, for proper realization of such projects in the future, proper collaboration between the institutions of both entities will be crucial.

Despite the fact that there are some larger protected areas, even national parks, the level of biodiversity conservation even in those areas is not entirely in line with international standards. The reasons for this are in the statutory definitions of national parks, which allow some forms of economic exploitation in these areas and a low level of enforcement of regulatory procedures prescribed by management. The latter is partly due to the difficult economic situation in the country after the devastating armed conflict and the lack of adequate funding from governmental sources.

One should also note that the percentage of the territory already under some form of protection is far from being adequate for a country with such outstanding biodiversity values.

Future Perspectives

The analysis showed that the level of protected area designations in the DAE is not sufficient to ensure adequate biodiversity protection. Only in Croatia, in the terrestrial part of the DAE, the IUCN 10 % threshold value of the land surface under protected area is achieved, while the marine part is far under this value.

The inadequate protection of biodiversity was found to be particularly evident in the corridors and connectivity between protected areas, which is evident from biodiversity gaps in the hotspot maps. In addition, Bosnia and Herzegovina, with its central role in connecting biodiversity values between the north and south of the DAE, is almost completely missing a system of protected areas with respective corridors. Transboundary protected areas, which are known to be important effective biodiversity conservation tools at the regional scale, have still not been efficiently established.

The lack of adequate data indicates that a great deal of effort must be involved in effective scientific studies, including accurate field inventories for a full understanding of the biodiversity potential of the region. This is particularly true for areas which have resulted in being biodiversity hotspots.

The geographic characteristics of the DAE indicate that the region will be under the serious influence of the anticipated impacts of climate change. Higher temperatures with longer periods of drought will have a negative impact, both on terrestrial, water and hypogean biodiversity. Paleontological and palynological studies have demonstrated that species are very sensitive to climate change. When the climate changes, species often die out in their present areas and colonize new areas. However, this occurs when changes happen over a long period of time, while changes in a very short time will probably have catastrophic consequences. Therefore, in the future a disruption of natural communities with the extinction of populations and species can be expected.

Since the region is characterized by a strong geomorphologic diversity, it is also expected that changes in the altitudinal distribution of species and habitats will occur. Changes in climate, together with the developing transport infrastructure, will create (and are already creating) favorable conditions for the arrival and acclimatization of new alien and invasive animal and plant species. Some of these can very negatively affect autochthonous communities and seriously impact the landscape.

Climatic changes will also affect the ecology of the sea. The impacts of temperature change on phytoplankton populations – as primary biomass producers – will follow in the subsequent food chain trophic levels.

Lessons Learned – a contribution from NSCs

The DAE still has a great deal to do to fill in the gap of information on biodiversity. The Gap Analysis shows that the quality, scale and detail of data on biodiversity in the region must still be improved for an appropriate assessment of the biodiversity values in the area. The main

lesson learned during the data gathering and Gap Analysis is that there is a huge gap in available data in the region regarding the specific components of biodiversity, as well as those connected to the current and planned practice in land use. Furthermore, the methodology for making an inventory of biodiversity and the availability of specific data and precision and reliability of available data vary greatly between the countries in the project area. In the case of Croatia, more precise data were available, but since the Gap Analysis entrance data should have been uniform for the project area, those data were not used. The significant shortage of data and its low precision severely limited the choice of biodiversity targets, as well as representativeness of final results. On the other hand, in most of the countries where data, information and studies exist, they are not readily shared among different users. Sometimes researchers or institutions are reluctant to share their data and information which are considered to be valuable property.

The biodiversity targets related to forestry are the best described and studied in the area. All countries studied have good knowledge and data on forest-related biodiversity targets. The other terrestrial targets are not similarly considered in all the countries, and they are not covered by special studies. The modeling of these targets shows that they are important for the region and require specific studies (especially canyons, high mountain lakes, streams and rivers). Cave biodiversity has proven to be vitally important in the area, although the information and data about that is limited. In some countries it is not studied at all (Albania). The list of species (including small mammals, reptiles, amphibians, birds, and fish) is too long and not all species are important or known for all the countries. The result of this is that data on this subject exists only on the international level (IUCN, IBA). In future studies it would be better to work on selected flag species.

The marine biodiversity is also a great challenge for the region. There are still too many studies needed to address the gap of information on marine biodiversity. The shortage of data related to marine ecosystems in the entire project area was most obviously visible.

Some of the biodiversity targets overlap and there is no clear division between them, which in the future will require a careful selection and discussion on biodiversity targets to be considered.

Conclusions

- There is a huge gap in available data for the region regarding the specific components of biodiversity, as well as those connected to the current and planned practice in land use. The lack of adequate data indicates that a great deal of effort must be involved in effective scientific studies, including accurate field inventories, for a full understanding of the biodiversity potential of the region.

- The level of protected area designations in the DAE is not sufficient to ensure adequate biodiversity protection. In not one of the countries (only the DAE part) the IUCN threshold rate (10 %) of land under PAs is not achieved. In Croatia, the terrestrial part of the DAE is better covered with PAs (13.87 %), while marine PAs cover only 3.17 % of the surface area. There are no Marine PAs in Bosnia and Herzegovina, Montenegro and Albania.

- Of a total of 85 targets identified in Slovenia, only 15 (17.6 %) were adequately covered with PAs, 68 (80.0 %) targets resulted as a gap and 2 (2.4 %) as a total gap. In

Croatia of a total 133 targets, 78 (58.6 %) were covered, 52 (39.1 %) resulted as a gap and 3 (2.3 %) as a total gap. In Montenegro 109 targets were identified, of which 60 (55 %) resulted as a gap, while 15 (14 %) resulted as a total gap. In Albania, 97 targets were identified, of which 38 (41.2 %) resulted as a gap and 5 (5.2 %) as a total gap. In Bosnia and Herzegovina a total of 111 targets were identified, of which 79 (71.2 %) resulted as a gap and 21 (18.9 %) as total gaps.

- With only 2.63 % of the surface covered, Bosnia and Herzegovina, with its central role in connecting biodiversity between the north and south of the DAE, is almost completely missing a system of protected areas.

- Lower altitudes of Montenegro and Albania were found to be adequately covered, mainly due to great surfaces represented by the Skadar (Schkoder) Lake and the coastal lagoons in Albania, which are all in PAs. In Slovenia, Croatia and Bosnia and Herzegovina, lowlands were not found to be adequately covered within PAs. Land at higher altitudes throughout the region should be considered adequately represented within PAs. The biggest gap in PAs was found to be land between 200 and 1400 m.a.s.l., which together with the lowlands represents the area with the highest human pressures.

- The great majority of forest types were found to be not adequately represented in PAs. On a regional level only evergreen forest and scrubs, thermophilous beech forests, coastal flooded forests of ash and common oak and shrubs of mountain pine are adequately represented in PAs.

- On a regional level, among important terrestrial habitats high mountain grasslands (‘rudine’), thermophilous grasslands and karstic fields with surface hydrology resulted to be gaps, while all other habitats were found to be adequately covered within PAs.

- Cave biodiversity is insufficiently represented in PAs. This target requires a more comprehensive and focused research in order to define the full value of this biodiversity component, which is extremely important for the entire region.

- Areas of particular richness in small terrestrial mammals were found to be in the mountainous inland area. Gaps were identified equally throughout the entire region.

- The most significant hotspot in reptile species richness was found to be in the coastal Adriatic area, influenced by the warm and dry Mediterranean climate. Gaps were found to be equally distributed throughout the coastal area. The great majority of islands resulted as gaps.

- Areas with the greatest diversity of amphibian species were found to be in areas with higher humidity. In the DAE those areas were identified in the central Dinaric part of Slovenia, in northern Croatia and in the mountainous area from eastern Bosnia and Herzegovina, through Montenegro and Albania. Gaps can be considered equally distributed throughout the region.

- No detailed maps of nesting birds were available for the DAE. The importance of karst poljes for nesting and migrating bird populations were analyzed. Only in Slovenia karst poljes were found to be adequately covered within PAs. These extremely important habitats and characteristic landscape features are missing adequate

protection in the rest of the region. Important Bird Areas (IBA), Specially Protected Areas (SPA) and one Ramsar site in Bosnia and Herzegovina were analyzed to see how efficient they are for the proper protection of bird populations. The biggest lack in the number of such areas resulted again in Bosnia and Herzegovina, where only three sites were identified. On a regional level, important bird sites were found to be adequately covered within PAs.

- Important areas for freshwater fish richness were identified in Dalmatian and south Bosnia and Herzegovina's river systems, particularly those of the Krka, Cetina, and Neretva rivers. All identified areas were found to be highly affected by human pressures. On the regional level, all the most important areas in fresh water fish diversity are under-represented within the current PA system.

- The major gaps in large charismatic mammals' protection were identified in Slovenia and in Bosnia and Herzegovina. In Bosnia and Herzegovina none of the species is adequately covered within PAs. The planned infrastructure will fragment ranges of large charismatic carnivores.

- In the case of marine biodiversity the main gap is represented by the lack of data for the region - the shortage of data related to marine ecosystems in the entire project area was the most obvious one. There are still too many studies needed to address the gap of information on marine biodiversity. In Croatia, marine PAs cover only 3.17 % of the surface area. There are no Marine PAs in Bosnia and Herzegovina, Montenegro and Albania. Even if the rate of marine PAs in Croatia is too low, it was found that some identified targets are adequately represented within them. Coastal habitats are adequately covered within terrestrial PAs.

1.2. Definition of DAE

Definitions of the Dinaric Region differ between sources. In its narrowest sense, the region can be restricted to Dinaric Karst. Even in this case borders differ among authorities.

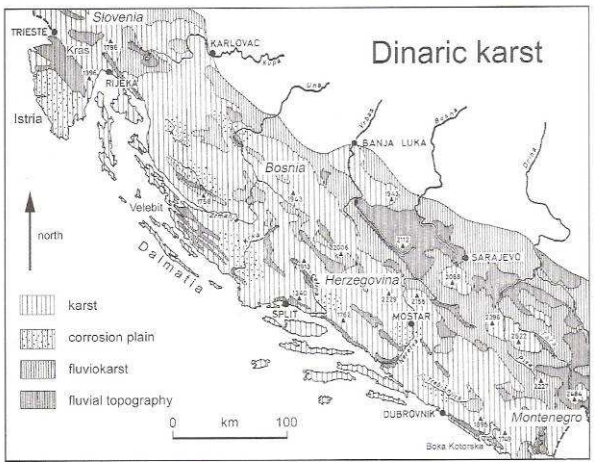


Figure 1(left): Borders of the Dinaric Karst as defined by Gams (1974; Figure 1) and by Roglić (1970; Figure 2). Note that Gams used the 19th century political borders.

Figure 2 (right): By geotectonic criteria the region is much broader and encompasses mountains of the western Balkans, i.e. also Šara-Pindos Mts. and the Albanian Alps.

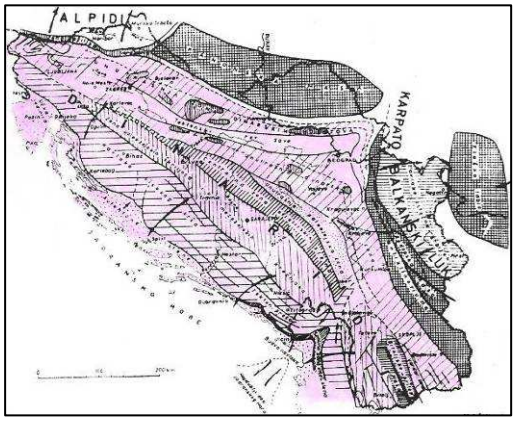


Figure 3: Dinaric area, based on geotectonic evidence (Rodić, 1970)

Geographers mainly define the Dinaric region as follows: Tolmin – Cerkno – Vrhnika – the southern margin of Ljubljanjsko barje – the Temenica River – the estuary of R. Krka – estuary of R. Kolubara – Ljig – Dičina – R. Zapadna Morava – R. Ibar – Kosovo – Skadar basin or estuary of R. Bojana or Medanski bay (Melik, 1949; A.M., 1966; Rodić, 1970; V.R., 1970; Encyclopaedia Britannica). It should be noted that neither the Encyclopaedia Britannica sources nor those from the former Yugoslavia

consider Albania to be part of the Dinarics; the Albanian mountains have different tectonics and lack a karst region.

Discrepancies exist among geographers regarding the border in SE Slovenia and adjacent Croatia (Bela Krajina, the basin of Karlovac, Žumberak – Gorjanci). In the basin of the River Sava, the majority of authorities agree that the mountains in north Bosnia (Grmeč – Konjuh) and NW Serbia (Cer) are a part of the region. The south-eastern border is mainly defined as Prokletije – Žljeb – Mokra Gora. Considering the above evidence, the scope of the Dinaric region in Serbia, as proposed by Serbian authorities, is very modest.

Ecoregion is a loosely defined term; Dinaric karst would perhaps classify as a relatively homogeneous ecoregion. Such a definition, however, would exclude Albania and shrink the borders in the former Yugoslavia below the tolerable level. If one also takes into consideration the fact that the northern Albanian Alps are geographically a part of the DAE as defined by the WWF, the scope of the area and its borders are unavoidably arbitrary. In any case, western Serbia is part of Dinarides according to all authorities, but not a single source considers the Albanian Alps to be within the same geographic scope (Ignoring geotectonic borders which would extend our borders into the FYR, Macedonia and Greece). The sharp border of the Dinarides at the former Yugoslavia–Albania border might partly reflect past political divisions. E.g. the Encyclopaedia Britannica does not consider Greece to be a part of the Balkans.

Figure 4: DAE borders as proposed for WWF project

The border of the DAE was defined by NSCs during the workshop in Sarajevo (November 2007). A western part of Serbia has also been defined as being part of the Dinaric region (Figure 6). Serbia was not included in the project. The southeastern border is also artificial since it follows a political division between Albania and Macedonia.

Figure 5: Borders of DAE as defined for the purposes of the project

The following solution was proposed:

- Slovenia: borders as in the WWF map with slight corrections along the NE margin (inclusion of Kočevski Rog).
- Croatia: borders as in the WWF map.
- Bosnia and Herzegovina: borders as in the WWF map; this would make the alignment with Serbia more reasonable.
- Serbia: as proposed by the Institute for Nature Conservation of Serbia, but to exclude Kosovo (border on Mt. Prokletije – Mt. Žljeb – Mt. Mokra Gora).
- Montenegro: borders as in the WWF map.
- Albania: borders as in the WWF map.

The proposed inclusion of Serbia would not extend the area considerably, however, it would increase the amount of work (another NSC, data sets for a new political entity); one must also consider that CORINE is not available for Serbia.

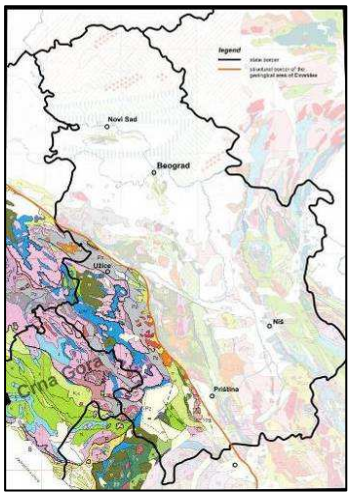


Figure 6: Dinarides in Serbia (by Institute for Nature Conservation of Serbia)

1.2.1 Statistical Definition of the Region

Statistical definition of the region contains statistical data, which were obtained from official sources or from the cartography created for the purposes of the project. All analyses were made according to this data. Shape surface is based on cartography constructed for the purposes of this report

Table 1: Surface area (km^2) of the DAE countries according to official data from web sources (Wikipedia).

Country	Official surface area (km^2)	Shape surface area (km^2)
Montenegro	13,812	13,886
Albania	28,748	28,781
Croatia	56,542	56,599
Bosnia and Herzegovina	51,197	51,193
Slovenia	20,273	20,212

Table 2: Terrestrial surface area and proportions of the DAE according to countries

Country	Terrestrial surface area (km^2) of the country within DAE	% of country surface area within DAE	% of the DAE represented by the country
Montenegro	13,886	100.00	13.61
Albania	11,826	41.09	11.59
Croatia	28,668	50.65	28.09
Bosnia and Herzegovina	41,224	80.53	40.39
Slovenia	6,455	31.94	6.32
Total terrestrial DAE	**102,059**		**100,00**

Table 3: Marine surface area of the DAE according to countries

Country	Marine surface area (km^2)	% of countries marine surface area
Croatia	31,843	89.50
Slovenia	179	0.50
Albania	1,143	3.21
Montenegro	2,408	6.77
Bosnia and Herzegovina	14	0.04
Total marine DAE	**35,587**	**100**

Table 4: Total DAE surface area according to countries.

Country	Marine surface area (km^2)	Terrestrial surface area (km^2) of the country within DAE	Total surface area of the country (km^2)
Montenegro	2,408	13,886	16,294
Albania	1,143	11,826	12,969
Croatia	31,843	28,668	60,511
Bosnia and Herzegovina	14	41,224	41,238
Slovenia	179	6,455	6,634
Total DAE	**35,587**	**102,059**	**137,646**

1.3. Overview of Gap Analysis

Gap Analysis is a method for identifying the degree to which biodiversity is represented in a mix of conservation lands in order to provide land managers and policy makers with the information they need to make better-informed decisions. Species and communities that are not adequately represented in the existing network of conservation lands constitute conservation "gaps". By identifying areas with little or no protection, one can make more sound management decisions in planning a protected area (hereafter PA) network. The importance of PAs has been widely supported, and numerous national and international agreements and laws consider PAs as the core of any conservation strategy. Namely, one of the most efficient ways to protect biodiversity is to maintain viable populations in natural ecosystems. However, a number of studies have demonstrated that PAs often do not represent the biodiversity of a region, and this also holds true for the DAE.

Gap Analysis was based on three main sets of data components:

1. Spatial orientation of various habitats (Land cover)
2. Distribution of biodiversity components (Biodiversity targets)
3. Map of areas already protected (Land stewardship)

1.3.1. Land Cover

A land cover map is a surrogate for ecosystems/habitats (vegetation communities) and is thus an unavoidable step, particularly because land cover maps are base layers for mapping the distribution of species and other biodiversity targets. The task of creating a land cover map was implemented as follows:

1. The purchase of topographic maps produced by the Military Geographic Institute ("Vojno geografski institut - VGI", scale 1:100 000) for the Dinaric Arc Ecoregion;
2. Processing of Landsat images for the Dinaric Arc Ecoregion;
3. Developing a digital terrain model;
4. Transforming purchased scanned topographic maps of the Dinaric Arc Ecoregion into GIS (scanning, georeferencing, rectifying, and vectorizing);
5. Developing Land Use/Land Cover layers (LU/LC) based on CORINE land cover/use maps of SL, HR, BiH, CG, and Al, integrating LC maps with digital terrain model;
6. Developing layers of planned infrastructure (CORINE category 1 and category 2 boundaries, highway network, railroad network) for SL, HR, BiH, CG, and AL.

The project area was covered with 55 topographic maps on a scale of 1:100 000, and one map on a scale of 1:200 000 (for the area covering part of Albania). Topographic maps were available in Gauss Krieger projection and covered three zones (5, 6, and 7). The following activities were performed to produce LC/LU layers in digital form:

1. Scanning of maps in resolution of 300 dpi on a large format scanner.
2. Removal of linear and non-linear deformations of scanned material by the method of polynomial rectification. All grid points and polynomial transformation of the first or second order were used.

3. Geo-coding of rectified scanned maps into original coordinate systems, i.e. zones 5, 6, and 7 of Gauss Krieger projection.

Thus, the processed topographic maps represented the basis of homogenous accuracy, which enabled position control of other spatial data and transformation into a unique coordinate system of projection and a source of specific spatial data (communications, hydrography, elevations, etc.).

Another source of spatial information was Landsat satellite images. The project area is covered with 14 images Landsat 7 ETM. Particular channels were pre-processed (sharpening, brightness, and contrast adjustment), then a multispectral image was created by connecting multispectral channels (Layer Stacking). Multispectral images in 30m resolution were obtained in this way. Using a panchromatic channel in 15 m resolution, by a pansharpening procedure, the resolution of the multispectral image was improved, thus obtaining images in 15 m resolution. Such images were transformed into a unique coordinate system of the project.

The source data for producing Digital Terrain Model were SRTM (Shuttle Radar Topography Mission) Version 2 Global Digital Terrain Model. For the space covered by the project, spatial transformation of SRTM data was executed. This implied position transformation from SRTM coordinate system into a unique coordinate system of the project, using global parameters of transformation. In order to establish a unique elevation system, elevation values were recalculated (Recalculation Elevation Values). This was necessary due to differences in elevation systems in which elevations were expressed in SRTM model and systems used in countries covered by the project. For the region of Montenegro and part of Albania, DMT accuracy was improved using higher accuracy data which were available to our GIS expert. Such improvements were made also for regions for which national coordinators provided relevant data.

Land Use/Land Cover (LU/LC) layer is based on CORINE 2000 obtained from the European Environment Agency. The data were overtaken in vector format and covered the entire project area. Topological control of overtaken data was performed, followed by attributization of vector entities, using the attributes defined in the legend marked CLC2000LEGENDEEA9799I. The LU/LC layer was symbolized according to those data. Transformation into project coordinate system was executed, to enable overlapping with other collected data.

As a final result of the above activities, a geospatial database was created, covering the following layers:

- Topographic maps at a scale 1:100 000
- Landsat satellite imagery raster dataset
- Digital Terrain Model
- Land use / Land cover layer
- Planned and existing infrastructure

All layers were transformed into the unique coordinate system of the project, which is a prerequisite for spatial and gap analyses that would be required in subsequent stages of project implementation.

1.3.2. Biodiversity Targets

The political fragmentation of the DAE posed severe problems while compiling information on the biodiversity targets. Croatia was the only country with publicly accessible, high quality digital data bases. Therefore, various sources of information were explored to cover the entire DAE and when appropriate, targets were modeled.

1.3.3. Protected Areas (PAs)

A significant proportion of the existing PAs is of such a small area that they could not be included in the analysis on such a large geographical scale. However, this does not mean that they have no significant effect on biodiversity conservation. Fundamentally, an area of 1 km^2, as the minimum threshold area considered in the analyses, was defined. In the case of an area being smaller than 1 km^2, but containing certain important relevance for biodiversity, the decision was made to include it despite its size. For some small PAs in Montenegro it was not possible to find a precise description or a digital map, therefore they were omitted from the analysis. PAs left out of the analysis are indicated by an asterisk (*) in the Table below (see chapter Protected areas).

Statistical data regarding PAs within countries and DAE are presented in the table below.

Table 5: Statistical distribution of PAs within countries

Country	IUCN Category	Surface area of PAs (km^2)	% in DAE	% in DAE part of Country
Albania	II	591.74	0.43	4.56
	III	0.58	0.00	0.00
	IV	329.06	0.24	2.54
	V	251.65	0.18	1.94
	VI	106.11	0.08	0.82
	Total	1,279.13	0.93	**9.86**
Bosnia and Herzegovina	I/IV	9.77	0.01	0.02
	II	425.42	0.31	1.03
	III	61.06	0.04	0.15
	III/V	28.66	0.02	0.07
	V	558.02	0.41	1.35
	Total	1,082.93	0.79	**2.63**
Croatia	I	24.25	0.02	0.04
	I/IV	787.95	0.57	1.30
	II	970.49	0.71	1.60
	III	2.77	0.00	0.00
	IV	0.00	0.00	0.00
	V	362.06	0.26	0.60
	V/VI	2,836.60	2.06	4.69
	Total	4,984.11	3.62	**8.24**

Country	IUCN Category	Surface area of PAs (km^2)	% in DAE	% in DAE part of Country
Montenegro	II	903.91	0.66	5.55
	III	2.57	0.00	0.02
	III/V	101.83	0.07	0.62
	IV	0.15	0.00	0.00
	V	1.45	0.00	0.01
	Total	1,009.91	0.73	**6.20**
Slovenia	III	30.36	0.02	0.46
	IV	17.48	0.01	0.26
	V	171.36	0.12	2.58
	V/II	231.32	0.17	3.49
	V/VI	0.11	0.00	0.00
	Total	450.63	0.33	**6.79**
Total DAE		8,806.72	6.40	

Table 6: Statistical distribution of marine and terrestrial PAs in Croatia

IUCN category	Country	Total area of PAs (km^2)	Total area of PAs (%)	Terrestrial PAs (km^2)	Terrestrial PAs (%)	Marine PAs (km^2)	Marine PAs (%)
I	Croatia	24.25	0.49	24.25	0.61	0.00	0
I/IV		787.95	15.81	193.34	4.86	594.61	58.95
II		970.49	19.47	753.81	18.96	216.67	21.48
III		2.77	0.06	2.71	0.07	0.05	0.00
V		362.06	7.26	354.04	8.91	8.02	0.79
V/VI		2,836.60	56.91	2,647.42	66.59	189.18	18.75
	Total	**4,984.11**		**3,975.57**		**1,008.54**	
	%	**8.24**		**13.87**		**3.17**	

Total length of the shoreline in the DAE is 6,733 km, of which 1,514 km (22.49 %) are covered with some of the PAs, terrestrial or marine. There are no marine PAs in Montenegro or in the Albanian part of DAE. Some marine PAs in Croatia cover also parts or entire island surfaces.

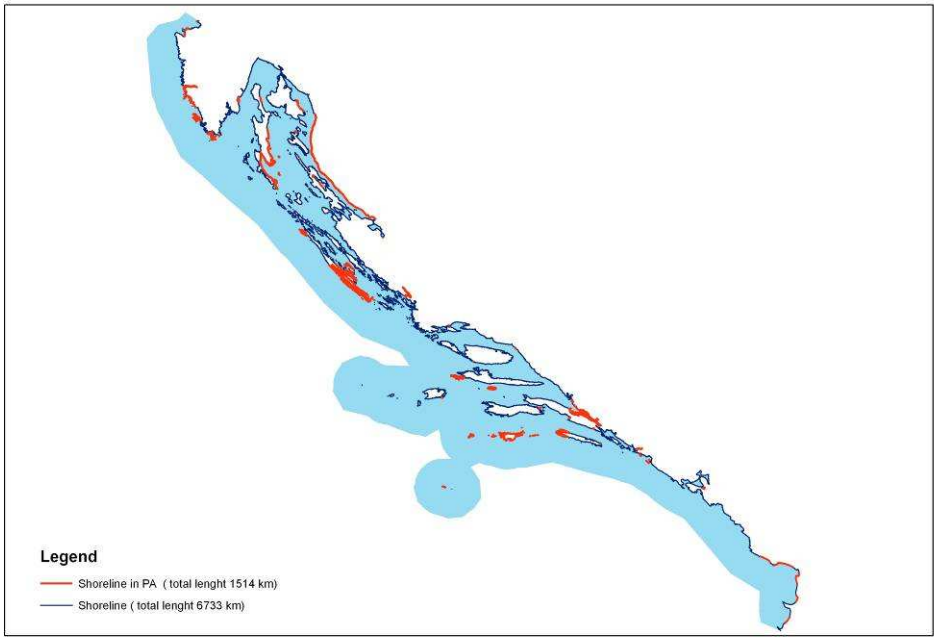


Figure 7: Shoreline and shoreline within PAs

1.3.4. Gap Analysis

The World Conservation Union (IUCN) has suggested that countries set aside at least 10 % of their terrestrial area into PAs (Dudley & Parish, 2006). The importance of protected areas has been widely recognized as the core of any conservation strategy. One of the most efficient ways to protect biodiversity is to maintain viable populations in natural ecosystems. The first step is to determine the degree to which biodiversity is represented in the existing system of PAs, referred to as Gap Analysis. This analysis provides an assessment of the effectiveness of the existing system of PAs for the conservation of biodiversity. Target species and habitats that are not adequately represented in PAs are gaps. For the purposes of the project, gaps are defined as targets which have a range (or surface) represented by less than 10 % in PAs. Targets that are not represented at all in PAs are considered total gaps. Targets represented more than 10 % in PAs are considered covered. The choice of the 10 % threshold value is, on the one hand, a reasonable consideration of the IUCN suggestion, and on the other, it is a value used by similar previous studies (Maiorano et al., 2006).

The Gap Analysis was executed separately for each of the five DAE countries, and for the entire region.

The representation of targets (species only) in defined spatial units was used for the hotspot analysis. The methodology followed Krystufek & Griffiths (2002). The study area was divided into 22,012 not-overlapping hexagons of 5 km^2 (each hexagon width is 2.75 km). These spatial units (cells) were overlaid with shapes of ranges of selected species. Each species was found to be present in the unit, if the unit overlaid the range. Hotspots were defined as hexagons with high species densities, the cut-off point being the upper quartile (the top 25 % hexagons).

The following maps were built:

- Big charismatic mammals,
- Terrestrial species hotspots (small terrestrial mammals, reptiles, amphibians - *Proteus anguinus* was excluded as it was included in the cave biodiversity hotspots)
- Freshwater fish of the Adriatic basin hotspots,
- Terrestrial species Gap hotspots (small terrestrial mammals, reptiles, and amphibians).

A majority of targets were not overlapped and were considered in Gap Analysis as independent targets.

1.4. Work Progress and Timetable

Activities in Gap Analysis followed the time schedule stipulated by the WWF.

A detailed work scheme on biodiversity targets was defined during a meeting between RSC, the GIS expert and the WWF Director of Conservation (Belgrade, 2007). Subsequent progress showed that not all targets were feasible due to a lack of any relevant information in parts of the region. Henceforth, two marine targets could not be ensured and had to be abandoned.

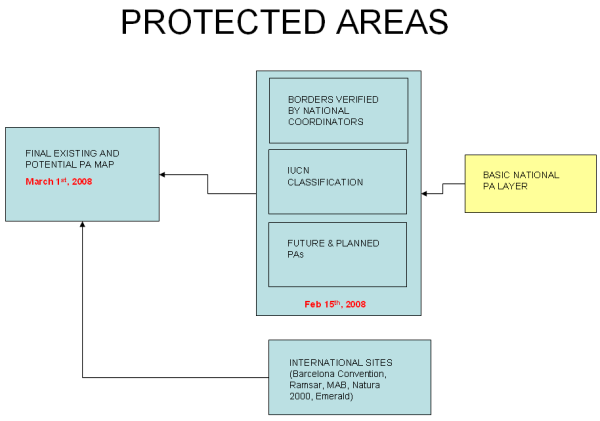


Figure 8: Work scheme on biodiversity target Protected Areas.

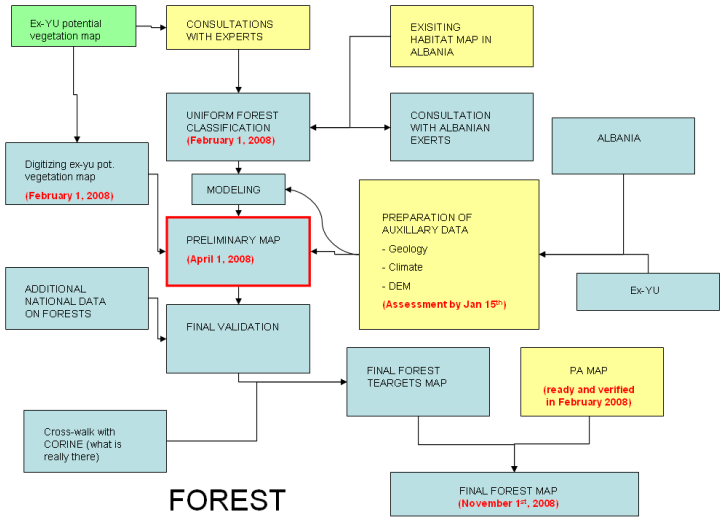


Figure 9: Work scheme on biodiversity target Forests.

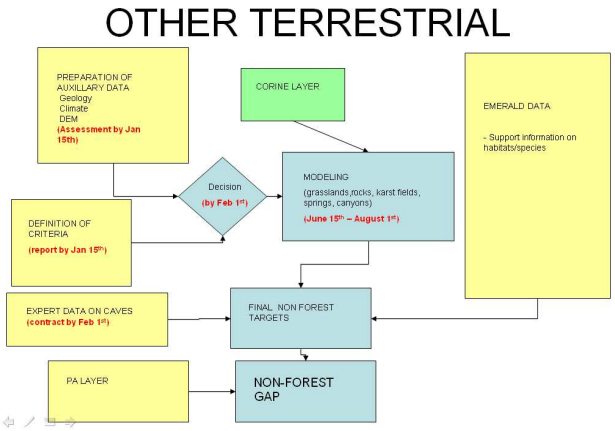


Figure 10: Work scheme on biodiversity target Other terrestrial targets.

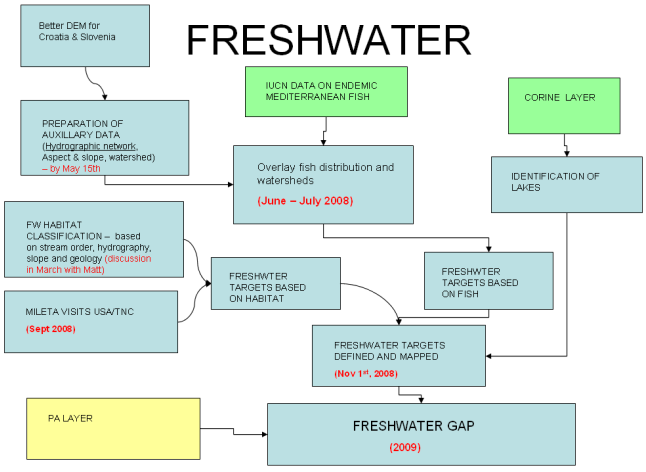


Figure 11: Work scheme on biodiversity target Freshwater.

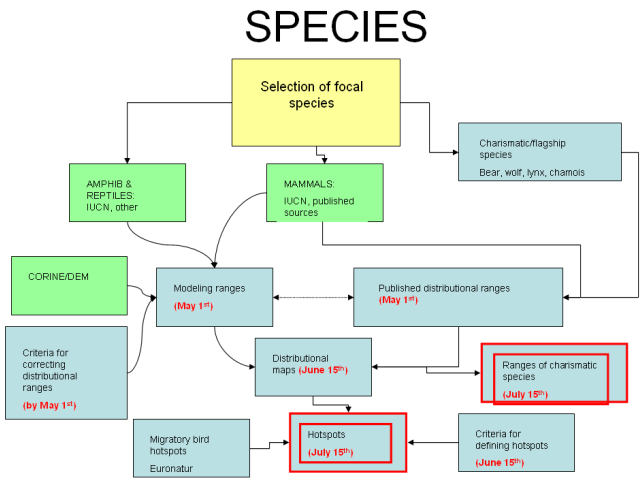


Figure 12: Work scheme on biodiversity target Species.

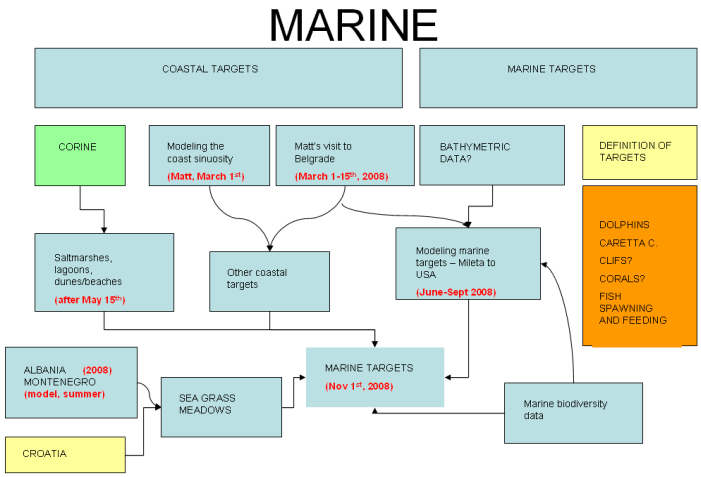


Figure 13: Work scheme on biodiversity target Marine.

The progress was assessed in regular Inception Reports (July 15, 2007, January 15, 2008, July 15, 2008, January 15, 2009) and during RSC workshops that were held between November 27 and 29, 2007 (Sarajevo, Bosnia and Herzegovina), between November 24 and 27, 2008 (Dugo Selo, Zagreb, Croatia), and between June 29 and July 1, 2009 (Dugo Selo, Zagreb, Croatia). The RSC maintained regular contacts with NSCs, the PL, and the Program Director by email and phone. The RSC team also visited different institutions in the DAE region to check the availability of information and to ensure its delivery for the purpose of the Gap Analysis.

The project was presented by the RSC at different meetings and workshops. Some of them included a series of workshops for business planning for PAs on the Island of Vilm – Germany (December 2008), Sarajevo – Bosnia and Herzegovina (January 2009), Ljubljana – Slovenia (June 2009), etc. The project was presented at the COSEP Congress of Students of Environmental Protection of South Eastern Europe (Kopaonik – Serbia, May 2009).

2. INPUT DATA

Availability of data on a regional level is highly diverse. In some cases, data for some countries are quite good (unfortunately all of them are not available in some countries as funding for obtaining such data was not available within project budget); in other cases, some data are of a very poor quality for other countries. Such discrepancies in the quality of data (both in terms of outstandingly good and outstandingly weak data) can highly influence the output: the situation at the regional (Dinaric) area. Therefore, it was decided to use the data that best presented the situation of targets throughout the entire region.

2.1. Biodiversity Targets

For the purpose of the Gap Analysis, data regarding the occurrence of species and habitats of relevant consideration for the biodiversity aspect of the region were collected. Data were obtained and verified by the NSC. Five groups of targets were defined (forests, other terrestrial targets, cave biodiversity, species, and marine). An additional target, elevation, was subsequently added for the purpose of analyzing the altitudinal distribution of PAs throughout the DAE. For the species group including only vertebrates, the only group with a reasonably well known distribution was considered. The target group for birds was analyzed in partnership with EuroNatur and Borut Stumberger, and is added in the appendix. Data for the target cave biodiversity were provided by Dr. Boris Sket, PhD and Dr. Maja Zagmajster, PhD. Data of habitat occurrence were obtained either from literature or normatively. Some targets were modeled by the GIS expert from existing land cover maps. Due to obstacles in providing adequate data and modeling, the target for the analysis of submarine cliffs was abandoned. After modeling, it turned out that the target Bathial zone does not extend into the DAE and was subsequently left out of the analysis.

2.1.0. Elevation

The whole area of the DAE is characterized by relevant changes in elevation. Distances from sea level to mountain peaks more than 1000 m high are often only a few kilometers. The prevailing mountainous inner area clearly passes into the flat Pannonian plain on the north. Canyons, cliffs, and mountain ranges reach the sea steeply on one side and plain Karstic fields on the other, are characteristic features that have a strong influence on the biodiversity of the region. Therefore, it was found adequate to introduce an additional target that represents the diversity in elevation throughout the DAE. The target has been modeled after the topographic map and divided in altitudinal belts of 200 m. It enabled identification of altitudinal representativeness of PAs.

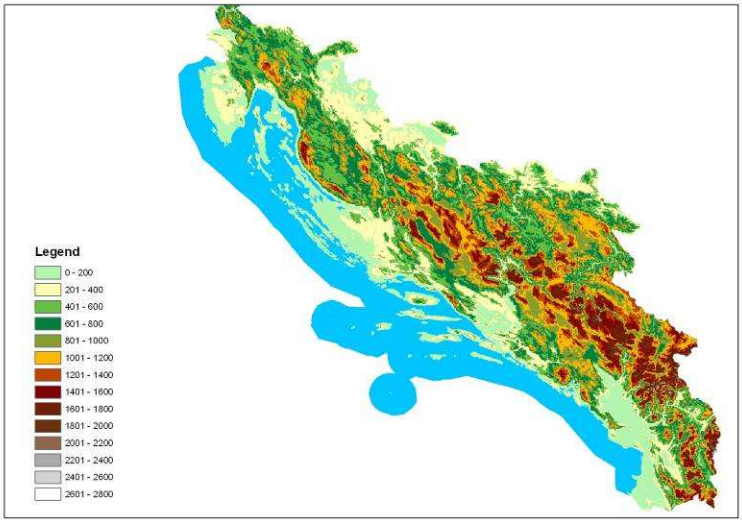


Figure 14: Altitudinal belts

2.1.1. Forests

All together, 13 distinct forest types were identified as independent biodiversity targets. The basic source for classification was the 1:1,000,000 map of potential vegetation of SFRJ for Slovenia, Croatia, Bosnia and Herzegovina, and Montenegro. For Albania a 1:200 000 map was used that was obtained from the Albanian National Forest Inventory. Identified layers of potential forest vegetation were modeled overlaying CORINE 2000 maps (classes: 311 Broad-leaved forest, 312 Coniferous forest, 313 Mixed forest). This resulted in a map of current forest cover.

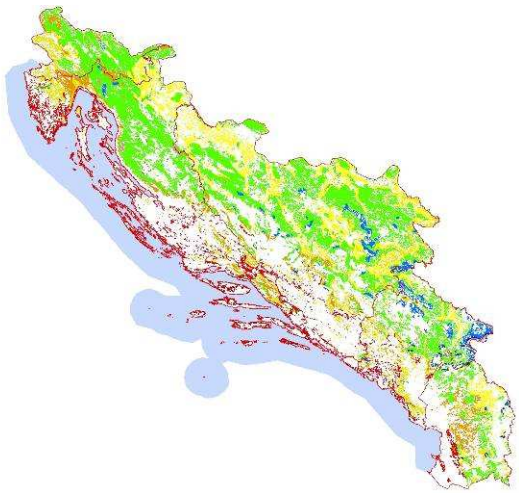


Figure 15: Forests of the DAE

2.1.1.1. Evergreen Forests and Scrubs

Xerothermic vegetation is restricted to the climate with hot, dry, rainless summers and mild (thermal minimum >4^{o}C) and wet winters (mean annual rainfall <1200 mm) on most arid sites along the Adriatic coast and on islands. Today, only relict patches of forest remain. In the past, so much of the land was degraded throughout the area to

tall (*maquis*) and low scrubs (*phrygana*). The vegetation is mainly composed of conifers (*Pinus halepensis, Juniperus oxycedrus, Juniperus phoenicea*), sclerophylous evergreen trees and scrubs (*Quercus ilex, Olea europaea, Pistacia lentiscus, Ceratonia siliqua, Arbutus unedo* etc.) with the occasional admixture of termophylous deciduous taxa (*Ostrya carpinifolia, Fraxinus ornus*, etc.). In Albania, *Quercus ilex* is restricted to the south of the country (outside DAE); vegetation is dominated by *Arbutus unedo* and *Juniperus sp*.

Figure 16: Evergreen forests and scrubs

2.1.1.2. Oriental Hornbeam Forests

This climatogenic vegetation replaces the evergreen vegetation in cooler conditions in the climate with warm and dry summers, mild winters with a mean annual temperature of 12.7-15^{o}C; and an annual precipitation of 900-1500 mm (regionally up to c. 2000 mm) with peaks in autumn and spring. It is transitional to continental forests. It occurs mainly along the coast, up to 600 m.a.s.l. (north) to 950 m (south). Predominately developed on red and brown Mediterranean soils on limestone (also dolomites), also on shallow black and brown eroded soil, even on bare rocks. It penetrates deeper inland along river valleys, especially on sunny warm slopes. Floristically rich but frequently degraded to scrubby vegetation. Characteristic species include: *Carpinus orientalis, Ostrya carpinifolia, Quercus pubescens, Celtis australis, Acer monspessulanum, Pistacia terebinthus, Pyrus amigdaliformis, Sorbus domestica, Phillyrea latifolia, Fraxinus ornus*, etc.

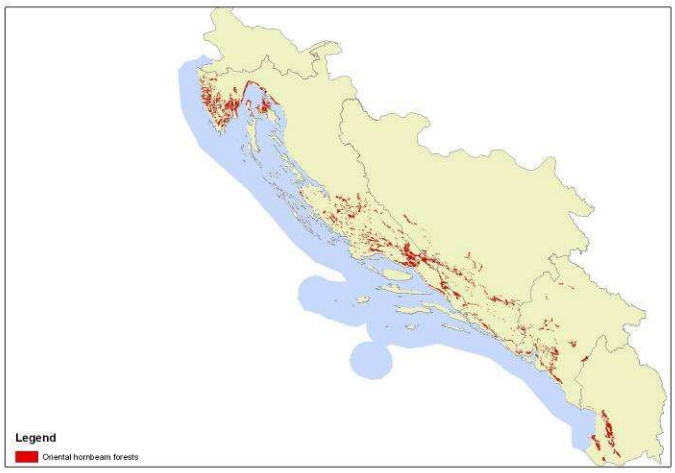


Figure 17: Oriental hornbeam forests

2.1.1.3. Thermophilous and Supra-Mediterranean Oak Woods

This climatogenic vegetation occurs in the climate with a mean annual temperature between 10.8 and 15°C and annual precipitations 1063—1665 mm (1500-3000 mm in Montenegro), mainly on brown calcareous soils, rendzinas and terra rossa on limestone and dolomites, locally also on mudstones (flysch), at elevations <950 m. The term 'karst-woods' has been applied to this transitional vegetation that is frequently developed as low, degraded forest, dominated by *Quercus pubescens*, *Fraxinus ornus*, *Carpinus orientalis* at lower and *Ostrya carpinifolia* at higher altitudes. Throughout the area, *Quercus pubescens* is often replaced by *Quercus cerris, Quercus virgiliana, Quercus trojana* and *Quercus frainetto*.

Figure 18: Thermophilous and supra-Mediterranean oak woods

2.1.1.4. Thermophilous Beech Forests

Moderately thermophilous, beech-dominated forests are transitional between thermophilous and supra-Mediterranean oak woods and montane beech forests. Dominate on sun exposed steep slopes on limestone and dolomite bedrocks between

500 and 1000 (1100) m.a.s.l. *Fagus sylvatica* is intermixed with *Quercus petraea, Q. pubescens Ostrya carpinifolia, Acer obtusatum,* etc.

Figure 19: Thermophilous beech forests

2.1.1.5. Montane and Subalpine Beech Forests

Beech dominated continental forests on carbonate and moderately acid noncarbonated bedrock at elevations between 300 and 1700 m (2000 m in the south). They occur in the area where the annual mean temperature is 5-8^{o}C (10-14^{o}C during vegetation season) and precipitation is abundant (1100-1800 mm) and evenly distributed. Mixed forests of beech and fir (*Abieti-Fagetum s. lat.)* are particularly extensive (particularly in Slovenia, Croatia, and Bosnia and Herzegovina), semi-natural and as such, of great conservational importance. Floristically rich forests: *Fagus sylvatica, Acer pseudoplatanus, A. platanoides, Tilia sp., Fraxinus excelsior, Picea abies, Abies alba* etc. Patches of Montane beech forests on very acid non-carbonate bedrock, mainly along the northeastern margin of the DAE, are floristically impoverished.

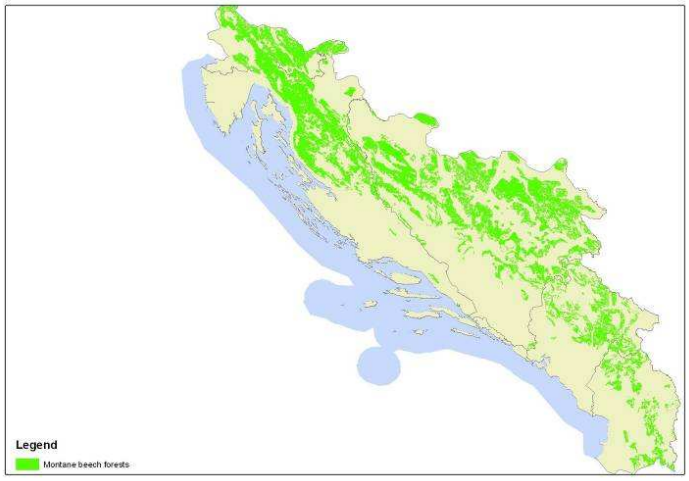


Figure 20: Montane and subalpine beech forests

2.1.1.6. Oak-Hornbeam Forests

Continental oak forests occur on various soils, both acid and calcareous (black soils, brown soils, sols lessivés, grumusols, fresh neutral soils of deep profile, pseudogley) on carbonate and non-carbonate bedrock. Altitudinal range is from the lowlands where soil is saturated with water a part of the year, to dry slopes <1000 m.a.s.l. These forests are dominated by oaks (*Quercus petraea, Quercus cerris, Quercus frainetto*) and regionally admixed with *Acer obtusatum, Sorbus torminalis, Caprinus betulus, Ostrya carpinifolia, Castanea sativa, Betula sp*. etc.

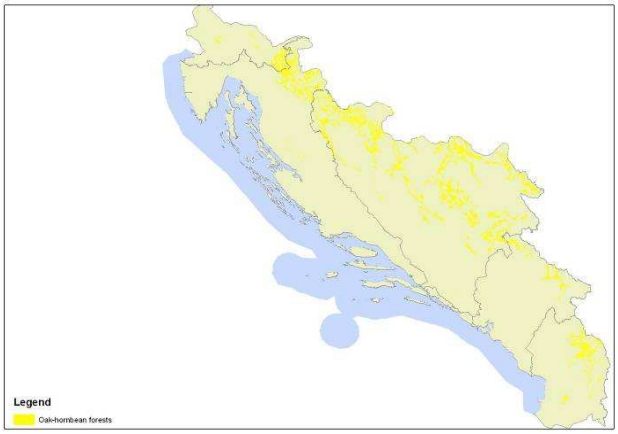


Figure 21: Oak-hornbeam forests

2.1.1.7. Hygrophilic Forests of Common Oak

Hygrophilic forests of common oak are of a very marginal occurrence in the DAE, being mainly restricted to the lowlands along the Sava River. The flooded forests in particular are strongly influenced by the ground water table and can be inundated up to 4 months during seasonal flooding. On terraces and slightly elevated terrains which are not directly affected by floods, the common oak forms associations with the hornbeam. However, even under such conditions, the association depends on soil which is saturated with water up to 4m deep. The most frequent trees in hygrophilic oak forests are *Quercus robur, Fraxinus alnus, Ulmus minor, Alnus glutinosa, Acer tataricum, Carpinus betulus* etc.

Figure 22: Hygrophilic forests of common oak

2.1.1.8. Coastal Flooded Forests of Ash and Common Oak

From the vegetation point of view, this is a rather heterogeneous forest type of a very patchy occurrence within the DAE. It occurs on flooded terraces with various types of grey, black soils and alluvial pararendzina and is mainly composed of *Quercus robus, Fraxinus angustifollia, Ulmus laevis, U. minor, Acer tataricum, Rhamnus chathartica, Frangula alnus, Crataegus laevigata, Salix cinerea* etc. Forest association *Fraxino-Quercetum roboris* was widespread in temporarily flooded karstic fields of the DAE, but is preserved only along the River Mirna in Istria, Croatia. Association *Periploco-Quercetum roboris* was always restricted to the lowlands along the Skadar/Skhodra Lake.

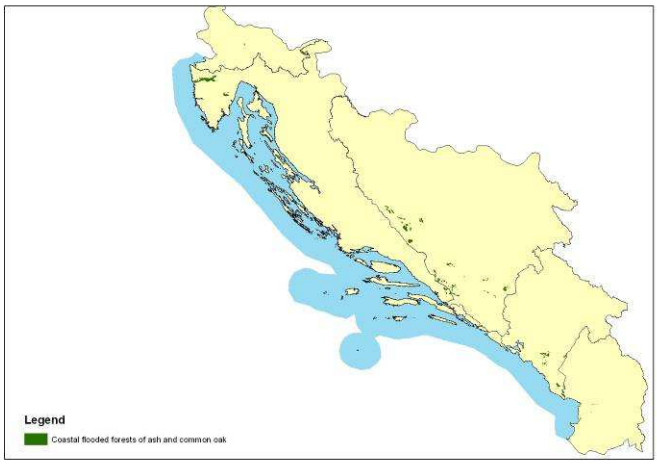


Figure 23: Coastal flooded forests of ash and common oak

2.1.1.9. Spruce and Fir Forests

Spruce and fir forests are patchily dispersed across the entire DAE region from the lowlands into the subalpine belt and occur on both, carbonate and non-carbonate bedrock. Spruce stands in particular usually occupy higher mountain regions between 1000 and 1800 (2000) m.a.s.l. with a cold continental climate (mean annual temperature 2-6^{o}C). Fir is mainly limited to the montane belt and lower elevations with a prevalence of humid climate. Both the Norway Spruce, *Picea abies*, and the fir *Abies alba* form either pure or mixed stands. Spruce forests of the DAE are very similar to those in Central Europe apart from the presence of Balkan taxa.

Figure 24: Spruce and fir forests

2.1.1.10. Omorika Spruce Forests

Omorika spruce *Picea omorika* is a Balkan paleoendemic of very small range along the Drina River on the border between Bosnia and Herzegovina and Serbia. Omorika spruce forests occur on steep rocky slopes and are very tolerant to cold and excessive drought. The majority of the range is in Serbia, where forests are known from the mountains of Tara and Zvezda. In Serbia almost all known localities are within protected areas, while in Bosnia and Herzegovina, the species is completely uncovered by protected areas. Since this target is of great biogeographycal significance for the region, an adequate conservation plan that would involve trans-boundary cooperation is urgently needed.

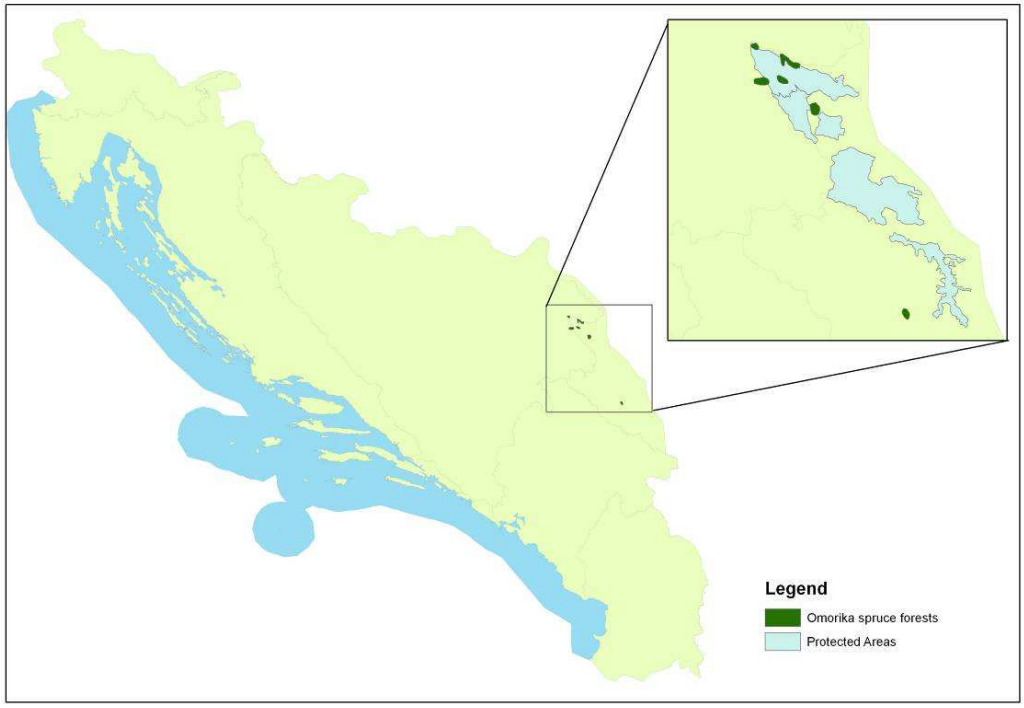


Figure 25: Omorika spruce forests

2.1.1.11. Forests of Heldreich's Pine

Forests of Heldreich's pine occur under the Mediterranean climate regime, on carbonate and very rarely on non-carbonate and ophiolithic bedrock. Habitats are usually extreme ones, with shallow and skeletal dark soils. Forests of Heldreich's pine extend to the very upper limit of forest vegetation (1400-1800 m.a.s.l.). *Pinus heldreichii* is paleondemic to the Balkan Peninsula.

Figure 26: Forests of Heldreich's pine

2.1.1.12. Forests of Macedonian Pine

Pinus peuce, a paleoendemic species to the Balkans, forms a characteristic forest complex of dense canopy on acid bedrocks at higher elevations (1400-2100 m). Within the DAE, it is restricted to mountains in Montenegro and Albania.

Figure 27: Forests of Macedonian pine

2.1.1.13. Shrubs of Mountain Pine

Mountain pine, *Pinus mugo*, forms the upper-most belt of woody vegetation (>1400 m.a.s.l.) on carbonate soils as well as noncarbonated ranker. Precipitation is abundant

(2000-3000 mm), mean annual temperatures low (<2-5^{o}C) and vegetation period very short.

Figure 28: Shrubs of mountain pine

2.1.2. Other Terrestrial Targets

This set of targets are on the one hand, habitats of relevant importance for biodiversity of the DAE, and on the other, characteristic natural features of the region, mainly due to its geological composition. Targets bogs, canyons, streams and rivers, lakes, grasslands, rocky habitats, karst fields with surface hydrology were modeled during visit of the Gap Analysis expert to TNC, California, in August 2008.

2.1.2.1. Bogs

Bogs are wetlands, characterized by the deposit of dead plant material that, in the absence of oxygen, leads to the formation and accumulation of peat. Bogs are common in central and northern Europe, but a rare feature in the predominantly calcareous bedrock of the DAE. They cover small surface areas and are mainly restricted to higher elevations. Due to their high acid and oligotrophic conditions, bogs provide habitat to specific ecotypes of plants, e.g. *Sphagnum subsecundum, S. squarosum, Drepanocladus sendtneri, D. aduncus, Polytrichus microcarpum, P. strictum, Drosera rotundifolia, Carex echinata* (= *C. stellulata*), *C. flava, C. hostiana, C. stellulata, Eriophorum angustifolium, E. vaginatum, E. latifolium, Calluna vulgaris, Vaccinium myrtillus, V. vitis-idaea, Drosera rotundifolia,* and *Betula pubescens*.

This target includes fens, types of bogs which receive water and nutrients from ground and rainwater, and raised bogs, in which the only source of water is atmospheric water, therefore these habitats are low in nutrients.

Shape files of bogs have been available for Slovenia and Croatia. Narrative data were provided for Montenegro, Bosnia and Herzegovina, and Albania.

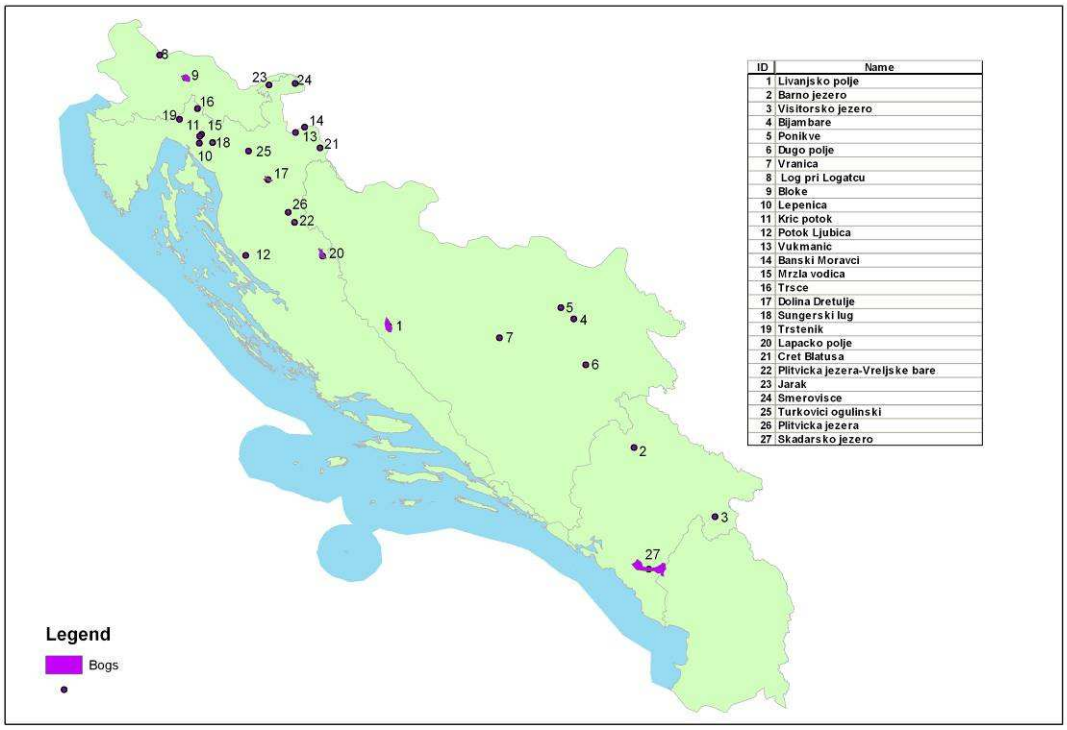


Figure 29: Bogs

2.1.2.2. Canyons

Tectonism has given the Dinaric Arc Ecoregion a profusion of inland cliffs which have been very stable over time, and thus, unsurprisingly, many endemics are concentrated there. Noteworthy, Mediterranean endemic plants tend to be species of open places; those that like shade mostly prefer the shade of rocks to that of trees. On the whole, one does not find endemics in the forests but on open grounds: cliffs, rocky slopes and high mountains. As places out of human reach, cliffs normally also escape cultivation and most fires. Vertical cliffs even escape browsing by grazing animals and are natural refugia for palatable plants and for many plants which cannot otherwise survive the competition of the more vigorous and aggressive plants of the surrounding habitats. Canyons act also as refuges for some tertiary relict species of plants. List of characteristic plants overlaps to a certain extent with the target h. (Oromediterrane rocky habitats). Particularly frequent are species from genera: *Cerastium, Silene, Dianthus, Heliosperma, Onosma, Sempervivum, Sedum, Saxifraga, Potentilla, Linum, Hypericum, Asperula, Stachys, Verbascum, Ramonda, Campanula, Staehelina.*

In Bosnia and Herzegovina, many of endangered stenoendemic plants (*Alyssum moellendorfianum, Euphorbia gregersenii, E. Herzegovina, Melampyrum trichocalicinum, Seseli hercegovinum, Symphyandra hofmannii*) are found in canyons.

This target has been modeled from the existing topographic and LC maps. The criteria used for modeling was a rapid change in elevation, slopes of 45° or more with a length of 1 km or more. The target was subsequently verified by the National Scientific Coordinators.

Figure 30: Canyons

2.1.2.3. Streams and Rivers

The watercourses of the Dinaric Arc Ecoregion empty into two basins, the Black Sea and the Adriatic. All rivers of the Black Sea catchment area have an outlet into the River Sava, which is on the northern margin of the Ecoregion. Rivers of the Adriatic catchment are generally short, a consequence of the bedrock subjected to karstification, which prevalently enable surface hydrology. Where the erosive power of water dominates over corrosive power, the landscape is characterized by impressive canyons and river valleys. The corrosive activity of water led to the formation of diverse surface and, especially, subterranean karstic systems. Adriatic rivers are frequently intermittent, sink rivers of various lengths; as such they are also captured into the 'karst fields with surface hydrology" biodiversity target.

Due to their isolation, Adriatic rivers contain a large number of endemic animals, primarily fish. In Bosnia and Herzegovina, 31 aquatic insects are endemic to the springs of karstic watercourses (genera *Rhyachopila, Allotrichia, Hidropsyche, Chaetopteryx, Annitella, Drusus, Potamophylax*, etc.).

The fresh water environments have been largely subjected to human activities, which changed both the geomorphological and the biodiversity aspects of rivers. Karst watercourses are considered to be critically threatened habitats. Factors that impact on fish populations often act as synergistic. The main threats to endemic fish populations are represented by flow rate regulations, dam building and reservoir formations that represent river obstructions, pollution, introduction of alien species, etc.

Due to the lack of available information for freshwaters, habitat heterogeneity was based on physical properties of watercourses. Freshwater courses according to criteria were thus divided:

- Inclination: $<1^{o}$, $1\text{-}5^{o}$, $>5^{o}$
- Elevation: <100 m; 100-750 m; >750 m

Such division yielded 9 different watercourse categories. Although they differ in ecological properties, it was not possible to link these categories with biotic communities.

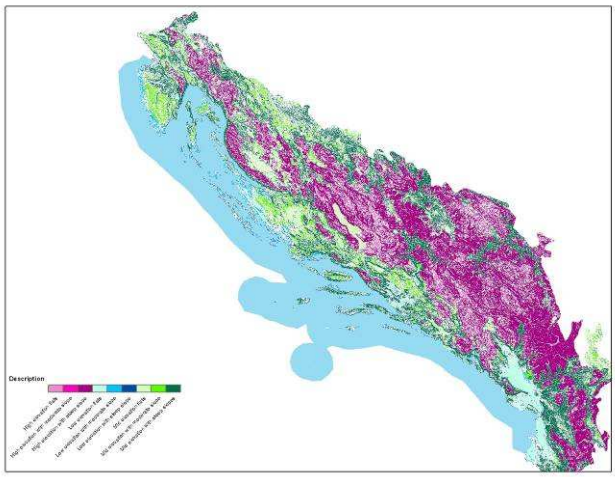


Figure 31: Modeled watercourses category according to elevation and inclination criteria

Even after the modeling of this target according to categories, specific outcomes that would indicate biodiversity values in relation to the character of rivers didn't appear. Therefore Gap Analysis of the streams and rivers of the Adriatic catchment in relation to the target fresh water fish of the Adriatic basin was performed.

Figure 32: Modeled watercourses category

Water courses of the Adriatic catchment according to elevation (0-100 m, 100-750 m, 750-2750 m) were further divided. A more precise analysis was performed.

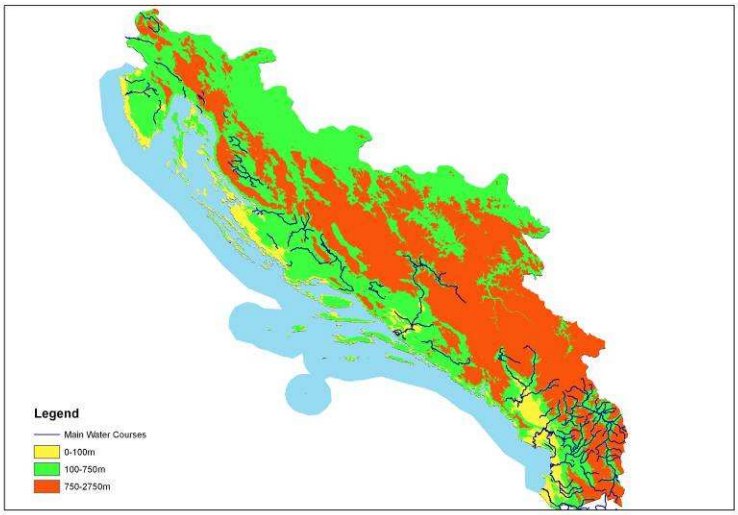


Figure 33: Modeled watercourses category according to elevation category

In addition, maps in relation to exploitation of water, of tree Adriatic basin rivers (Krka, Cetina and Neretva) were built. They appear particularly important for fresh water fish diversity. Based on the above examples and taking into account the situation with other rivers and streams, especially in accordance with different national strategies on hydropower constructions, it can be concluded that the whole river system in the DAE is under severe threat of exploitation of water for energy supply. In addition, one can say that the high biodiversity values of DAE rivers and streams will be degraded (lost) even before those values are properly recognized.

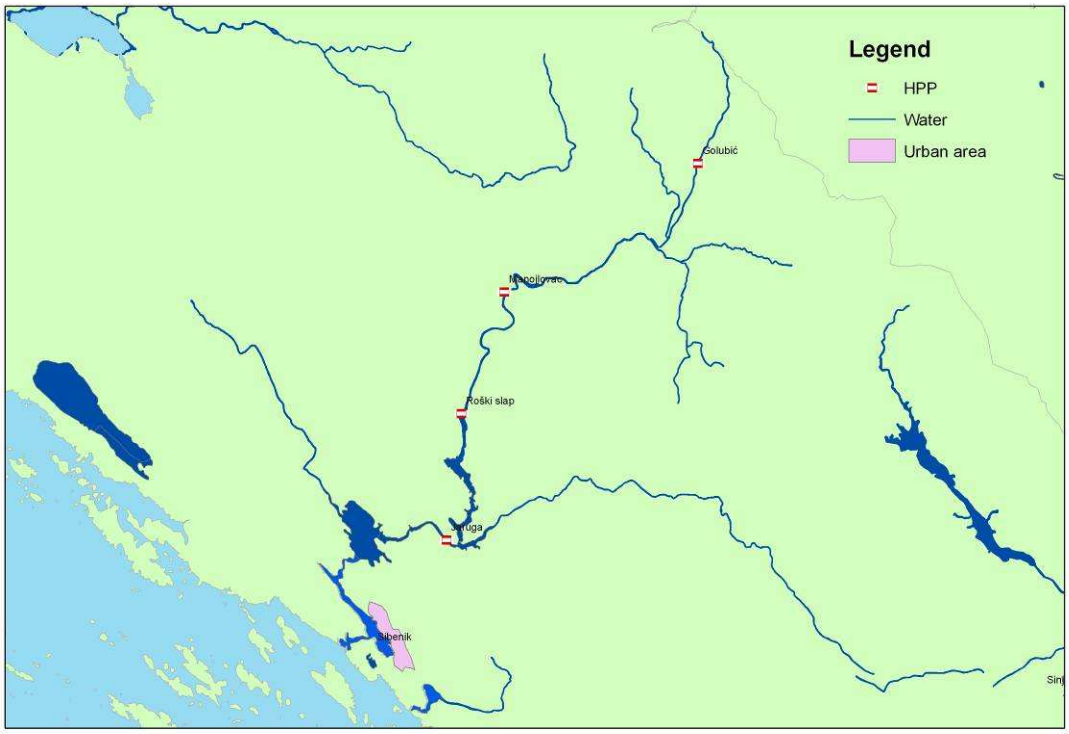


Figure 34: Krka River

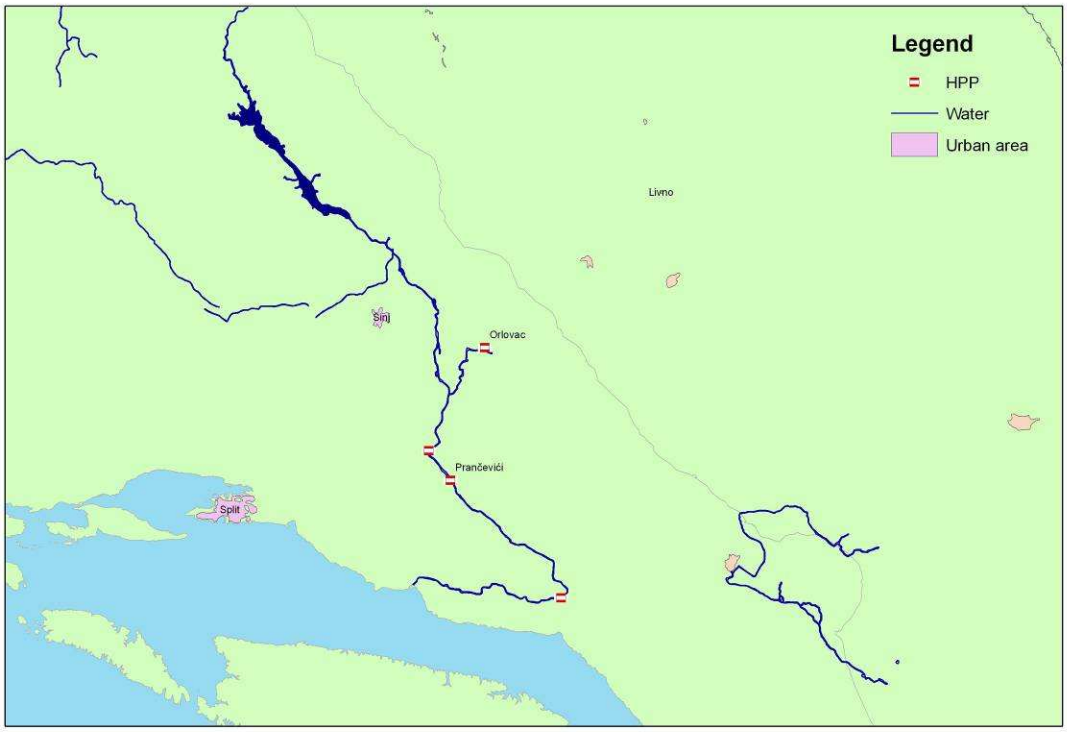


Figure 35: Cetina River

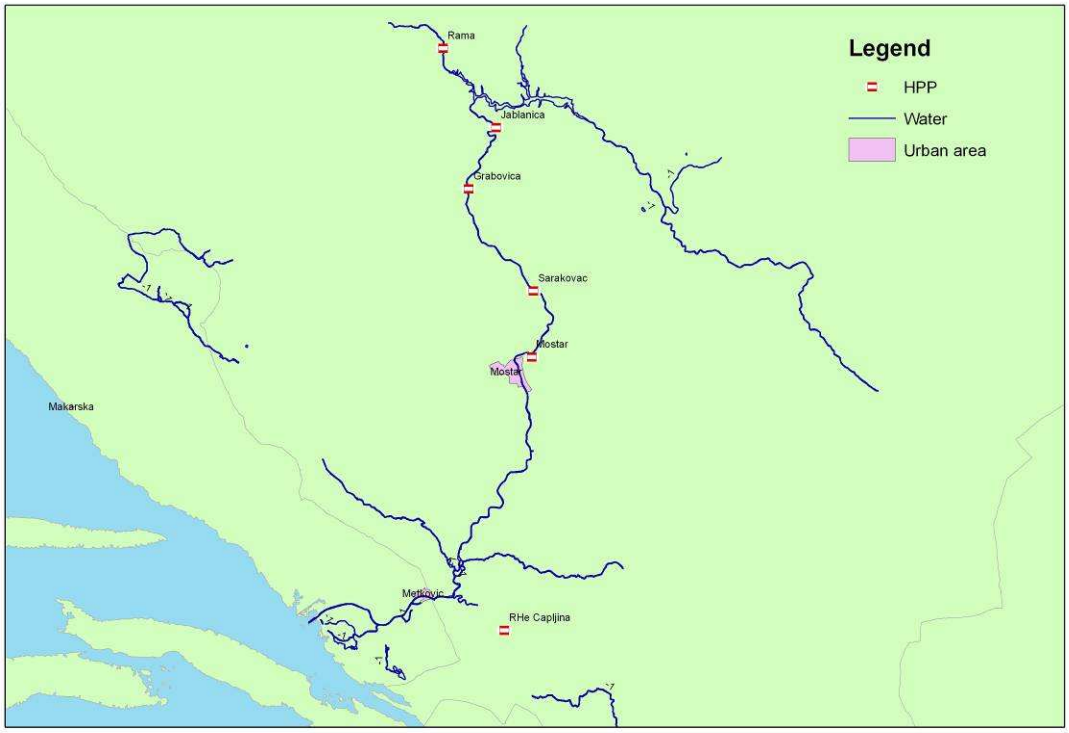


Figure 36: Neretva River

2.1.2.4. Mediterranean Lakes

Natural freshwater lakes close to the seashore are rare along the Adriatic coast and on the islands. Despite their rarity, they are important locally, both from the point of

view of the local economy and biodiversity conservation. E.g. Vransko Lake near Pakoštane is the largest natural lake in Croatia (surface area of 30.7 km^2) and Lake Scutari (Albania/Montenegro) is the largest freshwater body in the region (391 km^2). Vransko Lake on the Island of Cres, which is 74 m deep, is the biggest natural water accumulation in the northern Adriatic region, while Crveno Lake near Imotski is outstanding for its depth of 250 m. In some of these lakes, freshwater is mixed with the sea, which provides specific ecological conditions, typified by various Characeae in the water body and various plants on the shore (*Phragmites australis, Cladium mariscus, Periploca graeca, Vitex agnus-castus*). Lakes and their marshy shores are also important resting and feeding sites on bird migration routes.

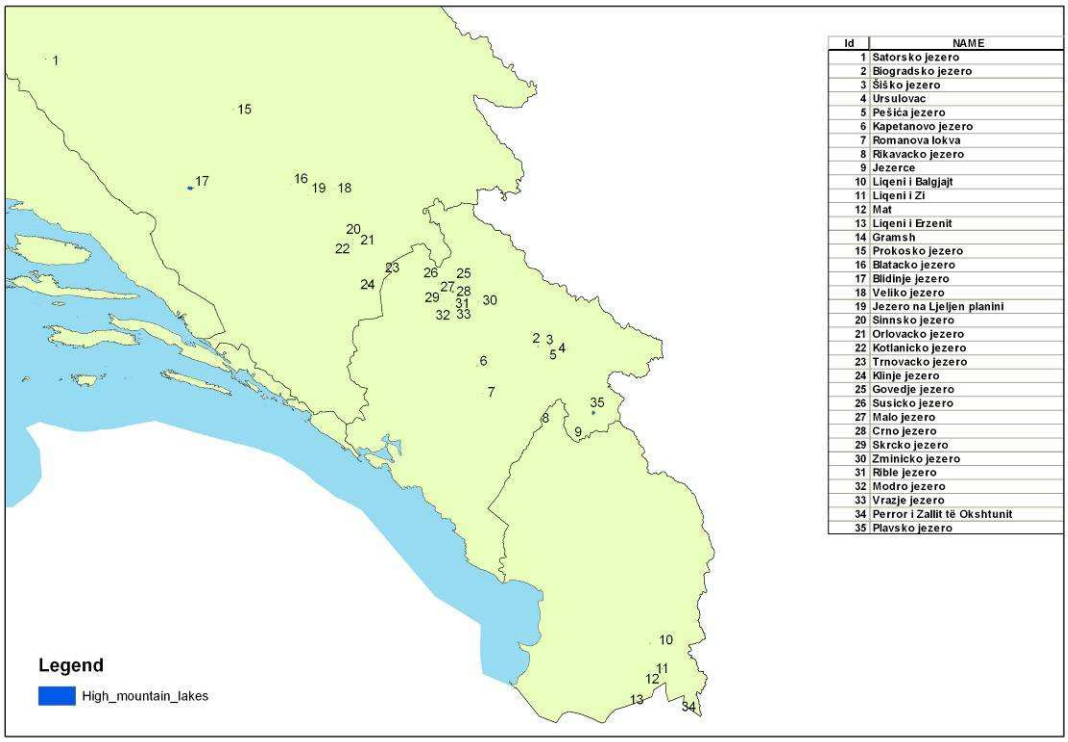
Mediterranean lakes have been captured from topographic maps and subsequently verified by National Scientific Coordinators.

Figure 37: Mediterranean lakes

2.1.2.5. High Mountain Lakes

High mountain lakes are largely of glacial origin and consequently they are a poor source of endemics. Despite this, as unique landscape features they increase local biodiversity in various ways. Among others, selective pressure under the extreme environment of high mountain lakes produced various responses in life history traits in various animal groups, e.g. paedomorphosis in newts (*Triturus*). Recently, many such unique populations were lost as a consequence of trout introduction into the lakes for angling.

The target encompasses all lakes above 1400 m of elevation to avoid confusion with artificial/man-made lakes.



Id	NAME
1	Satorsko jezero
2	Biogradsko jezero
3	Šiško jezero
4	Ursulovac
5	Pešica jezero
6	Kapetanovo jezero
7	Romanova lokva
8	Rikavacko jezero
9	Jezerce
10	Liqeni i Balgjajt
11	Liqeni i Zi
12	Mat
13	Liqeni i Erzenit
14	Gramsh
15	Prokosko jezero
16	Blatacko jezero
17	Blidinje jezero
18	Veliko jezero
19	Jezero na Ljeljen planini
20	Sinnsko jezero
21	Orlovacko jezero
22	Kotlanicko jezero
23	Trnovacko jezero
24	Klinje jezero
25	Govedje jezero
26	Susicko jezero
27	Malo jezero
28	Crno jezero
29	Skrcko jezero
30	Zminicko jezero
31	Rible jezero
32	Modro jezero
33	Vrazje jezero
34	Perror i Zallit të Okshtunit
35	Plavsko jezero

Figure 38: High mountain lakes

2.1.2.6. High Mountain Grasslands (‘rudine’)

‘Rudine’ are widespread above the tree line throughout the Dinaric Arc Ecoregion. In previous centuries, grasslands expanded towards lower elevations as a consequence of deforestation and expansion of pastoral activity. Just the opposite process has been observed recently, namely the expansion of shrubs and forest in the absence of large sheep herds. Floristically rich high mountain pastures. Characteristic plant species and genera are *Anthyllis alpestris, Buphthalmum salicifolium, Campanula sp., Centaurea sp., Dianthus sp., Edraianthus sp., Festuca pungens, Festuca rubra, Gentiana lutea ssp. symphyandra, Globularia bellidifolia, Helianthemum sp., Hieracium sp., Juniperus communis ssp. nana, Koeleria eriostachya, Oxytropis dinarica, Rhinanthus angustifolius, Scorzonera purpurea, Senecio doronicum, Sesleria juncifolia, Thymus balcanus*. On acid soils *Nardus stricta* is dominant. In Bosnia and Herzegovina over 1500 species of vascular plants are found in ‘rudine’. Diversity of plant associations declines with altitude.

This target encompasses all natural grasslands and pastures (CORINE classes) above an elevation of 1500 m. The altitudinal threshold was proposed by National Scientific Coordinators during the workshop in November 2007.

Figure 39: High mountain grasslands

2.1.2.7. Thermophilous Grasslands

Similarly as in the 'rudine', thermophilous grasslands are floristically rich and include a number of endemics. Dry and warm grasslands are frequently interspersed with rocky habitats (including screes) and delimitation between the two is largely scale-dependent. The target thus overlaps partially with rocky habitats (cf. pts. h and i below). Thermophilous grasslands are also shrinking due to the expansion of shrubs and forest. Characteristic plants of the driest and warmest grasslands along the Adriatic coast and islands are *Brachypodium retusum, Brachypodium distachium, Trifolium stellatum, Trifolium angustifolium, Trigonella gladiata, Convolvulus althaeoides ssp. tenuissimus, Plantago afra, Hippocrepis unisiliquosa, Bellardia trixago, Briza maxima, Allium subhirsutum.*

The continental area of the Adriatic coast is characterized by a cooler climate and higher altitudes. Dry grasslands differ from those of the coastal areas prevalently in the composition of plant species. Characteristic plants are the following: *Centaurea rupestris, Carex humilis, Satureia subspicata, Iris illyrica, Leucanthemum liburnicum, Edraianthus tenuifolius, Trifolium montanum, Pulsatilla grandis, Festuca valesiaca*. Nowadays, many types of grassland are in the process of overgrowing, especially with *Juniperus oxycedrus* and *Ostrya carpinifolia* due to the abandoning of pasturing. Some areas were artificially reforested with *Pinus nigra*.

This target encompasses all natural grasslands and pastures (CORINE classes) on southwest slopes below an elevation of 1500 m. The altitudinal threshold was proposed by National Scientific Coordinators during the workshop in November 2007.

Figure 40: Thermophilous grasslands

2.1.2.8. Oromediterranean Rocky Habitats

Many Mediterranean endemics seek shade below rocks rather than under trees. Oromediterranean rocky habitats are thus rich in endemics however they frequently form a mosaic with grasslands and shrubby communities. They are rich floristically (some representative plant species are *Achilea clavenae, Arabis scopoliana, Athamanta haynaldii, Campanula fenestrellata, Campanula portenschlagiana, Campanula waldsteiniana, Cerastium dinaricum, Bunium alpinum, Degenia velebitica, Drypis spinosa, Heliosperma pusillum, Iberis pruitii, Micromeria croatica, Moltkia petraea, Potentilla clusiana, Primula kitaibeliana, Rumex scutatus, Seseli maly, Sesleria juncifolia and Silene marginata*) and provide shelter to various vertebrate endemics (*Dinaromys bogdanovi* and several lizards).

This target has been modeled taking into consideration the following presumptions: (1) CORINE screes and rocky habitats, (2) existing on southwestern slopes (3) with the inclination $>30^{o}$ (4) which are in the Emerald Mediterranean and Alpine biogeographic regions.

Figure 41: Oromediterranean rocky habitats

2.1.2.9. High-Mountain Rocky Habitats

Although species specialized on rocky habitats are frequently altitudinal generalists, some small range endemics are frequently restricted to high elevations (e.g. the newly described *Dinarolacerta montenegrina*). However even the altitudinal generalists become more common only above c. 1500 m above sea level (e.g. *Dinaromys bogdanovi* and the chamois *Rupicapra rupicapra*).

This target has been modeled considering CORINE screes and rocky habitats at the elevations above 1600 m.

Figure 42: High-mountain rocky habitats

2.1.2.10. Karstic Fields With Surface Hydrology

Karstic fields were prepared in assessment with bird targets. Cf. Apendix

Karstic fields (poljes; also known as Dinaride fields) are specific geographic formations characterizing the Dinaric karst from Slovenia to Montenegro. The majority of such poljes are in west Bosnia, Herzegovina and Montenegro. Livanjsko Polje is the largest, 65 km long and 6 km wide, with a total area of 402 km^2. Poljes are mostly narrow and long blind valleys sharply bordered by the steep slopes of the Dinaric mountain ridges, which also determines their predominantly northwest to southeast direction. Frequently, karstic fields developed parallel one to another at different altitudes, e.g. in west Bosnia and Herzegovina to five particular elevations, between 1200 and 20 m above sea level. Karstic fields result from heavy erosion during the glacial peaks or during the Holocene. Until the end of the Pleistocene, fields were most probably covered with lakes out of which water leaked slowly into corroded calcareous bedrock. As such, the bottoms of the karstic fields consist of diluvial or alluvial deposits put down on Neogenic lake sediments which are 700 m thick in the Glamočko Polje and more than 2500 m in Duvanjsko Polje. All of these deposits in the poljes function as hydrogeological barriers. Being cut deeply into the bedrock, karstic fields brought numerous underground channels to the surface allowing a water outlet through their waterproof bottoms. These sources feed rivers and streams meandering along the level bottom of the fields and sink into subterranean passages (ponors) at the field's edge. In autumn, the quantity of precipitation is such that the swallow-holes (ponors) can no longer accommodate the

water so the fields inundate and temporary lakes appear. Depending upon the altitude and the amount of autumn precipitation, lakes inundate the fields in October, November or December, and dry up in April, May, June or even July. The flooding thus occurs for 6-10 months per year. Two-thirds of 38 km^2 of the Cerknica Polje depression is flooded annually and the volume of floodwater exceeds 80 million m^3 in the Glamoč field. Those surfaces of karstic fields from which water flows off but slowly and reluctantly are likely to be marshy throughout the year. At the beginning of the 20th century, intensive hydroregulation works were started to eradicate periodic flooding. All ponors have been shielded against surface leakage by grounding, plugging, and the construction of local rock-filled dikes in front of ponor zones. Water from the field Buško Blato, with 80 % of its surface being constantly under water, has been transferred to a man-made reservoir with a capacity of 800 million m^3.

Karstic fields are covered with the best cultivable soil in otherwise rather inhospitable karstic world. Nowadays the margins of karstic fields are mostly under plough whereas the central parts are occupied by pastures and meadows. Human settlements are concentrated on the margins of poljes.

Vegetation of the poljes developed with a marked dependence on hydrographic conditions. Although hydroregulations and cultivation changed natural habitats, karstic fields with surface hydrology remain important 'habitat islands' in a largely waterless karstic landscape. The marshy ground of dried lake bottoms are densely overgrown by *Eleocharis palustris* in addition to *Galium elongatum, Carex acuta, Polygonum amphibium, Juncus articulatus, Mentha aquatica, Potentilla reptans, Deschampsia cespitosa, Ranunculus repens* and *Thalictrum flavum*. Humid habitats are under floristically rich plant associations, characterized by *Cirsium oleraceum, Angelica sylvestris, Caltha palustris, Equisetum palustre, Carex panacea*, and *Eriophorum latifolium*. Dry meadows are frequently dominated by *Scilla litardierei, Sesleria uliginosa, Dechampsia media, D. cespitosa, Edrianthus dalmaticus, Trifolium fragiferum, T. montanum, T. cinctum, Hordeum secalinum, Narcissus tazetta, N. radiiflorus, Poa sylvicola, Salvinia natans, Scorzonera parviflora, Orchis laxifolia, Alopecurus rendlei, Lotus tenuis, Ranuculus sardous, R. acris, Lathyrus pannonicus, Carex distans, C. divisa, C. davalliana, Centaurea jacea, Bromus racemosus, Festuca pratensis, Filipendula vulgaris, Chrysopogon gryllus, Bromus erectus* and *Sanguisorba muricata*. Many karst fields are centers of plant endemism in Bosnia and Herzegovina. Animals associated with the permanent waters of poljes may attain high local abundances, e.g. *Hirundo medicinalis, Bufo bufo, Rana dalmatina,* and *Misgurnus fossilis*. Meadows are the typical habitat of various insects such as *Euphydryas aurinia* and *Chrysochraon dispar*. A deep soil layer in addition to water banks provide suitable habitats for several small mammals (*Neomys anomalus, Arvicola terrestris, Microtus arvalis*) which have mosaic ranges in a predominantly arid karstic landscape. Poljes are also important sites for birds at various phases of their infradian cycles: during nesting, migration or wintering. In isolation, some taxa developed endemic species, e.g. the crustacean *Chirocephalus croaticus*.

Karstic rivers and wetlands associated with poljes are critically endangered habitats in Croatia.

Poljes were first defined from the topographic layers and subsequently verified by the National Scientific Coordinators. Cartographic information is available for Croatia. There are no poljes in the Dinaric Arc Ecoregion in Albania.

Figure 43: Karstic fields with surface hydrology

2.1.3. Cave Biodiversity

The Dinaric karst covers more than 56,000 km^2 and includes tens of thousands of caves of heterogeneous ecological conditions (e.g. cave temperatures vary between 4^{o}C and 16^{o}C, depending on the altitude). Dinaric caves and interstitial waters are inhabited by over 450 stygobiotic species, which is by far the highest number in the world, if compared with other regions of corresponding size. In addition, more than 790 terrestrial obligate cave species have been recorded thus far. Two cave systems (Planina-Postojna in Slovenia and Vjetrenica in Bosnia and Herzegovina), each with c. 100 species, are possibly the global top hotspots in cave biodiversity. Apart from morphological and taxonomic diversity, the Dinaric cave fauna also show a high ecological diversity. Since species show "slow life style", are strictly tied to their restricted habitat, and are frequently known from a small number of localities (even a single cave), the Dinaric hypogean biodiversity is endangered.

Data was provided by an international expert (Professor B. Sket, University of Ljubljana). We shall focus on beetles, which have been well studied and represent approximately 45 % of terrestrial cave species. Besides, the data provider also focused on unique stygobiotis representatives ("phylogenetic relicts"), e.g. the only known knidarian *Velkovrhia enigmatica*, the only definitively stygobiotic clamp *Congeria kusceri*, the only stygobiotic tube-worm *Marifugia cavatica*, and the only non-American stygobiotic amphibian *Proteus anguinus*.

The Croatian National Coordinator's statement is that the work in Appendix 2 does not include all existing data for Croatia, regarding the previous research of Croatian hypogean biodiversity, therefore the image in Croatia represents a huge gap in data. The Albanian and Montenegrin National Coordinators made the statement that only information on the localities of caves could be collected, however this type of data is not compatible with the biodiversity target of cave biodiversity. No such data on cave biodiversity for Montenegro, Albania and Bosnia and Herzegovina exists.

In addition, all recent literature data about hypogean diversity, mainly for Croatia, which were not included in the study presented in Appendix II, were collected. In the table below the collected data for each location, the species described for the location, and the source of the data are presented. However, it was not possible to include those data in the analysis, since the overall number of species in each quadrant was not available. This parameter was considered as basic criteria for coleopteran hotspots.

The analysis revealed that hypogean diversity requires a more comprehensive and focused research in order to define realistic biodiversity hotspots, especially as the data for some DAE countries are inadequate.

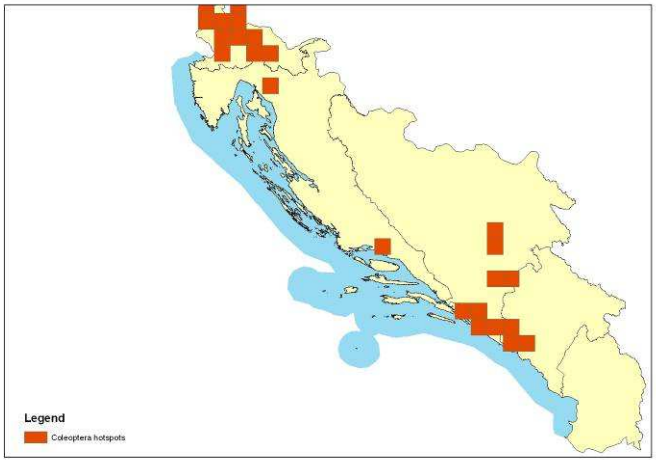


Figure 44: Distribution hypogean Coleoptera hotspots

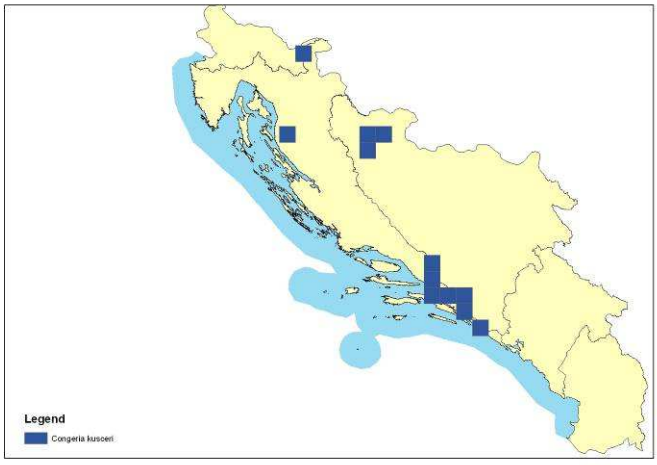


Figure 45: Distribution of *Congeria kusceri*

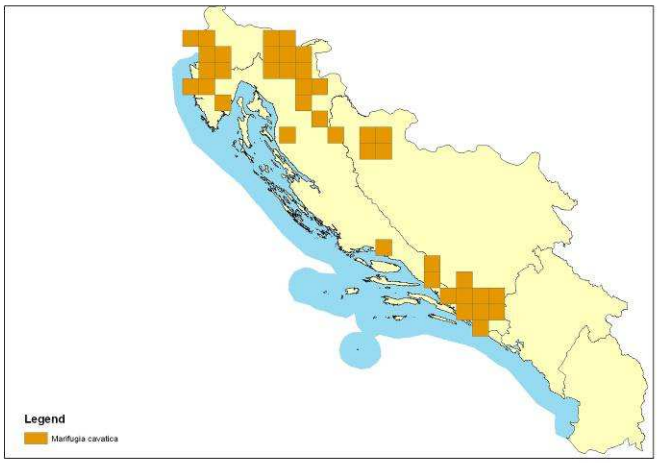


Figure 46: Distribution of *Marifuga cavatica*

Figure 47: Distribution of *Velkovrhia enigmatica*

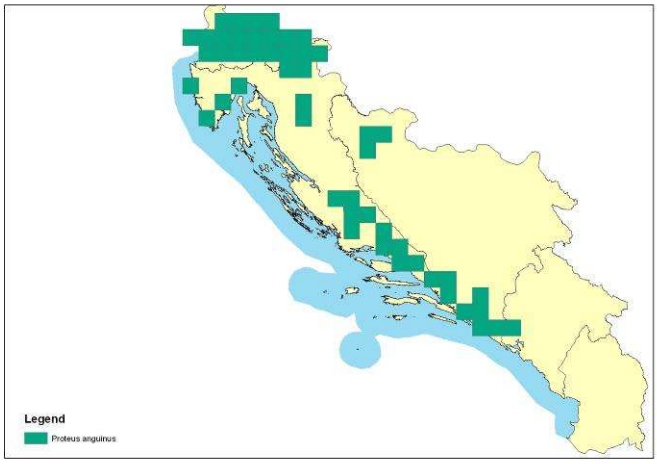


Figure 48: Distribution of *Proteus anguinus*

Table 7: New data for Hypogean biodiversity

Location: Croatia; Glogova jama/Sniježnica **Biodiversity data:** *Blattochaeta marianii kusijanovici* (Coleoptera) **Source:** VIT, S. & HLAVAČ, P., 2005: New cavernicolous ant-like beetle of the genus *Euconnus* (Subg. Tetramelus) from Croatia (Coleoptera:Scydmaenidae). Natura Croatica, 14(1): 29-38
Location: Croatia; Špilja u Radinovicima/Biokovo **Biodiversity data:** *Neolovricia ozimeci* (Coleoptera) **Source:** LAKOTA, J., JALŽIĆ, B. & MORAVEC, J., 2009: *Neolovricia ozimeci* n. gen. et n. sp., a new genus and new species of subterranean trechine carabid from Central Dalmatia (Coleoptera: Carabidae, Anillina) with notes on distribution of Lovricia aenigmatica, Natura Croatica, 18(1):1-13.
Location: Croatia; Jama Lovrićija II, Sv.Jure/Biokovo **Biodiversity data:** *Lovricia enigmatica* (Coleoptera) **Source:** LAKOTA, J., JALŽIĆ, B. & MORAVEC, J., 2009: *Neolovricia ozimeci* n. gen. et n. sp., a new genus and new species of subterranean trechine carabid from Central Dalmatia (Coleoptera: Carabidae, Anillina) with notes on distribution of Lovricia aenigmatica, Natura Croatica, 18(1):1-13.
Location: Croatia; Gospodska Špilja, Cetina/ Dinara **Biodiversity data:** *Lovricia jalzici* (Coleoptera) **Source:** LAKOTA, J., JALŽIĆ, B. & MORAVEC, J., 2009: *Neolovricia ozimeci* n. gen. et n. sp., a new genus and new species of subterranean trechine carabid from Central Dalmatia (Coleoptera: Carabidae, Anillina) with notes on distribution of Lovricia aenigmatica, Natura Croatica, 18(1):1-13.
Location: Croatia; Markov ponor, Lipovo polje, Sjeverni Velebit / Lika **Biodiversity data:** *Typhlotrechus bilimeki kiesenwetteri* (Coleoptera), *Leptodirus hochenwarti* (Coleoptera), *Congeria kusceri (*Phylogeographic relict) **Source:** JALŽIĆ, B., 2001: The first finding of a live stygobiont bivalve *Congeria* in the Lika region, Croatia. Natura Croatica, 10(3):213-220.
Location: Croatia; Lukina jama, Sjeverni Velebit / Lika **Biodiversity data:** *Congeria kusceri (*Phylogeographic relict) **Source**: JALŽIĆ, B., 2001: The first finding of a live stygobiont bivalve *Congeria* in

the Lika region, Croatia. Natura Croatica, 10(3):213-220.
Location: Croatia; Male Ponte jama/ Mljet **Biodiversity data:** *Bryaxis krilei* (Coleoptera) **Source:** HLAVAČ, P., 2008: A new cavernicolous species of the genus *Bryaxis* (Coleoptera: Staphylinidae: Pselaphinae) from the island of Mljet, Natura Croatica, 17/1: 1-8, Zagreb
Location: Croatia; Cerovačke Špilje / Gračačko polje **Biodiversity data:** *Redensekia likana likana* (Coleoptera), *Redensekia likana kosiniensis* (Coleoptera), *Parapropus sericeus augustae* (Coleoptera), *Typhlotrechus bilimeki kiesenwetteri* (Coleoptera), *Laemostenus cavicola caicola* (Coleoptera), *Laemostenus elongatus elongatus* (Coleoptera), *Machaerites sp.* (Coleoptera), *Troglophilus cavicola* (Coleoptera) **Source:** BRALIĆ, I., (ed.), 2007. Cerovačke Špilje. Vodič. Javna ustanova "Park prirode Velebit"
Location: Croatia; Jama Torak/Nacionalni park Krka **Biodiversity data:** *Marifugia cavatica* (Phylogeographic relict) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Trišića jama/Nacionalni park Krka **Biodiversity data:** *Neotrechus ganglbaueri* (Coleoptera), *Laemostenus cavicola* (Coleoptera), *Speleobates novaki* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Lalići/Nacionalni park Krka **Biodiversity data:** *Neotrechus ganglbaueri* (Coleoptera), *Speleobates novaki* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka»,

Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Kistanje/Nacionalni park Krka **Biodiversity data:** *Neotrechus ganglbaueri* (Coleoptera), *Speleobates novaki* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; jama Spaskraljica/Nacionalni park Krka **Biodiversity data:** *Neotrechus ganglbaueri* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Laškovica/Nacionalni park Krka **Biodiversity data:** *Neotrechus ganglbaueri* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Miljacka II/Nacionalni park Krka **Biodiversity data:** *Laemostenus cavicola* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Drenovaća jama/Nacionalni park Krka **Biodiversity data:** *Speleobates novaki* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska

fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Bićine/Nacionalni park Krka **Biodiversity data:** *Speleobates novaki* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Martina jama/Nacionalni park Krka **Biodiversity data:** *Speleobates novaki* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Skradin/Nacionalni park Krka **Biodiversity data:** *Speleobates novaki* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Vrulja/Nacionalni park Krka **Biodiversity data:** *Phaneropella lesinae* (Coleoptera) **Source:** JALŽIĆ, B., OZIMEC, R., BEDEK, J., HAMIDOVIĆ, D., SLAPNIK, R., FRANIČEVIĆ, M, LUKIĆ, M., BILANDŽIJA H., PAVLEK, M., 2007: Špiljska fauna Nacionalnog parka Krka, Simpozij rijeka Krka i Nacionalni park «Krka», Prirodna i kulturna baština, zaštita i održivi razvitak, Zbornik radova:491-506, Šibenik
Location: Croatia; Bezgovačka jama/Brač **Biodiversity data:** *Euconnus (Tetramelus) bazgoviensis* (Coleoptera) **Source:** VIT, S. & HLAVAČ, P., 2005: New cavernicolous ant-like beetle of the genus *Euconnus* (Subg. Tetramelus) from Croatia (Coleoptera:Scydmaenidae). Natura

Croatica, 14(1): 29-38
Location: Croatia; Zagorska peć, Ogulin **Biodiversity data:** *Machaerites jurinaci* (Coleoptera) **Source:** PAVIĆEVIĆ, D. & OZIMEC, R., 2008: Three new species of the genus *Machaerites* L. Miller, 1855 (Staphylinidae, Pselaphinae) from Croatia, Advances in the studies of the fauna of the Balkan Peninsula-Papers dedicated to the memory of Guido Nonveiller, Institute for Nature conservation of Serbia, 22:281-290, Belgrade
Location: Croatia; Pit Staje, Mune, Ćićarija **Biodiversity data:** *Machaerites kastavensis* (Coleoptera) **Source:** PAVIĆEVIĆ, D. & OZIMEC, R., 2008: Three new species of the genus *Machaerites* L. Miller, 1855 (Staphylinidae, Pselaphinae) from Croatia, Advances in the studies of the fauna of the Balkan Peninsula-Papers dedicated to the memory of Guido Nonveiller, Institute for Nature conservation of Serbia, 22:281-290, Belgrade
Location: Croatia; cave Orlovac, Majorija, Senj **Biodiversity data:** *Machaerites nehaji* (Coleoptera) **Source:** PAVIĆEVIĆ, D. & OZIMEC, R., 2008: Three new species of the genus *Machaerites* L. Miller, 1855 (Staphylinidae, Pselaphinae) from Croatia, Advances in the studies of the fauna of the Balkan Peninsula-Papers dedicated to the memory of Guido Nonveiller, Institute for Nature conservation of Serbia, 22:281-290, Belgrade
Location: Croatia; jama samograd, Račišče/Korčula **Biodiversity data:** *Nonveilleria romani* (Coleoptera) **Source:** PAVIĆEVIĆ, D. & BESUCHET C. 2003. Bythinini troglobie des Balkans; un genre nouveau et deux espèces nouvelles (Coleoptera Staphylinidae Pselaphinae). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 76: 279-285.
Location: Croatia; jama Brizićeva, Smrekovac, Šverda/Gorski kotar **Biodiversity data:** *Leptodirus hochenwarti* (Coleoptera) **Source:** OZIMEC, R., 2005: Preliminarna biospeleološka analiza područja Šverde, Zapadni Gorski kotar, Primorsko-goranska županija, Hrvatska, Subterranea Croatica, 5:15-20, Karlovac
Location: Croatia; jama Daždeland, Brestice, Šverda/Gorski kotar **Biodiversity data:** *Parapropus sericeus* (Coleoptera), *Otiorinchus sp.* (Coleoptera) **Source:** OZIMEC, R., 2005: Preliminarna biospeleološka analiza područja Šverde,

Zapadni Gorski kotar, Primorsko-goranska županija, Hrvatska, Subterranea Croatica, 5:15-20, Karlovac
Location: Croatia; jama s 3 škulje, Blatna draga, Šverda/Gorski kotar **Biodiversity data:** *Parapropus sericeus* (Coleoptera), *Astragobius angustatus* (Coleoptera), *Anophthalmus sp.* (Coleoptera) **Source:** OZIMEC, R., 2005: Preliminarna biospeleološka analiza područja Šverde, Zapadni Gorski kotar, Primorsko-goranska županija, Hrvatska, Subterranea Croatica, 5:15-20, Karlovac
Location: Croatia; jama tri ledene suze majke božje, Smrekovac, Blatna draga, Šverda/Gorski kotar **Biodiversity data:** Curculionidae (Coleoptera), Chrysomelidae (Coleoptera) **Source:** OZIMEC, R., 2005: Preliminarna biospeleološka analiza područja Šverde, Zapadni Gorski kotar, Primorsko-goranska županija, Hrvatska, Subterranea Croatica, 5:15-20, Karlovac
Location: Croatia; Bržnica jama, Blatna draga, Šverda/Gorski kotar **Biodiversity data:** *Spelaeodromus sp.* (Coleoptera) **Source:** OZIMEC, R., 2005: Preliminarna biospeleološka analiza područja Šverde, Zapadni Gorski kotar, Primorsko-goranska županija, Hrvatska, Subterranea Croatica, 5:15-20, Karlovac
Location: Croatia; Jama pušak svijeta, Smrekovac, Šverda/Gorski kotar **Biodiversity data:** *Astragobius angustatus* (Coleoptera), *Prospelaeobates brelihi* (Coleoptera) **Source:** OZIMEC, R., 2005: Preliminarna biospeleološka analiza područja Šverde, Zapadni Gorski kotar, Primorsko-goranska županija, Hrvatska, Subterranea Croatica, 5:15-20, Karlovac
Location: Croatia; Markova jama, Tar/Istra **Biodiversity data:** *Pauperobythus globuliventris* (Coleoptera) **Source:** NONVEILLER G., PAVIĆEVIĆ D. & OZIMEC R. 2002: Description d'un nouveau Psélaphide cavernicole d'Istrie (Croatie): *Pauperobythus globuliventris* g. nov., n. sp. (Coleoptera, Pselaphinae, Bythinini). *Bulletin de la Société entomologique de France,* 107 (1): 13-18
Location: Croatia; mt. Brisa, Biokovo **Biodiversity data:** *Dalmatoreicheia janaki* (Coleoptera)

Source: MAGRINI, P. & BULIRSCH, P., 2005: Un nuovo genere, un nuovo sottogenere e due nuove specie di Scaritini anoftalmi della regione Adriatica Orientale, Quad. Studi Nat. Romagna, 20:83-99

Location: Bosnia and Herzegovina; Vjeternica, Trebinje

Biodiversity data: *Congeria kusceri (*Phylogeographic relict), *Marifugia cavatica* (Phylogeographic relict), 11 species of beetles (Coleoptera)

Source: LULIĆ, I., BAKŠIĆ, D., MULAOMEROVIĆ, J., & OZIMEC, R. 2005 : Recent research into Vjetrenica cave (Bosnia-Herzegovina) and the current view of the cave its candidature for the World Heritage List. In: Proceedings of the 14th International Congress of Speleology: 21-28 August 2005, Athens, Kalamos, Hellas.

Location: Bosnia and Herzegovina; Vran mt.

Biodiversity data: *Leonhardia hilfi ssp hilfi* (Coleoptera)

Source: NONVEILLER G., PAVIĆEVIĆ D., RAĐA T. & VUJCIC-KARLO, S. 2002: A new species of the genus Leonhardia Ritter, 1901 from Herzegovina (Coleoptera, Leiodidae, Cholevinae, Leptodirini)). *Revue Francaise D'Entomologie,* 24 (4): 165-168.

Location: Bosnia and Herzegovina; Plasa mt.

Biodiversity data: *Leonhardia hilfi ssp. robusta* (Coleoptera)

Source: NONVEILLER G., PAVIĆEVIĆ D., RAĐA T. & VUJCIC-KARLO, S. 2002: A new species of the genus Leonhardia Ritter, 1901 from Herzegovina (Coleoptera, Leiodidae, Cholevinae, Leptodirini)). *Revue Francaise D'Entomologie,* 24 (4): 165-168.

Location: Bosnia and Herzegovina; Žepče

Biodiversity data: *Leonhardia reitteri ssp. reitteri* (Coleoptera)

Source: NONVEILLER G., PAVIĆEVIĆ D., RAĐA T. & VUJCIC-KARLO, S. 2002: A new species of the genus Leonhardia Ritter, 1901 from Herzegovina (Coleoptera, Leiodidae, Cholevinae, Leptodirini)). *Revue Francaise D'Entomologie,* 24 (4): 165-168.

Location: Bosnia and Herzegovina; Ledenica, Vlašić mt.

Biodiversity data: *Leonhardia reitteri ssp. reitteri* (Coleoptera)

Source: NONVEILLER G., PAVIĆEVIĆ D., RAĐA T. & VUJCIC-KARLO, S. 2002: A new species of the genus Leonhardia Ritter, 1901 from Herzegovina (Coleoptera, Leiodidae, Cholevinae, Leptodirini)). *Revue Francaise D'Entomologie,* 24 (4): 165-168.

Location: Bosnia and Herzegovina; Koričani, Vlašić mt. **Biodiversity data:** *Leonhardia reitteri ssp. mersa* (Coleoptera) **Source:** NONVEILLER G., PAVIĆEVIĆ D., RAĐA T. & VUJCIC-KARLO, S. 2002: A new species of the genus Leonhardia Ritter, 1901 from Herzegovina (Coleoptera, Leiodidae, Cholevinae, Leptodirini)). *Revue Francaise D'Entomologie,* 24 (4): 165-168.
Location: Bosnia and Herzegovina; Gole mt, Jajce **Biodiversity data:** *Leonhardia reitteri ssp. zarquieyi* (Coleoptera) **Source:** NONVEILLER G., PAVIĆEVIĆ D., RAĐA T. & VUJCIC-KARLO, S. 2002: A new species of the genus Leonhardia Ritter, 1901 from Herzegovina (Coleoptera, Leiodidae, Cholevinae, Leptodirini)). *Revue Francaise D'Entomologie,* 24 (4): 165-168.
Location: Bosnia and Herzegovina; Kruščica mt., Ilidža **Biodiversity data:** *Leonhardia droveniki* (Coleoptera) **Source:** NONVEILLER G., PAVIĆEVIĆ D., RAĐA T. & VUJCIC-KARLO, S. 2002: A new species of the genus Leonhardia Ritter, 1901 from Herzegovina (Coleoptera, Leiodidae, Cholevinae, Leptodirini)). *Revue Francaise D'Entomologie,* 24 (4): 165-168.
Location: Bosnia and Herzegovina; jama na Paklinama, Tomislavgrad **Biodiversity data:** *Leonhardia delminiumica* (Coleoptera) **Source:** NONVEILLER G., PAVIĆEVIĆ D., RAĐA T. & VUJCIC-KARLO, S. 2002: A new species of the genus Leonhardia Ritter, 1901 from Herzegovina (Coleoptera, Leiodidae, Cholevinae, Leptodirini)). *Revue Francaise D'Entomologie,* 24 (4): 165-168.
Location: Montenegro; Golubija šilja/Virpazar **Biodiversity data:** *Pseudamaurops calcaratus* (Coleoptera) **Source:** NONVEILLER, G. & PAVIĆEVIĆ, D. 2002 : Une nouvelle espèce de *Pseudamaurops* Jeannel, 1948 du Monténégro, et remarques sur les genres voisins (Coleoptera: Pselaphinae: Amauropini). *Annales de la Société entomologique de France* (n.s.) 38(4): 435-442.
Location: Montenegro; jama pri kraju Budos, Nikšić **Biodiversity data:** *Nonveilleria lepida* (Coleoptera)

Source: PAVIĆEVIĆ, D. & BESUCHET C. 2003. Bythinini troglobie des Balkans; un genre nouveau et deux espèces nouvelles (Coleoptera Staphylinidae Pselaphinae). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 76: 279-285.
Location: Montenegro; Kameno more, Knezlaz, Krivošije **Biodiversity data:** *Bryaxis tuberculiceps* (Coleoptera) **Source:** NONVEILLER G., PAVIĆEVIĆ D. & BESUCHET C. 2003. *Bryaxis tuberculiceps* sp. nov., Pselaphide cavernicole du Monténégro (Coleoptera, Staphylinidae, Pselaphinae). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 76:287-291.
Location: Montenegro; Lovčen (700m.n.m.v) **Biodiversity data:** *Reicheadella (Chaetomargoreicheia) lakotai* (Coleoptera) **Source:** MAGRINI, P. & BULIRSCH, P., 2005: Un nuovo genere, un nuovo sottogenere e due nuove specie di Scaritini anoftalmi della regione Adriatica Orientale, Quad. Studi Nat. Romagna, 20:83-99

2.1.4. Species

This biodiversity target involves only vertebrates, i.e. a group with reasonably well known distributional ranges. Species having particular conservation importance for the region, which means that they are included in national and IUCN red lists or they are considered particularly threatened, were considered. In the analysis species which are not listed as threatened, but with particular biogeographical importance for the region – i.e. species with their only European range in the Balkans or endemic species, were also included. Widespread European species were excluded from analysis. Earlier studies showed (Krystufek, B., Kletečki, E. 2007) that islands are rapidly losing species richness as a function of declining surface area, consequently only the largest islands are considered. Besides, none of the Adriatic islands contain endemic species. Distribution maps have been modeled considering preferred habitat (based on CORINE classes) and altitude. Modeled ranges were overlapped subsequently to discern hotspots in species richness for particular taxonomic groups. In the subsequent text, Dinaric endemics (>80 % of the range within the Dinaric Arc Ecoregion as defined for purpose of the WWF project) are indicated by an asterisk (*).

2.1.4.1. Small Terrestrial Mammals

Small terrestrial mammals frequently have small ranges, a restricted dispersal and high habitat specificity. Earlier studies (Krystufek & Griffiths, 1999) showed that major species turnover in the Dinaric mountains occurs at approximately 800-100 m above sea level. 30 species belonging to two orders, Soricomorpha and Rodentia, were considered: *Sorex araneus, S. minutus, S. alpinus, Neomys fodiens, N. anomalus, Crocidura leucodon, Suncus etruscus, Talpa europaea, T. caeca, T. stankovici, Myodes glareolus, Dinaromys bogdanovi*, Microtus arvalis, M. agrestis, M. liechtensteini, M. subterraneus, M. savii, M. thomasi, Chionomys nivalis, Arvicola terrestris, Spalax leucodon, Micromys minutus, Apodemus epimelas, A. flavicollis, A. agrarius, Mus spicilegus, Dryomys nitedula, Eliomys quercinus* and *Muscardinus avellanarius* (Figures 51 - 77).

Data of distribution ranges were obtained from literature (Petrov, 1992).

Modeled range shapes of small terrestrial mammal species were overlaid to define areas of the highest species richness. The study area was divided into 22.012 not-overlapping hexagons of 5 km^2 (each hexagon width being 2,75 km). Each species was found to be present in the unit, if the unit overlaid the range. Hotspots were defined as hexagons with high species densities, the cut-off point being the upper quartile (the top 25 % hexagons). The hotspot analysis resulted in a map showing the hexagons with the highest small terrestrial mammal species richness. Furthermore, all protected areas were excluded from the hotspot range to identify major gaps.

Figure 49: Small terrestrial mammals' hotspots. Isolated upper quartile units represent top hotspots in small terrestrial mammals' species richness

Areas of particular richness for small terrestrial mammals are found to be mainly in the mountainous inland. These areas are: the Dinaric Range in Slovenia, the Gorjanci – Žumberak Mountains, the Gorski Kotar area, northern Lika, the mountainous area the Dinara Range, the central mountain range in Bosnia and Herzegovina, the northern mountainous area of Montenegro and the Albanian mountain range.

Figure 50: Small terrestrial mammals' hotspot gaps

Significant gaps were found in the eastern and southern parts of Slovenia. While the Croatian part of the Žumberak – Gorjanci Mountains were found to be adequately covered by the current PA system, the Slovenian part remains completely uncovered.

Gaps were found in northern Croatia. In the region of Gorski Kotar, small terrestrial mammal species were found to be inadequately covered with PAs. There are no PAs in the Dinara mountain range.

In Bosnia and Herzegovina, the areas with the highest diversity remain almost completely unprotected.

Significant gaps also occur in Montenegro, especially where the mountainous area in the northern part of the country was found to be inadequately covered. The area between the Durmitor mountains and the border with Albania is almost completely lacking in PAs. The recently established National Park Prokletije will partially fill this gap.

In Albania, gaps were found in the entire mountainous area. Existing PAs do not adequately cover areas with the highest diversity of small terrestrial mammal species.

Species	**Endemic dinaric**	**IUCN classification**
Sorex araneus	no	LC

Species	**Endemic dinaric**	**IUCN classification**
Sorex alpinus	no	NT

Species	Endemic dinaric	IUCN classification
Sorex minutus	no	LC

Species	Endemic dinaric	IUCN classification
Neomys fodiens	no	LC

Species	Endemic dinaric	IUCN classification
Neomys anomalus	no	LC

Species	Endemic dinaric	IUCN classification
Suncus etruscus	no	LC

Species	Endemic dinaric	IUCN classification
Talpa europaea	no	LC

Species	Endemic dinaric	IUCN classification
Talpa caeca	no	LC

Species	Endemic dinaric	IUCN classification
Talpa stankovici	no	LC

Species	Endemic dinaric	IUCN classification
Dinaromys bogdanovi	yes	VU

Species	Endemic dinaric	IUCN classification
Myodes glareolus	no	LC

Species	Endemic dinaric	IUCN classification
Arvicola terrestris	no	LC

Species	Endemic dinaric	IUCN classification
Microtus arvalis	no	LC

Species	Endemic dinaric	IUCN classification
Microtus agrestis	no	LC

Species	Endemic dinaric	IUCN classification
Microtus subterraneus	no	LC

Species	Endemic dinaric	IUCN classification
Microtus liechtensteini	no	LC

Species	Endemic dinaric	IUCN classification
Microtus thomasi	no	LC

Species	Endemic dinaric	IUCN classification
Chionomy nivalis	no	LC

Species	Endemic dinaric	IUCN classification
Apodemus agrarius	no	LC

Species	Endemic dinaric	IUCN classification
Apodemus flavicollis	no	LC

Species	Endemic dinaric	IUCN classification
Apodemus epimelas	no	LC

Species	Endemic dinaric	IUCN classification
Micromys minutus	no	LC

Species	Endemic dinaric	IUCN classification
Mus spicilegus	no	LC

Species	Endemic dinaric	IUCN classification
Spalax leucodon	no	LC

Species	Endemic dinaric	IUCN classification
Muscardinus avellanarius	no	LC

Species	Endemic dinaric	IUCN classification
Dryomys nitedula	no	LC

Species	Endemic dinaric	IUCN classification
Eliomys quercinus	no	NT

2.1.4.2. 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. Main threats are represented by loss and degradation of habitats. Important threats are represented also by overharvesting, persecution and collisions with vehicles. The introduction of alien species is also a significant threat for some species.

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 Balkans than elsewhere.

At the beginning 33 species of turtles, lizards and snakes were considered: *Testudo hermanni, Mauremys rivulata, Pseudapus apodus, Tarentola mauritanica, Hemidactylus turcicus, Ablepharus kitaibelli, Algyroides nigropunctatus*, Iberolacerta horvathi, Dinarolacerta mosorensis*, D. montenegrina*, Lacerta bilineata, L. trilineata, L. viridis, L. agilis, Dalmatolacerta oxycephala*, Podarcis erhardii, P.melisellensis*, P. muralis, P. sicula, P. taurica, Zootoca vivipara, Typhlops vermicularis, Vipera aspis, V. ursinii, V. berus, Zamenis situla, Dolichopis caspius, Platyceps najadum, Elaphe quatuorlineata, Malpolon monspessulanus, Telescopus fallax, Hierophis gemonensis* and *H. viridiflavus* (Figures 80-107).

Tarentola mauritanica was found to be an alohtone species for the fauna of Croatia and Slovenia, therefore of no influence on the regional biodiversity. There are no data for *Vipera aspis* in Croatia, and only one data for Slovenia, outside the DAE part of the country. Therefore, the two species were excluded from further analysis.

Data of distribution ranges were obtained from literature (Böhme & al., 1999, Böhme & al., 2001, Böhme & al., 2005, Janev-Hutinec & al., 2006) and the IUCN Red List.

The modeled range shapes of reptile species were overlayed to define areas of the highest species richness. The study area was divided into 22,012 not-overlapping hexagons of 5 km^2 (each hexagon width is 2,75 km). Each species was found to be present in the unit, if the unit overlayed the range. Hotspots were defined as hexagons with high species densities, the cut-off point being the upper quartile (the top 25 % hexagons). The hotspot analysis resulted in a map showing the hexagons with the highest reptile species richness. Furthermore, all protected areas were excluded from the hotspot range to identify major gaps.

Figure 78: Reptile hotspots. Isolated upper quartile units represent top hotspots in reptile species richness

The significance of the western Balkans (i.e. the Dinaric Arc Ecoregion) for reptiles has been emphasized. The most significant hotspot in reptile species richness was found to be in the coastal Adriatic area, influenced by the warm and dry Mediterranean climate. The diversity of reptile species must also be attributed to the geographical position of the region, between the western Mediterranean, the Alps and the Eastern Balkans.

Figure 79: Reptile hotspot gaps.

Gaps were found to be equally distributed along the coast. Only some areas of continental Croatia (i.e. Velebit, Protected Areas of Central Dalmatia), and the lowlands of Montenegro and Albania seem adequately covered. However, lowlands of Montenegro and Albania are mainly represented by bodies of water (lakes and coastal lagoons), habitats where reptile diversity should not be as high as represented. Therefore, those areas are not as well covered with PAs as one might suppose from the map. The great majority of islands resulted as gaps.

Species	**Endemic dinaric**	**IUCN classification**
Testudo hermanni	no	LR/nt

Species	**Endemic dinaric**	**IUCN classification**
Mauremys rivulata	no	-

Species	Endemic dinaric	IUCN classification
Pseudopus apodus	no	-

Species	Endemic dinaric	IUCN classification
Hemidactylus turcicus	no	LC

Species	Endemic dinaric	IUCN classification
Ablepharus kitaibelli	no	LC

Species	Endemic dinaric	IUCN classification
Algyroides nigropunctatus	yes	LC

Species	Endemic dinaric	IUCN classification
Iberolacerta horvathi	no	NT

Species	Endemic dinaric	IUCN classification
Lacerta trilineata	no	LC

Species	Endemic dinaric	IUCN classification
Lacerta viridis	no	LC

Species	Endemic dinaric	IUCN classification
Lacerta bilineata	no	LC

Species	Endemic dinaric	IUCN classification
Lacerta agilis	no	-

Species	Endemic dinaric	IUCN classification
Dinarolacerta mosorensis	yes	VU

Species	Endemic dinaric	IUCN classification
Dinarolacerta montenegrina	yes	-

Species	Endemic dinaric	IUCN classification
Dalmatolacerta oxycephala	yes	LC

Species	Endemic dinaric	IUCN classification
Podarcis erhardii	no	LC

Species	Endemic dinaric	IUCN classification
Podarcis melisellensis	yes	LC

Species	Endemic dinaric	IUCN classification
Podarcis muralis	no	LC

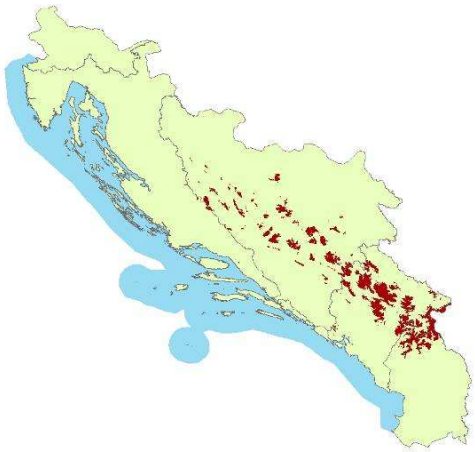
Species	Endemic dinaric	IUCN classification
Podarcis sicula	no	LC

Species	Endemic dinaric	IUCN classification
Podarcis taurica	no	LC

Species	Endemic dinaric	IUCN classification
Zootoca vivipara	no	LR/lc

Species	Endemic dinaric	IUCN classification
Vipera berus	no	LC

Species	Endemic dinaric	IUCN classification
Vipera ursinii	no	EN



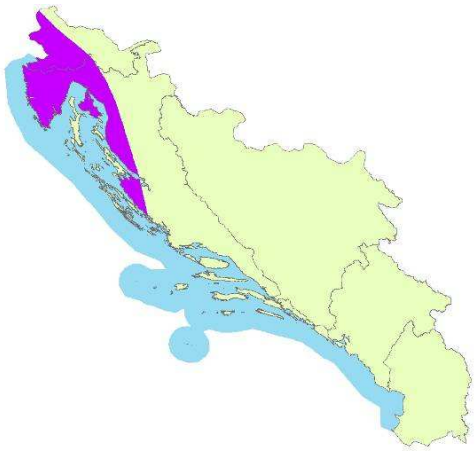
Species	Endemic dinaric	IUCN classification
Elaphe quatuorlineata	no	NT

Species	Endemic dinaric	IUCN classification
Zamenis situla	no	LC

Species	Endemic dinaric	IUCN classification
Dolichopis caspius	no	-

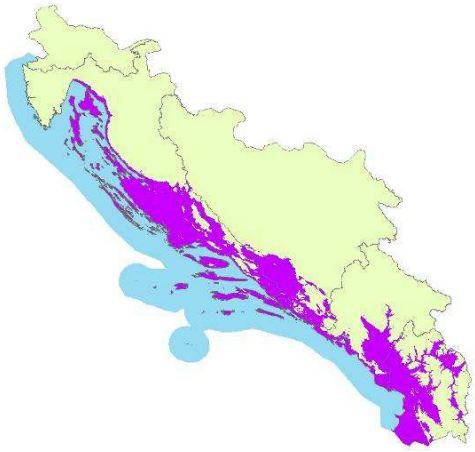
Species	Endemic dinaric	IUCN classification
Hierophis gemonensis	no	LC

Species	Endemic dinaric	IUCN classification
Hierophis viridiflavus	no	LC

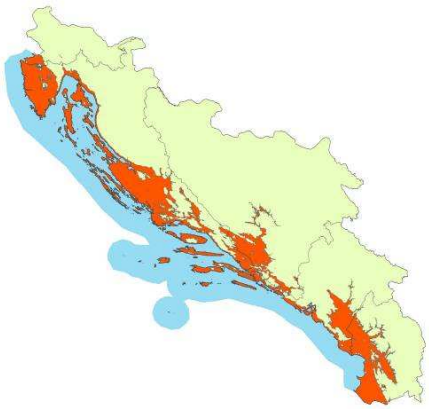


Species	Endemic dinaric	IUCN classification
Platyceps najadum	no	LC

Species	Endemic dinaric	IUCN classification
Malpolon monspessulanus	no	LC



Species	Endemic dinaric	IUCN classification
Telescopus fallax	no	LC



2.1.4.3. Amphibians

The species richness of amphibians depends on the humidity of the habitats, consequently their biodiversity pattern is completely different from that of reptiles.

Within countries of the Mediterranean basin, 115 of amphibian species can be found, a much higher number than in central and northern Europe. 64 % of species were found to be endemic and 28,7 % are threatened with extinction.

The main threat is represented by the loss and degradation of habitats. An important negative effect is felt upon the introduction of an alien species. In some areas harvesting still has a considerable negative impact on amphibian populations (especially green frogs). There is a risk that the disease chytridiomycosis could become a serious threat for amphibians of the region, particularly in relation to global warming.

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 density of species were 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.

14 species of salamanders, newts and tailless amphibians were considered: *Bombina bombina, Hyla arborea, Rana arvalis, R. temporaria, R. latastei, R. graeca, Pelophylax esculenta, P. kurtmuelleri, P. ridibunda, P.lessonae, P. shqiperica, Salamandra atr, Triturus alpestris* and *T. carnifex* (Figures 110 - 123). *Proteus anguinus** was considered among cave biodiversity targets.

After modeling, the species *Bombina bombina* was found outside the DAE borders, therefore the target was left out of the analysis.

Data of distribution ranges were obtained from literature (Janev-Hutinec & al., 2006) and the IUCN Red List.

Modeled range shapes of amphibian species were overlayed to define areas of the highest species richness. The study area was divided into 22,012 not-overlapping hexagons of 5 km^2 (each hexagon width being 2,75 km). Each species was found to be present in the unit, if the unit overlayed the range. Hotspots were defined as hexagons with high species densities, the cut-off point being the upper quartile (the top 25 % hexagons). The hotspot analysis resulted in a map showing the hexagons with the highest amphibian species richness. Furthermore, all protected areas were excluded from the hotspot range to identify major gaps.

Figure 108: Amphibian hotspots. Isolated upper quartile units represent top hotspots in amphibian species richness

As previously mentioned, areas with the greatest diversity of amphibian species are found in areas with higher humidity. In the DAE those areas are found to be in the central Dinaric part of Slovenia, in northern Croatia and in the mountainous area from eastern Bosnia and Herzegovina, through Montenegro and Albania.

Figure 109: Amphibian hotspot gaps.

As shown in the maps, gaps can be considered equally distributed in all countries. Since amphibians are strictly confined to surface water bodies, and as being aware that surface water is rare on the prevalently karstic area, it has to be considered that this group is particularly threatened. The great majority of water bodies that are adequate for the reproduction of amphibians are man-made. In the past, such ponds were used for watering domestic animals. Today, with the abandonment of traditional agricultural practises, such habitats are disappearing.

Other habitats suitable for this target are humid lowlands and karstic poljes, which were mainly designated for agricultural use in the past.

Mediterranean lakes in Montenegro and Albania can be considered adequately covered with PAs.

Species	**Endemic dinaric**	**IUCN classification**
Hyla arborea	no	LC

Species	**Endemic dinaric**	**IUCN classification**
Rana arvalis	no	LC

Species	Endemic dinaric	IUCN classification
Rana temporaria	no	LC

Species	Endemic dinaric	IUCN classification
Rana latastei	no	VU

Species	Endemic dinaric	IUCN classification
Rana graeca	no	LC

Species	Endemic dinaric	IUCN classification
Pelophylax esculenta	no	LC

Species	Endemic dinaric	IUCN classification
Pelophylax ridibunda	no	LC

Species	Endemic dinaric	IUCN classification
Pelophylax lessonae	no	LC

Species	Endemic dinaric	IUCN classification
Pelophylax kurtmuelleri	no	LC

Species	Endemic dinaric	IUCN classification
Pelophylax shqiperica	no	EN

Species	Endemic dinaric	IUCN classification
Salamandra atra	no	LC

Species	Endemic dinaric	IUCN classification
Triturus alpestris	no	LC

Species	Endemic dinaric	IUCN classification
Triturus carnifex	no	LC

2.1.4.4. Birds

Surprisingly, no detailed maps of nesting birds are available for the Dinaric Arc Ecoregion. An expert opinion on the importance of Karst poljes and waterbird conservation was brought in as a partner contribution to the DAE by EURONATUR (B.Štumberger; see attached as an annex to this report). Consequently, this target is defined by areas important for birds during migration and nesting. In addition, Important Bird Areas (IBA) database (BirdLife International database) was included for Albania, Bosnia and Herzegovina and Montenegro, for Slovenia a database of existing Specially Protected Areas (SPA) and in Croatia a database of proposed SPAs was used. Livanjsko Polje in Bosnia and Herzegovina which is designated as a Ramsar site was also included. Additionally, a gap analyses of defined bird areas was undertaken by matching those areas with existing PAs. Data were obtained from NSCs.

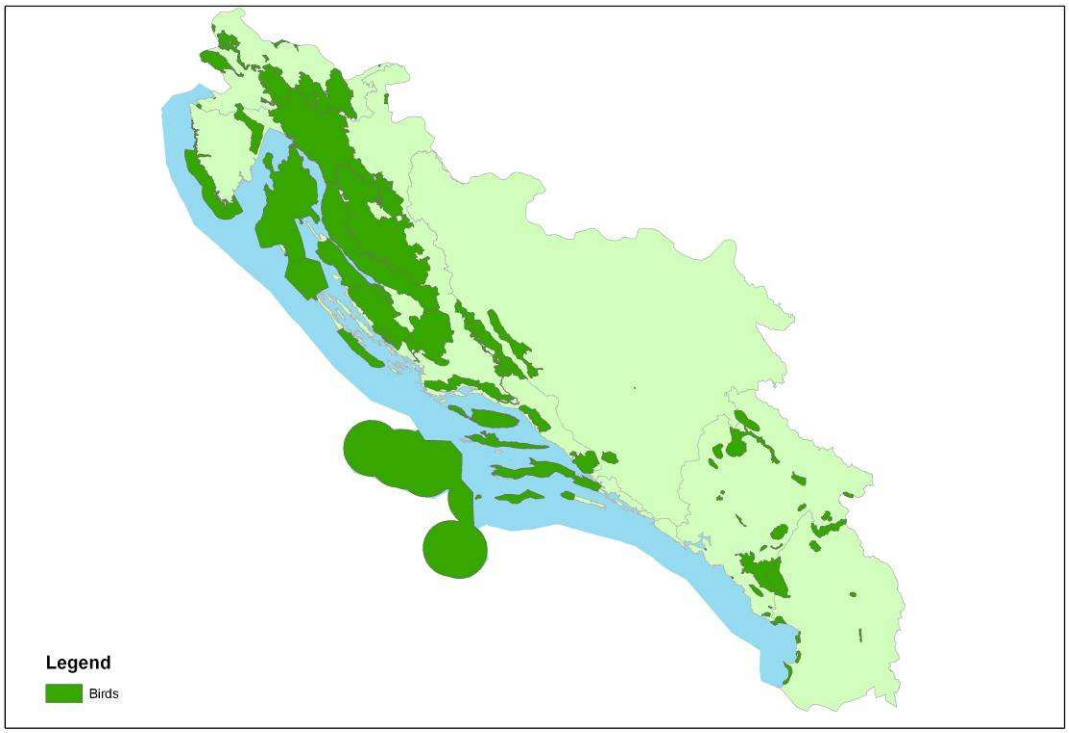


Figure 124: Important Bird Areas (IBA), Specially Protected Areas (SPA) and Ramsar sites in the DAE

Table 8: List of Important Bird Areas, Specially Protected Areas an Ramsar sites.

Country	Area Name	Category	Shape area (km^2)
Albania	Prokletije	IBA	7.46
Albania	Marash mountains	IBA	13.76
Albania	Lalzi Bay	IBA	48.29
Albania	Thethi	IBA	47.91
Albania	Lura	IBA	12.60
Albania	Patoku lagoon	IBA	22.17
Albania	Lake Shkodra	IBA	268.24
Albania	Velipoja	IBA	37.21
Albania	Drini Delta	IBA	22.83
Bosnia and Herzegovina	Boračko jezero	IBA	0.72
Bosnia and Herzegovina	Hutovo blato	IBA	87.96
Bosnia and Herzegovina	Livanjsko polje	RAMSAR	408.03
Croatia	Akvatorij zapadne Istre	SPA	816.09
Croatia	Cetina	SPA	234.41
Croatia	Delta Neretve	SPA	248.45
Croatia	Dinara	SPA	542.72
Croatia	Gorski kotar, Primorje i sjeverna Lika	SPA	2,728.07
Croatia	Krka i okolni plato	SPA	1,104.97
Croatia	Kvarnerski otoci	SPA	2,664.52
Croatia	Lastovsko otočje	SPA	195.76
Croatia	Lička krška polja	SPA	2784.08

Croatia	Mosor, Kozjak i Trogirska zagora	SPA	463.22
Croatia	Nacionalni park Kornati i Park prirode Telašćica	SPA	286
Croatia	Nacionalni park Mljet	SPA	52.87
Croatia	Nacionalni park Plitvička jezera (s Vrhovinskim poljem)	SPA	314.64
Croatia	Park prirode Biokovo	SPA	195.33
Croatia	Pokupski bazen	SPA	19.24
Croatia	Pučinski otoci	SPA	6,293.88
Croatia	Ravni kotari	SPA	1,042.33
Croatia	Sjeverni dio zadarskog arhipelaga	SPA	755.45
Croatia	Sjeverozapadna Dalmacija i Pag	SPA	724.8
Croatia	Srednjedalmatinski otoci i Pelješac	SPA	1,411.05
Croatia	Učka i Ćićarija	SPA	311.26
Croatia	Velebit	SPA	2,064.37
Croatia	Vransko jezero i Jasen	SPA	59.08
Montenegro	Biogradska gora	IBA	57.58
Montenegro	Buljarica	IBA	2.17
Montenegro	Cijevna	IBA	12.34
Montenegro	Čemovsko polje	IBA	12.82
Montenegro	Delta Bojane	IBA	7.09
Montenegro	Dolina Zete	IBA potential	14.62
Montenegro	Durmitor	IBA	356.79
Montenegro	Golija	IBA potential	29.6
Montenegro	Hajla	IBA	9.92
Montenegro	Komovi	IBA potential	22.43
Montenegro	Kučke planine	IBA potential	110.63
Montenegro	Ljubišnja	IBA potential	114.97
Montenegro	Nikšićke akumulacije	IBA	18.23
Montenegro	Pivska visoravan	IBA potential	67.98
Montenegro	Plavsko jezero	IBA	9.31
Montenegro	Prokletije	IBA	156.17
Montenegro	Rumija	IBA	41.46
Montenegro	Sasko jezero	IBA	3.22
Montenegro	Skadarsko jezero	IBA	423.33
Montenegro	Tivatska solila	IBA	1.17
Montenegro	Ulcinjska solana	IBA	14.74
Montenegro	Visitor	IBA potential	29.48
Slovenia	Banjščice	SPA	11.17
Slovenia	Cerkniško jezero	SPA	33.64
Slovenia	Kočevsko - Kolpa	SPA	979.23
Slovenia	Krakovski gozd - Šentjernejsko polje	SPA	1.55
Slovenia	Kras	SPA	247.45
Slovenia	Ljubljansko barje	SPA	28.14
Slovenia	Nanoščica - porečje	SPA	19.45
Slovenia	Planinsko polje	SPA	10.44
Slovenia	Reka - dolina	SPA	16.54
Slovenia	Sečoveljske soline	SPA	8.2
Slovenia	Snežnik - Pivka	SPA	485.23
Slovenia	Škocjanski zatok	SPA	1.16
Slovenia	Trnovski gozd	SPA	115.56
Slovenia	Trnovski gozd in Nanos - južni rob	SPA	93.56

2.1.4.5. Freshwater Fish of the Adriatic Basin

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. The main threats are water pollution and 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. A very significant threat is represented by the introduction of alien species.

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 southwestern Iberian peninsula, northern Italy with western Slovenia, central and southern Dalmatia, some areas of central Greece, southwestern Turkey and in the Middle East.

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 DAE has been identified as particularly important in freshwater fish richness. Regionally areas of high freshwater fish richness have been identified in western Slovenia and in central Dalmatia and Herzegovina (Particularly the Krka and Neretva river systems). Within central Dalmatian rivers, particular attention must be paid to the Cetina river, the longest within Croatia's Adriatic basin rivers. The Cetina is situated within the Dalmatian centre of freshwater fish endemism. Because of its energy and water supply potential, it is considered the most exploited and therefore the most degraded river in Croatia.

Particularly spectacular is the evolutionary divergence in some cyprinid genera like Phoxinellus (10 endemic species), Telestes (4 endemics), Chondrostoms (3 endemics), Cobitis (3 endemics), Squalis (3 endemics) and Rutilus (2 endemics). Twenty-three species are listed in the IUCN Red list as endangered (categories VU, EN, CR), and a further two are already globally extinct (*Chondrostoma scodrense, Telestes ukliva*). No less than 57 fish species are evaluated as endangered (VU, EN, CR) on the Croatian red list, and two have already been declared extinct in the region.

45 species of which 34 endemic were considered. List of species (* endemic to the Dinaric Ecoregion and for the Adriatic basin): *Salaria fluviatilis, Cobitis bilineata*, C. narentana*, C. ohridana*, Aulopyge huegeli*, Barbus plebejus*, Chondrostoma genei*, C. knerii*, C. phoxinus*, Gobio benacensis*, Leuciscus svallize*, Pachychilon pictum*, Phoxinellus adspersus*, P. alepidotus*, P. croaticus*, P. dalmaticus*, P. frontalis*, P. ghetaldii*, P. jadovensis*, P. krbavensis*, P. metohiensis*, P. pseudalepidotus*, Rutilus aula*, R. basak*, R. karamani*, R. ohridanus, Scardinius dergle*, Squalius illyricus*, S. microlepis*, S. zrmanjae*, Telestes montenegrinus*, T. polylepis*, T. turskyi*, T. ukliva*, Aphanius fasciatus, Knapowitschia croatica*, K. mrakovcici*, K. radovici*, Padogobius bonelli*, Lethenteron zanandreai*, Salmo marmoratus*, S. visovacensis*, S. zrmanjensis** and *Salmothymus obtusirostris** (Figures 125 – 169).

Data of distribution ranges were obtained from literature (Mrakovčić & al., 2006) and the IUCN Red List.

Modeled range shapes of freshwater fish species were overlayed to define areas of highest species richness. The study area was divided into 22012 not-overlapping hexagons of 5 km^2 (each hexagon width being 2,75 km). Each species was found to be present in the unit, if the unit overlayed the range. Hotspots were defined as hexagons with high species densities, the cut-off point being the upper quartile (the top 25 % hexagons). The hotspot analysis resulted in a map showing the hexagons with highest freshwater fish species richness. Furthermore, all protected areas were excluded from the hotspot range to identify major gaps.

Figure 125: Fresh water fish of the Adriatic basin hotspots. Isolated upper quartile units represent top hotspots in Fresh water fish of the Adriatic basin richness

On the regional level, all the most important areas in fresh water fish diversity are under-represented within the current PA system. Northern and central parts of Dalmatia (Croatia) are particularly rich in freshwater fish and include the highest number of endemic fish species. As mentioned in the Gap Analysis chapter, the majority of species are inadequately covered with PAs. The area was found to be rather sensitive, since it is under heavy anthropogenic influence.

Hotspots in freshwater fish richness were identified in the southern parts of Bosnia and Herzegovina, which is not covered by the current PA system. Practically all freshwater fish species in Bosnia and Herzegovina were found to be either gaps or total gaps.

Hotspots were identified also in western Slovenia, where almost all freshwater fish species were found to be underrepresented within the current PA system.

A hotspot for freshwater fish is found in the western part of Montenegro, where only lake species are adequately covered by the current PA system, while river species are almost completely uncovered.

Species	Endemic dinaric	IUCN classification
Salaria fluviatilis	no	LC

Species	Endemic dinaric	IUCN classification
Cobitis bileneata	no	LC

Species	Endemic dinaric	IUCN classification
Cobitis dalmatina	yes	VU

Species	Endemic dinaric	IUCN classification
Cobitis narentana	yes	VU

Species	Endemic dinaric	IUCN classification
Cobitis ohridana	yes	LC

Species	Endemic dinaric	IUCN classification
Aulopyge huegeli	yes	EN

Species	Endemic dinaric	IUCN classification
Barbus plebejus	no	LC

Species	Endemic dinaric	IUCN classification
Chondrostoma genei	no	LC

Species	Endemic dinaric	IUCN classification
Chondrostoma knerii	yes	EN

Species	Endemic dinaric	IUCN classification
Chondrostoma phoxinus	yes	EN

Species	Endemic dinaric	IUCN classification
Gobio benacensis	no	EN

Species	Endemic dinaric	IUCN classification
Leuciscus svallize	yes	VU

Species	Endemic dinaric	IUCN classification
Pachychilon pictum	yes	LC

Species	Endemic dinaric	IUCN classification
Phoxinellus adspersus	yes	VU

Species	Endemic dinaric	IUCN classification
Phoxinellus alepidotus	yes	EN

Species	Endemic dinaric	IUCN classification
Phoxinellus croaticus	yes	EN

Species	Endemic dinaric	IUCN classification
Phoxinellus dalmaticus	yes	CR

Species	Endemic dinaric	IUCN classification
Phoxinellus fontinalis	yes	CR

Species	Endemic dinaric	IUCN classification
Phoxinellus ghetaldii	yes	EN

Species	Endemic dinaric	IUCN classification
Phoxinellus jadovensis	yes	CR

Species	Endemic dinaric	IUCN classification
Phoxinellus krbavensis	yes	CR

Species	Endemic dinaric	IUCN classification
Phoxinellus metohiensis	yes	VU

Species	Endemic dinaric	IUCN classification
Phoxinellus pseudalepidotus	yes	VU

Species	Endemic dinaric	IUCN classification
Rutilus aula	no	LC

Species	Endemic dinaric	IUCN classification
Rutilus basak	yes	LC

Species	Endemic dinaric	IUCN classification
Rutilus karamani	yes	LC

Species	Endemic dinaric	IUCN classification
Rutilus ohridanus	no	LC

Species	Endemic dinaric	IUCN classification
Scardinius dergle	yes	NT

Species	Endemic dinaric	IUCN classification
Squalius illyricus	yes	NT

Species	Endemic dinaric	IUCN classification
Squalius microlepis	yes	EN

Species	Endemic dinaric	IUCN classification
Squalius zrmanjae	yes	NT

Species	Endemic dinaric	IUCN classification
Telestes montenegrinus	yes	LC

Species	Endemic dinaric	IUCN classification
Telestes polylepis	yes	CR

Species	Endemic dinaric	IUCN classification
Telestes turskyi	yes	CR

Species	Endemic dinaric	IUCN classification
Telestes ukliva	yes	EX

Species	Endemic dinaric	IUCN classification
Aphanius fasciatus	no	LC

Species	Endemic dinaric	IUCN classification
Knipowitschia croatica	yes	VU

Species	Endemic dinaric	IUCN classification
Knipowitschia mrakovcici	yes	EN

Species	Endemic dinaric	IUCN classification
Knipowitschia radovici	yes	DD

Species	Endemic dinaric	IUCN classification
Padogobius bonelli	no	LC

Species	Endemic dinaric	IUCN classification
Lethenteron zanandreai	no	LC

Species	Endemic dinaric	IUCN classification
Salmo marmoratus	no	LC

Species	Endemic dinaric	IUCN classification
Salmo visovacensis	yes	-

Species	Endemic dinaric	IUCN classification
Salmo zrmanjensis	yes	-

Species	Endemic dinaric	IUCN classification
Salmothymnus obtusirostris	yes	EN

2.1.4.6. Large charismatic mammals

Large charismatic mammals mostly require large tracts of undisturbed habitat and are sensitive to management practice. On the other hand, they attract disproportional public attention. Four species, 3 carnivores and one ungulate, were selected: the brown bear (*Ursus arctos*), wolf (*Canis lupus*), lynx (*Lynx lynx*) and chamois (*Rupicapra rupicapra*) (Figures 175-178). Carnivores, particularly the brown bear and wolf, are potentially conflict species and consequently their long-term conservation is most feasible in areas with a low human density. The situation of the lynx is particularly problematic. 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 westcentral Montenegro are populated by the Carpathian subspecies, which was introduced to Slovenia in mid-1970s and spread afterwards. The chamois is also represented by two subspecies in the Dinaric Arc Ecoregion: the Alpine (*R. r. rupicapra*), and the endemic Balkan subspecies (*R. r. balcanica*). The northwestern 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.

It is expected that this biodiversity target (carnivores) will allow the identification of forest segments and corridors linking them, which would be beneficial also for other biodiversity components, not captureed in this project. E.g. the Dinaric region is on the southern edge of capercaillie (*Tetrao urogallus*), a rare species with declining populations. Also noteworthy, dense and extensive continental beech forests support a high density Ural owl (*Strix urallensis*) which putatively depends on the fat dormouse (*Glis glis*) as its main prey. Population dynamics of a dormouse depend crucially on

the beech mast production. In conclusion, the target has a potential to identify also key species and ecosystem(s) as well as processes within them.
Source: narrative and various data from literature (see references).

Table 9: Distribution of gaps among large charismatic mammals (C- covered, G- gap)

	Slovenia	Croatia	Bosnia and Herzegovina	Montenegro	Albania	DAE
Ursus arctos	G	C	G	G	C	C
Lynx lynx	G	C	G	C	C	C
Canis lupus	G	C	G	G	G	G
Rupicapra rupicapra	C	C	G	C	C	C

The major gaps in large charismatic mammals' protection were identified in Slovenia and in Bosnia and Herzegovina. In Bosnia and Herzegovina none of the species is adequately covered with PAs. In Slovenia, only the chamois is adequately covered by the current protected area system. In Montenegro and in Albania, only the lynx and the chamois are adequately represented within the current PA system. In some parts of Montenegro and in the Albanian mountains the extremely rare Balkan subspecies of lynx still occurs. In both countries adequate conservation strategies have to be ensured for the proper protection of the species. In Croatia all four species are adequately covered.

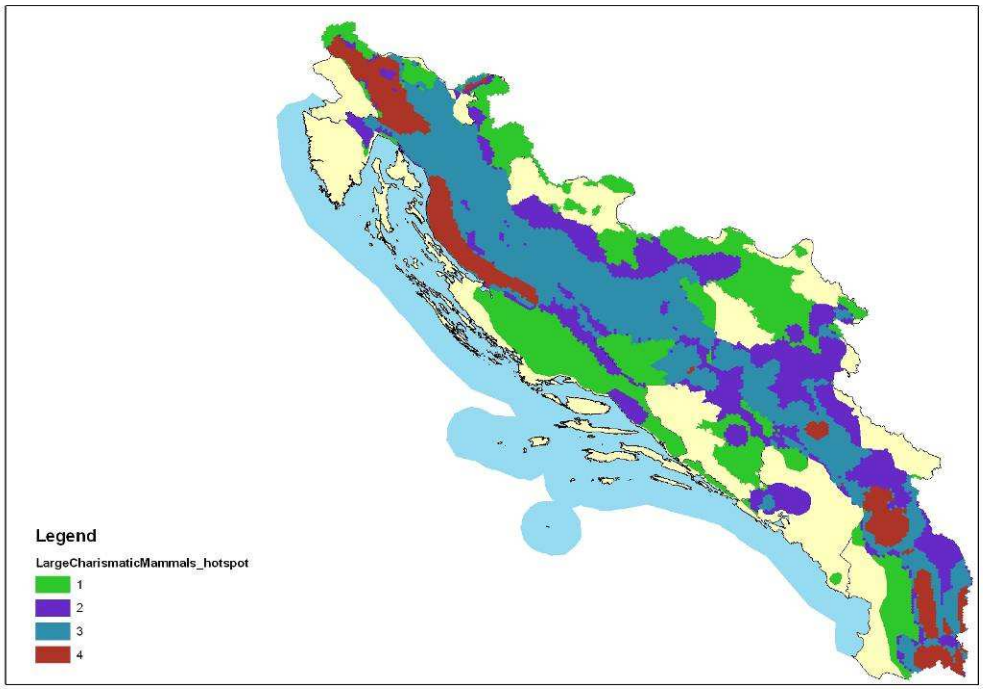


Figure 170: Large charismatic mammals hotspots. Shown is number of species per area

Figure 171: Large carnivores hotspots. Shown is overlap of all three large carnivores (*Ursus arctos, Canis lupus, Lynx lynx*)

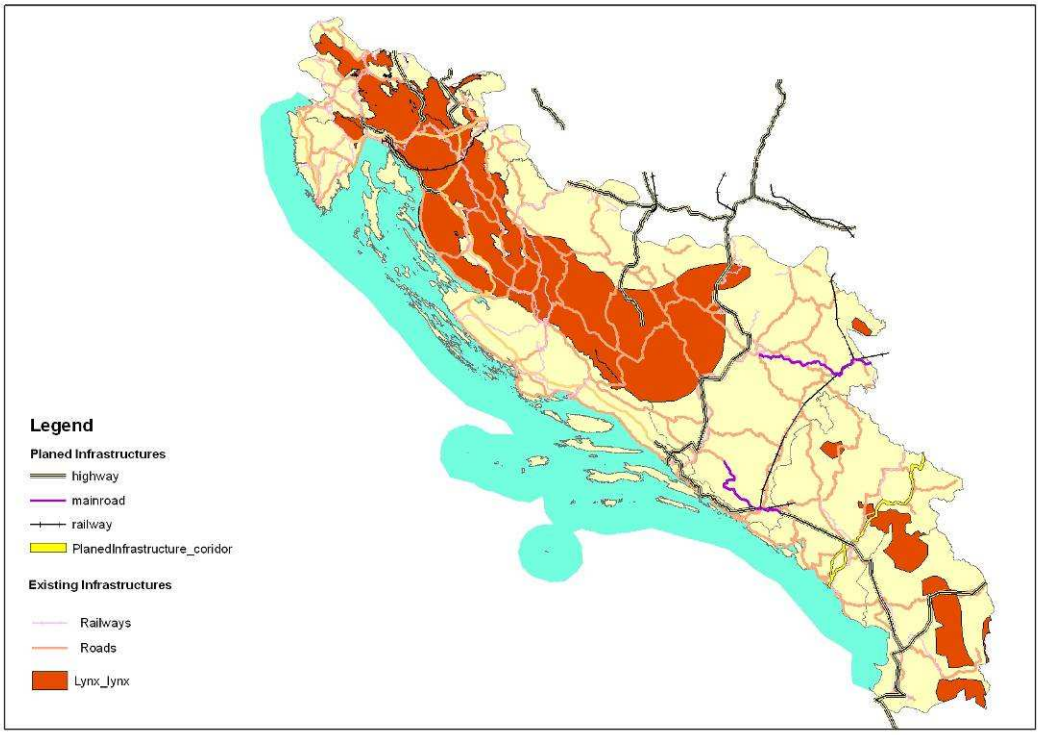


Figure 172: Overlap of *Lynx lynx* range, planed and existing infrastructure

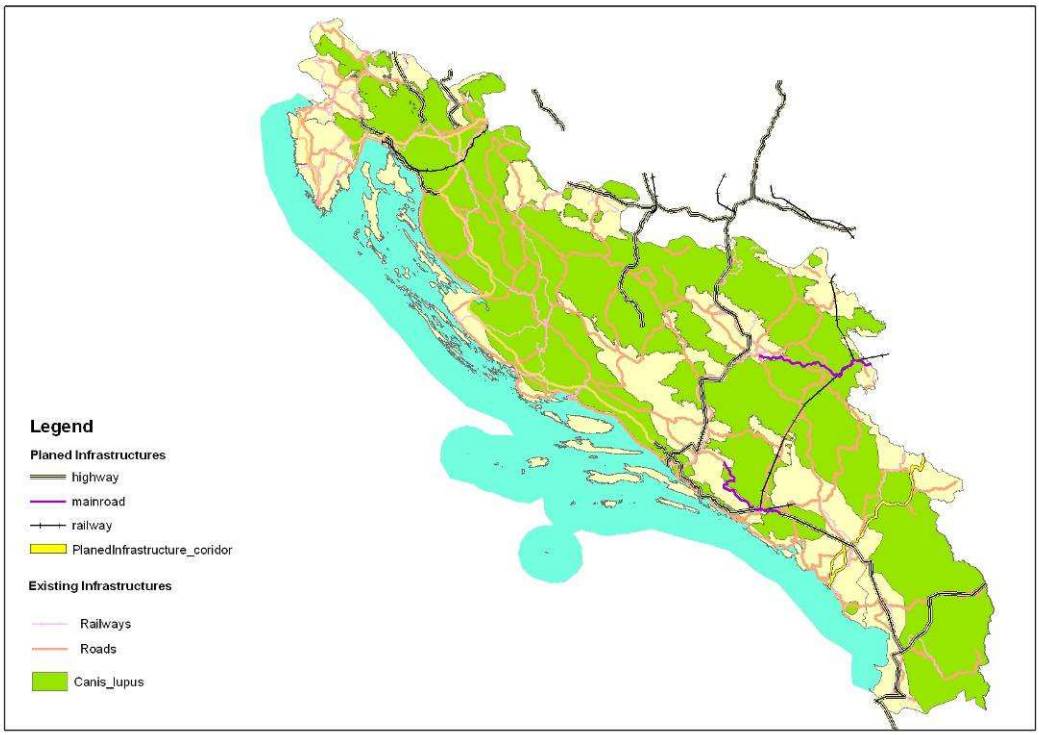


Figure 173: Overlap of *Canis lupus* range, planed and existing infrastructure

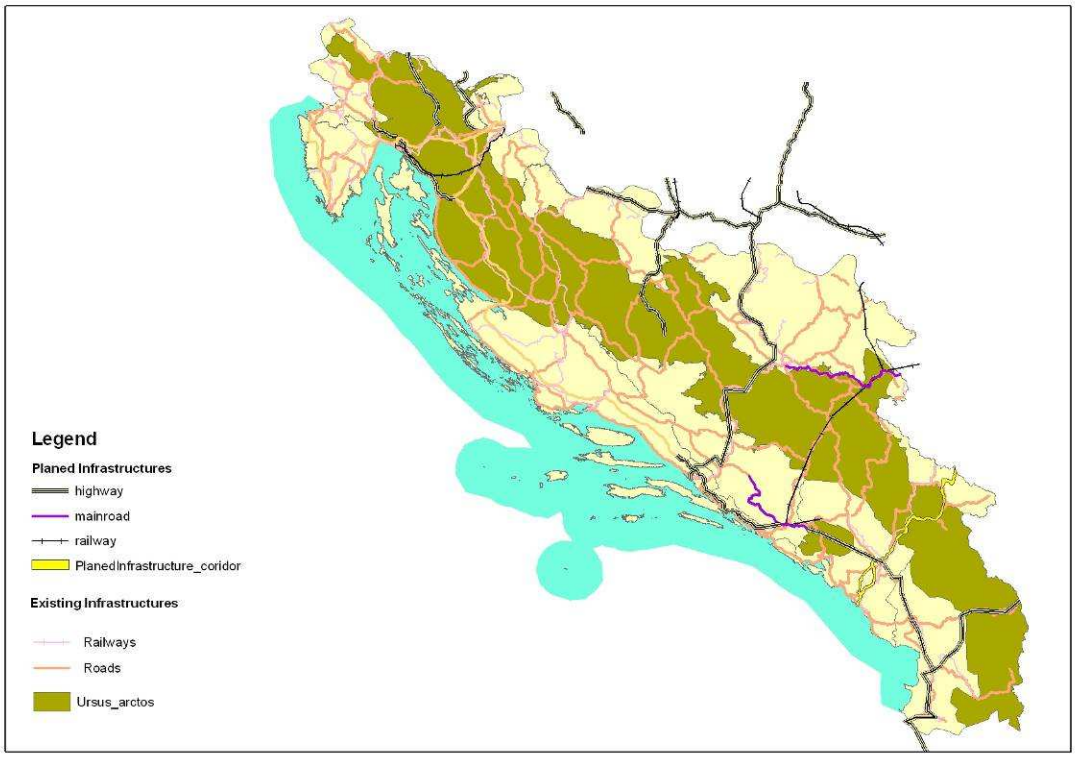


Figure 174: Overlap of *Ursus arctos* range, planed and existing infrastructure

1. The existing network of roads is particularly dense in the border zone of Croatia and western Bosnia, but the majority of these are not highways.

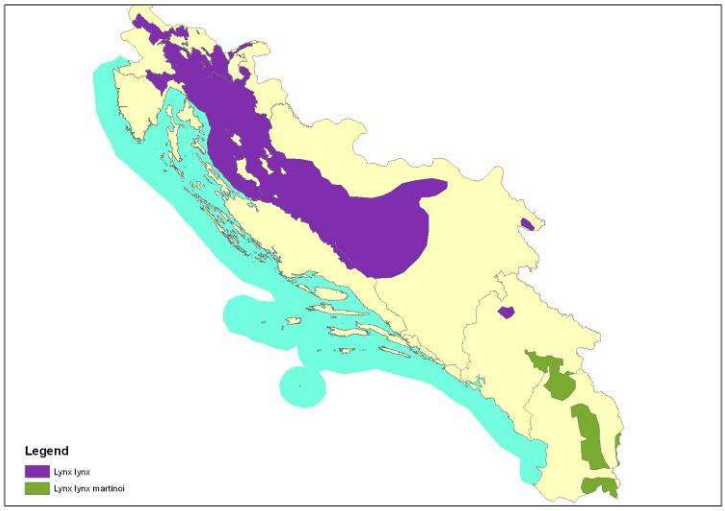
2. Three existing highways and at least two railways already cut through the hotspot of large carnivores in the northwestern DAE, in Slovenia and northwestern Croatia. Although it has been demonstrated that a highway can act as a deadly obstacle for the brown bear, no measures have thus far implemented to neutralize this situation on the highways in Slovenia.

3. The planned infrastructure will fragment ranges of large charismatic carnivores in three sectors: the railway in northwestern Croatia, a highway and a railway in Bosnia and Herzegovina, and a highway in northern Albania. It has to be expected that this will further affect the contiguity of the brown bear throughout its Dinaric range. Furthermore, a planned highway in Albania will fragment the range of the highly endangered Balkan lynx to a larger degree than any existing infrastructure.

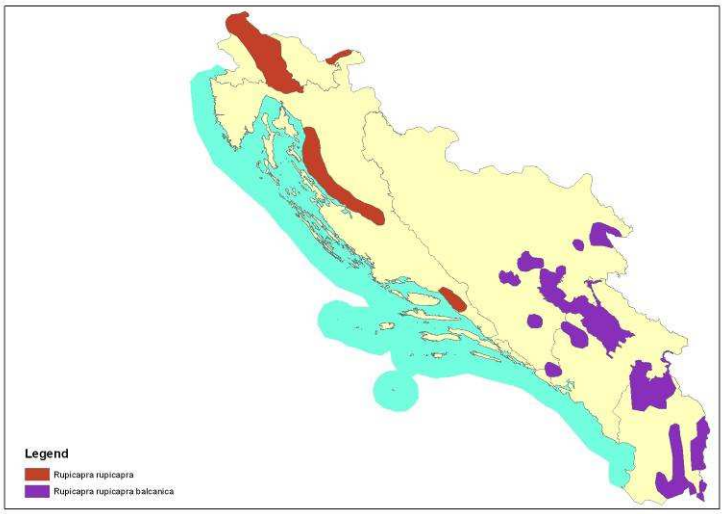
Species	**Endemic dinaric**	**IUCN classification**
Ursus arctos	no	VU

Species	**Endemic dinaric**	**IUCN classification**
Canis lupus	no	LC

Species	Endemic dinaric	IUCN classification
Lynx lynx	no	LC



Species	Endemic dinaric	IUCN classification
Rupicapra rupicapra	no	LC



2.1.5. Marine

The Adriatic Sea supports a biodiversity which is higher than expected from its proportion in the Mediterranean Sea. For example, 429 fish species were recorded for the Adriatic as compared to 664 for the entire Mediterranean; six species are endemic to the Adriatic (*Acipenser naccarii, Knipowitschia panizzae, Pomatoschistus canestrinii, Speleogobius trigloides, Gobius kolombatovici, Syngnathus taenionotus*). The majority of the Adriatic is shallow with depths up to 200 m (continental shelf) occupying 73,9 % of its bottom. Depths exceeding 200 m are concentrated in the depressions of the island of Jabuka and of the south Adriatic. The Adriatic Sea is oligotrophic (a consequence of a low nutrient content) and productivity is higher along the coast than in the open sea. Biodiversity of the eastern Adriatic Sea is still

poorly documented, particularly when cartographic information is in question. For Croatia, which covers the majority of seacoast, the species richness is estimated to be between 6000 and 7000 plants and animals. Endemism is relatively high in flora (12,1 %) with two distinct centres: western Istria and the Bay of Kvarner, and central Adriatic (islands of Jabuka, Vis, Biševo and Palagruža). The entire Adriatic ecosystem is under threat due to pollution, coastal constructions, overfishing, biological invasions etc. Threats are particularly acute in shallow coastal areas. Bays, archipelagos and river estuaries are particularly exposed to various forms of habitat degradation. Within the Dinaric Arc Ecoregion, the Dalmatian and Albanian coast were already identified as being two among thirteen Mediterranean sites of conservation importance.

The eastern Adriatic Sea abounds with islands that run parallel to the coast and are actually ridges of submerged Dinaric Mountains. The great majority of islands are very small and only 67 of them are ≥ 1 km^2 in surface area; the area of 29 islands exceeds 10 km^2, while only eight islands are larger than 100 km^2. During the Last Glacial Maximum, when a sufficient volume of water had been removed from the ocean basins and stored in the continental ice sheets, the global sea level was reduced by around 135 m. As a consequence, the Adriatic islands, as is known today, were a part of the mainland. They became isolated from the mainland following climatic amelioration and the reduction of global ice volumes by more than 50 per cent approximately 11,500 years before the present. Although endemism is low on the islands, numerous interesting biodiversity features are linked with the Adriatic archipelago (e.g. rapid allopatric divergence of isolated lizard populations: *Podarcis melissellensis* and *P. sicula*).

2.1.5.1. Sea Caves

Sea caves are numerous on the karstified bedrock; over 200 were identified for the Croatian coast but their biodiversity has been poorly explored. Due to a lack of light, there is normally no primary production in sea caves. Plants are few, but they are characteristic: *Rivularia atra, Catenella caespitosa, Hildenobrandia rubra, Phymatolithon lenormandii, Peyssonnelia sp.* and *Palmophyllum crassum*. Deeper inside caves one can find the sponges *Asbestopluma hypogea* and *Oopsacas minuta.*

Figure 179: Sea caves

2.1.5.2. Sea Grass Meadows

The majority of sea grass meadows are mainly of *Posidonia oceanica* and range from the infralitoral zone till the depth of c. 40 m. Sea grass meadows are more common in the central and southern Adriatic, than in its northern parts. This target has been largely modeled.

Figure 180: Sea grass meadows

2.1.5.3. Coastal Lagoons

Coastal lagoons are rare habitats on the prevalently limestone Adriatic coast. Even so, such habitats represent an important site for fish spawning and will therfore also be captured under the target. This target also overlaps with the sea grass meadows.

Figure 181: Coastal lagoons

2.1.5.4. Bays

There are few large (Boka Kotorska, Limski kanal) and numerous small bays in the rocky Adriatic coast. Bays provide shelter for a rich fish assemblage but are under threat.

Figure 182: Bays

2.1.5.5. Salt Marshes, Standing Brackish and Saltwater

Flat and muddy alkaline coast saturated with salt provides a habitat for hallophyllic plants (*Salicornia europaea, S. fruticosa, Salsola soda, Triglochin bulbosa, Artemisia caerulescens, Inula crithmoides, Juncus maritimus, J. acutus, J. gerardi, Centaureum spicatum, Aster tripolium, Carex extensa, Halimione portulacoides, Puccinellia palustris, Limonium serotinum, L. bellidifolium*). Such habitats are quite rare along the eastern Adriatic coast, and are frequently under heavy pressure from humans.

Figure 183: Salt marshes, standing brackish and saltwater

2.1.5.6. Dunes, Salt Steppes and Salt Scrubs

Sandy beaches, which are mainly common in the southern part of the Dinaric Arc Ecoregion, provide suitable conditions for the development of salt steppes, characterized by *Elymus farctus, Echinosphora spinosa, Eryngium maritimum, Euphorbia paralis, Cyperus capitatus, Medicago marina, Pancratium maritimum, Calystegia soldanella, Sporobolus pungens and Maresia nana.* Sandy beaches of the Vlora Bay are possibly a nesting site for a loggerhead turtle (*Caretta caretta*) in Albania.

Figure 184: Dunes, salt steppes and salt scrubs

2.1.5.7. Fish Spawning and Feeding Sites

The fishing industry in the Adriatic Sea is important within the Mediterranean. Although the Adriatic Sea covers only 5,5 % of the Mediterranrean surface area, it contributes to 12 % of its fish catch. Due to unsustainable fishing, a decline of 60 % was recorded in the last decades of the 20th century with several species being nearly fished out of existance (*Sciaena umbra, Labrus merula, Labrus bimaculatus, Labrus viridis*). The Red book of Croatia lists 123 marine fish (28 % of a total number) as being threatened; three species are already extinct in the Croatian part of the Adriatic (*Squatina oculata, Acipenser sturio, Argyrosomus regius*).

Using a wide variety of sources, the most important feeding and spawning sites along the eastern Adriatic coast were identified: estuaries of large rivers (e.g. the Dragonja, the Neretva), the Lake of Shkodra - Skadar, large bays (e.g. Boka Kotorska) and lagoons.

Figure 185: Fish spawning and feeding sites

2.1.5.8. Corridors for the Loggerheaded Turtle

The loggerheaded turtle (*Caretta caretta*) is the only common sea turtle in the Adriatic. Although the species probably does not reproduce on the Adriatic coasts, the Adriatic Sea is one of its key wintering sites in the Mediterranean. Pressures on the turtles are tremendous, e.g. c. 2500 animals are captured each year by fishing-nets in Croatia alone.

Figure 186: Corridors for the Loggerheaded turtle

2.1.5.9. Important areas for bottlenose dolphin

The bottlenose dolphin (*Tursiops truncatus*) is the only common whale species which reproduces also in the Adriatic. The animal is the top predator in the marine ecosystem and as such, a good indicator of its health. Important areas for the bottlenose dolphin are in Croatia (mapped) and in Albania (data has been provided by the National Scientific Coordinator).

Figure 187: Important areas for bottlenose dolphin

3. PROTECTED AREAS

Protected areas are managed for many purposes and nationally have been called by many different names, but all should fit within the premise that they contribute to conservation of biodiversity. To bring some order into this complicated situation, IUCN has developed a system of protected area categories, based on the primary management objectives. All categories are intended to fit within IUCN's overall definition of a protected area.

Common issues for all protected areas are:

* to be area-based concepts that might be found anywhere;
* to require specific measures (dedication, designation, regulation) for the purposes of biodiversity conservation (i.e. protection and maintenance);
* to require management, delivered through legal or other effective means; and
* by implication, to require that some kind of management authority is in place to secure conservation.

In the analysis only protected areas with IUCN classification were included.

Protected areas are listed in the IUCN international system of classification of protected areas according to their management objectives. In principle, the extent of the territory under which a certain management objective is included, should define the IUCN category (from I to VI). In practice, however, some countries have slightly different national systems of classification of their PA categories and therefore provide data on the categories of PAs also noting that there could be two different management approaches within one protected area. Designation of the catogory II/V, for example, means that the area is considered a National Park (IUCN ctg.II), but an extensive part of the overal area protected can also be managed following the objectives of management for cultural landscape (which is listed under IUCN ctg. V).

Natura 2000 sites are not widely considered as Protected Areas. For the purpose of this study, and also because only one country in the Dinaric Arc Ecoregion has already established a network of Natura 2000 sites (as an obligation when joining the EU), Natura 2000 sites were not considered Protected Areas and thus not included in the gap analyses when matching the targets to the PA network.

Protected Area Management Categories as defined by IUCN, based on primary management objective. These are:

CATEGORY I Strict Nature Reserve/ Wilderness Area: protected area managed mainly for science and wilderness protection

Definition: Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.

Large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.

CATEGORY II National Park: protected area managed mainly for ecosystem protection and recreation

Definition: Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

CATEGORY III Natural Monument: protected area managed mainly for conservation of specific natural features

Definition: Area containing one, or more, specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance.

CATEGORY IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention.

Definition: Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.

CATEGORY V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation

Definition: Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.

CATEGORY VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems

Definition: Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.

Table below indicates data on PAs that were provided by NSCs and includes the following information:

1. Country
2. Name of PA
3. Surface (km^2) of the PA
4. IUCN category

Abandoned PAs from analysis are indicated by an asterisk (*).

Table 10: Protected areas

Country	Protected Area	Surface (km^2)	IUCN category
Albania	Lugina Valbones	214.40	II
Albania	Lure	12.60	II
Albania	Mali Dajtit	294.25	II
Albania	Qafe Shtame	20.10	II
Albania	Theth	47.91	II
Albania	Zall Gjocaj	1.43	II
Albania	Vlashaj	0.58	III
Albania	Berzane	8.83	IV
Albania	Kune	8.39	IV
Albania	Liqeni Shkodres	269.32	IV
Albania	Patok - Fushekuqe	22.17	IV
Albania	Rrushkull	6.53	IV
Albania	Tej Drinit te Bardhe	0.47	IV
Albania	Vain	14.44	IV
Albania	Bardhet	7.06	V
Albania	Bize	5.80	V
Albania	Lumi Bunes - Velipoj	230.70	V
Albania	Bjeshka e Oroshit	47.03	VI
Albania	Luzni - Bulac	59.08	VI
Albania	Lumi i Gashit	*	I
Montenegro	Skadarsko jezero	423.33	II
Montenegro	Lovćen	63.38	II
Montenegro	Biogradska Gora	57.58	II
Montenegro	Durmitor	356.79	II
Montenegro	Brdo Spas kod Budve	1.31	III
Montenegro	Trebjesa u Nikšiću	1.26	III
Montenegro	Kanjon rijeke Pive	16.35	III/V
Montenegro	Kanjon rijeke Komarnice	26.00	III/V
Montenegro	Zajednica - Pinus heldreichii	28.58	III/V
Montenegro	Zajednica - Pinethum mughi montenegrinum	14.60	III/V
Montenegro	Đaloviča klisura kod Bijelog Polja	10.31	III/V
Montenegro	Globočica, Babutuša i Špilja kod selaTrnovo - Virpazar		III / V
Montenegro	Velika ulcinjska plaža	6.00	III / V
Montenegro	Tivatska solila	1.27	V
Montenegro	Pančeva oka i Crni žar – Skadarsko jezero	*	I
Montenegro	Manastrirska tapija – Skadarsko jezero	*	I
Montenegro	Ostrvo Grmožur i Tanki rt – Skadarsko jezero	*	I
Montenegro	Poluostrvo Ratac sa Žukotrljicom	*	III
Montenegro	Stari Ulcinj	*	III
Montenegro	13 jul i Njegošev park u Cetinju	*	III / V
Montenegro	Botanička bašta planinske flore Dulovine u Kolašinu	*	III / V
Montenegro	Botanička bašta u Grahovu	*	III / V
Montenegro	Botanički rezervat (Zajednica Lovora Oleandra) iznad Sopota kod Risna	*	III / V
Montenegro	Gradski park u Tivtu	*	III / V
Montenegro	Jama Duboki do u Njegušima - Cetinje	*	III / V
Montenegro	Lipska pećina kod Cetinja	*	III / V
Montenegro	Mala ulcinjska plaža	*	III / V
Montenegro	Novakovića pećina kod Tomaševa	*	III / V

Country	Protected Area	Surface (km^2)	IUCN category
Montenegro	Park dvorca kralja Nikole - Topolica u Baru	*	III / V
Montenegro	Park u blizini hotela Boka u Herceg Novom	*	III / V
Montenegro	Plaža Bečići	*	III / V
Montenegro	Plaža Buljarica	*	III / V
Montenegro	Plaža Drobni pijesak	*	III / V
Montenegro	Plaža Jaz	*	III / V
Montenegro	Plaža Lućice	*	III / V
Montenegro	Plaža Miločer	*	III / V
Montenegro	Plaža Mogren	*	III / V
Montenegro	Plaža Pećin	*	III / V
Montenegro	Plaža Pržno	*	III / V
Montenegro	Plaža Sveti Stefan	*	III / V
Montenegro	Plaža u Čanju	*	III / V
Montenegro	Plaža u Petrovcu	*	III / V
Montenegro	Plaža u Sutomoru	*	III / V
Montenegro	Plaža Valdanos	*	III / V
Montenegro	Plaža Velji pjesak	*	III / V
Montenegro	Savinska dubrava u Herceg Novom	*	III / V
Montenegro	Slovenska plaža	*	III / V
Bosnia and Herzegovina	Kozara	71.14	II
Bosnia and Herzegovina	Sutjeska	161.74	II
Bosnia and Herzegovina	Una	198.00	II
Bosnia and Herzegovina	Prokoško jezero	23.42	III
Bosnia and Herzegovina	Tajan	37.63	III
Bosnia and Herzegovina	Blidinje	470.07	V
Bosnia and Herzegovina	Hutovo blato	87.96	V
Bosnia and Herzegovina	Skakavac	*	III
Bosnia and Herzegovina	Vrelo Bosne	*	III
Bosnia and Herzegovina	Bijambare	*	V
Croatia	Bijele i Samarske stijene	11.27	I
Croatia	Hajdučki i Rožanski kukovi	12.98	I
Croatia	Cres-Lošinj	526.70	I/IV
Croatia	Datule Barbariga	4.17	I/IV
Croatia	Debela lipa - Velika Rebar	1.76	I/IV
Croatia	Dundo	2.07	I/IV
Croatia	Fojiška - Podpredoščica	5.08	I/IV
Croatia	Jadro	0.07	I/IV
Croatia	Kolansko blato-Blato Rogoza	1.78	I/IV
Croatia	Kontija	1.23	I/IV
Croatia	Krčič	4.27	I/IV
Croatia	Krk - Glavine - Mala luka	11.34	I/IV
Croatia	Laudonov Gaj	0.47	I/IV
Croatia	Lokrum	0.72	I/IV

Country	Protected Area	Surface (km^2)	IUCN category
Croatia	Lun - divlje masline	0.44	I/IV
Croatia	Mali bok - Koromačna	7.75	I/IV
Croatia	Malostonski zaljev	163.05	I/IV
Croatia	Močvarno područje "Orepak" kod Metkoviča	1.07	I/IV
Croatia	Motovunska šuma	2.63	I/IV
Croatia	Mrkan, Bobara i Supetar	1.28	I/IV
Croatia	Palud	2.28	I/IV
Croatia	Pantana	0.23	I/IV
Croatia	Plješivica-Javornik-Tisov vrh	0.73	I/IV
Croatia	Pod Gredom	5.68	I/IV
Croatia	Prud	3.24	I/IV
Croatia	Štirovača	2.49	I/IV
Croatia	Ušče Neretve	4.99	I/IV
Croatia	Vela Draga	0.92	I/IV
Croatia	Velika dolina	0.17	I/IV
Croatia	Velika Plješivica - Drenovača	1.13	I/IV
Croatia	Velo i Malo blato	4.96	I/IV
Croatia	Visibaba	0.78	I/IV
Croatia	Vražji prolaz i Zeleni vir	3.13	I/IV
Croatia	Vrljika	1.32	I/IV
Croatia	Zavižan-Balinovac-Zavižanska kosa	0.76	I/IV
Croatia	Zrmanja	5.90	I/IV
Croatia	Brijuni	34.06	II
Croatia	Kornati	215.91	II
Croatia	Krka	110.64	II
Croatia	Mljet	52.71	II
Croatia	Paklenica	95.15	II
Croatia	Plitvička jezera	296.43	II
Croatia	Risnjak	63.31	II
Croatia	Sjeverni Velebit	96.67	II
Croatia	Una	5.61	II
Croatia	Brusnik	0.05	III
Croatia	Cetina - vrela	0.19	III
Croatia	Gacka - vrela	0.16	III
Croatia	Jabuka	0.02	III
Croatia	Kupa - izvor	0.21	III
Croatia	Zavratnica	0.47	III
Croatia	Špilja u kamenolomu Tounj	1.37	III
Croatia	Pragozd Ravna gora	0.00	IV
Croatia	Badija	0.96	V
Croatia	Bijeli Potoci - Kamensko	10.85	V
Croatia	Brela	0.93	V
Croatia	Cetina	13.71	V
Croatia	Dolina Blaca	2.68	V
Croatia	Donji Kamenjak i medulinski arhipelag	4.17	V
Croatia	Dubrava Hanzina	4.46	V
Croatia	Dugi otok	6.67	V
Croatia	Čikola - kanjon	4.41	V
Croatia	Gornji Kamenjak	3.62	V
Croatia	Gvozdenovo - Kamenar	5.49	V

Country	Protected Area	Surface (km^2)	IUCN category
Croatia	Imotska jezera - Gaj	3.54	V
Croatia	Istarske toplice	7.14	V
Croatia	Kamačnik	0.79	V
Croatia	Kanal - Luka	10.96	V
Croatia	Kanjon Cetine	28.74	V
Croatia	Karešnica i Bijela	3.61	V
Croatia	Klek	8.49	V
Croatia	Konavoski dvori	5.26	V
Croatia	Kornatsko otočje, Ћut i Sitska otočna skupina	18.64	V
Croatia	Krka - krajolik	1.79	V
Croatia	Krka - krajolik (Donji tok)	30.26	V
Croatia	Labin, Rabac, Prklog	12.95	V
Croatia	Limski zaljev	14.77	V
Croatia	Lisina	13.43	V
Croatia	Lokvarsko jezero	4.37	V
Croatia	Modro oko i jezero	3.07	V
Croatia	Otok Ravnik	0.27	V
Croatia	Pakleni otoci	7.16	V
Croatia	Petrova gora - Biljeg	29.31	V
Croatia	Pičan	13.03	V
Croatia	Prapratno	1.08	V
Croatia	Prološko blato	10.01	V
Croatia	Rijeka Dubrovačka	3.50	V
Croatia	Rovinjski otoci i priobalno područje	13.86	V
Croatia	Saljsko polje	1.72	V
Croatia	Saplunara	1.29	V
Croatia	SI dio polutotka Lopar	0.79	V
Croatia	Slapnica	2.60	V
Croatia	Slušnica	1.48	V
Croatia	Sutina	4.63	V
Croatia	Učka-izvan parka	17.84	V
Croatia	Vidova gora	19.99	V
Croatia	Vučina	1.46	V
Croatia	Zlatni rat	0.12	V
Croatia	Zrče	1.83	V
Croatia	Ščedro	8.39	V
Croatia	Biokovo	195.33	V/VI
Croatia	Lastovsko otočje	195.76	V/VI
Croatia	Telaščica	70.09	V/VI
Croatia	Učka	159.75	V/VI
Croatia	Velebit	1,828.42	V/VI
Croatia	Vransko jezero	57.51	V/VI
Croatia	Žumberak - Samoborsko gorje	338.64	V/VI
Croatia	Banski Moravci - cret	*	I/IV
Croatia	Crnika	*	I/IV
Croatia	Čempresada "Pod Gospu" kod Orebiča	*	I/IV
Croatia	Čorkova uvala	*	I/IV
Croatia	Dubrava Hanzina	*	I/IV
Croatia	Đon močvar - cret	*	I/IV
Croatia	Glavotok	*	I/IV
Croatia	Jadro	*	I/IV

Country	Protected Area	Surface (km^2)	IUCN category
Croatia	Japetič	*	I/IV
Croatia	Javornik-Tisov vrh	*	I/IV
Croatia	Kočje	*	I/IV
Croatia	Košljun	*	I/IV
Croatia	Laudonov Gaj	*	I/IV
Croatia	Lokrum	*	I/IV
Croatia	Lun - divlje masline	*	I/IV
Croatia	Mrkan, Bobara i Supetar	*	I/IV
Croatia	Pantana	*	I/IV
Croatia	Ruskamen	*	I/IV
Croatia	Smerovišče	*	I/IV
Croatia	Vela draga	*	I/IV
Croatia	Velika dolina	*	I/IV
Croatia	Visibaba	*	I/IV
Croatia	Aleja čempresa na Porečkom groblju	*	III
Croatia	Amidžina pečina	*	III
Croatia	Baredine	*	III
Croatia	Brela - hrast	*	III
Croatia	Brusnik	*	III
Croatia	Cerovačke pečine	*	III
Croatia	Cerovica - brijest	*	III
Croatia	Cetina - vrela	*	III
Croatia	Crna pečina (špilja Vile jezerkinje)	*	III
Croatia	Crveno jezero	*	III
Croatia	Dva medunca kod Crikvenice	*	III
Croatia	Fantazija	*	III
Croatia	Gacka - vrela	*	III
Croatia	Gotovž- ponor	*	III
Croatia	Gračišče - kesteni	*	III
Croatia	Grapčeva špilja	*	III
Croatia	Gromačka spilja	*	III
Croatia	Hrast kod sela Sv. Petar	*	III
Croatia	Hrast u Kaštel Gomilici	*	III
Croatia	Jabuka	*	III
Croatia	Jama Vrtare male	*	III
Croatia	Kaštel štafilič - maslina	*	III
Croatia	Kolač	*	III
Croatia	Kupa - izvor	*	III
Croatia	Ledenica - spilja	*	III
Croatia	Lokvarka - spilja	*	III
Croatia	Markova jama	*	III
Croatia	Medina pečina	*	III
Croatia	Medvidina pečina	*	III
Croatia	Medvjedi - tisa	*	III
Croatia	Metkovič - čempres	*	III
Croatia	Miletin bor	*	III
Croatia	Močiljska spilja	*	III
Croatia	Močvarni čempres u Solinu	*	III
Croatia	Modra spilja	*	III
Croatia	Modrič pečina	*	III

Country	Protected Area	Surface (km^2)	IUCN category
Croatia	Modro jezero	*	III
Croatia	Nerežišča - borič	*	III
Croatia	Ostrovica - spilja	*	III
Croatia	Pčelinja pečina	*	III
Croatia	Pečina Golubnjača	*	III
Croatia	Petričeva pečina	*	III
Croatia	Pincinova jama	*	III
Croatia	Prezid - jela	*	III
Croatia	Pučišče - crnika	*	III
Croatia	Rača - spilja	*	III
Croatia	Ravnik - spilja	*	III
Croatia	Samogradska pečina	*	III
Croatia	Selce - divlja kruška	*	III
Croatia	Selce - zelenika	*	III
Croatia	Stara straža - slojevi	*	III
Croatia	Šipun - spilja	*	III
Croatia	Šupljara	*	III
Croatia	Una - vrelo	*	III
Croatia	Vela spilja	*	III
Croatia	Velnačka glavica	*	III
Croatia	Visibaba	*	III
Croatia	Vranjača - spilja	*	III
Croatia	Vrlovka - spilja	*	III
Croatia	Zametska pečina	*	III
Croatia	Žalič - pinj	*	III
Croatia	Žbandaj - brijest	*	III
Croatia	Živogošče - brijestovi	*	III
Croatia	Žrnovo - crnika	*	III
Croatia	Badija	*	V
Croatia	Baračeve špilje	*	V
Croatia	Brela	*	V
Croatia	Gacko i Dabarsko polje (1)	*	V
Croatia	Gacko i Dabarsko polje (2)	*	V
Croatia	Grab	*	V
Croatia	Hvar - obala	*	V
Croatia	izvor Rude	*	V
Croatia	Kamačnik	*	V
Croatia	Lopar	*	V
Croatia	Ošljak	*	V
Croatia	Ozalj - okolica	*	V
Croatia	Pazinska jama	*	V
Croatia	Petehovac	*	V
Croatia	Ravnik	*	V
Croatia	Rumin	*	V
Croatia	Saplunara	*	V
Croatia	Zavratnica	*	V
Croatia	Zečevo	*	V
Croatia	Zlatni rat	*	V
Slovenia	Brestovica pri Povirju - kal Globočaj	0.17	III
Slovenia	Brezovica - Brezoviška slepa dolina	1.22	III
Slovenia	Cerkno - soteska potoka Zapoška	0.11	III

Country	Protected Area	Surface (km^2)	IUCN category
Slovenia	Debeli rtič	0.24	III
Slovenia	Del porečja Govškarce	1.39	III
Slovenia	Gačnik	2.67	III
Slovenia	Gorenja Kanomlja - izvir v bližini Šinkovčeve jame in jama nad izvirom	0.01	III
Slovenia	Gorenja Kanomlja - ponor s sotesko v Klamah	0.01	III
Slovenia	Gorenja Trebuša: V malnih (soteska s slapovi)	0.10	III
Slovenia	Grahovo ob Bači: rastišče venerinih lascev	0.01	III
Slovenia	Grič Stena v dolini reke Dragonje	0.05	III
Slovenia	Hubelj - območje izvirov in fužine	0.79	III
Slovenia	Idrijska Krnice - Jelenk	0.14	III
Slovenia	Izvir Topličice	0.01	III
Slovenia	Jezeri v Fiesi	0.02	III
Slovenia	Kadice-soteska	0.14	III
Slovenia	Komen - gozd Cirje	0.07	III
Slovenia	Komen - gozd Draga	0.20	III
Slovenia	Komen - Obršljanski gozd	0.25	III
Slovenia	Kostanjevec (soteska in jame)	0.30	III
Slovenia	Kovk - okamenine trdoživnjakov	0.00	III
Slovenia	Marindolska loza, gozdni rezervat, Marindol	0.03	III
Slovenia	Marindolski steljniki	0.82	III
Slovenia	M'kcova grapa	0.23	III
Slovenia	Naravni spomenik Bedrova grapa	0.38	III
Slovenia	Naravni spomenik Kramaršca	0.07	III
Slovenia	Naravni spomenik pinijev drevored	0.01	III
Slovenia	Naravni spomenik Suha Idrijca	0.13	III
Slovenia	Naravni spomenik Vrtači pod Petelinovim vrhom	0.21	III
Slovenia	Obrov - Jezerina s ponikvami	1.31	III
Slovenia	Odolina - slepa dolina s ponikvami	0.57	III
Slovenia	Podpeška jama	0.09	III
Slovenia	Podpeški kamnolom	0.03	III
Slovenia	Podsteniška koliševka	0.07	III
Slovenia	Porezen - Porezen v območju občine Idrija	0.43	III
Slovenia	Porezen (vrh in greben)	0.30	III
Slovenia	Postojnski jamski sistem (Postojnska jama)	2.03	III
Slovenia	Potok Nerajčica z izviri Okno, Stepanjec in Krnica	0.02	III
Slovenia	Površine z dendrološko pomembnimi drevesi ob cerkvi Sv. Trojica	0.00	III
Slovenia	Površine z dendrološko pomembnimi drevesi v parku v Verdu	0.00	III
Slovenia	Predjama-območje, Predjamski jamski sistem, Predjamski grad, p.c. Žalostne Matere božje	1.78	III
Slovenia	Presihajoča jezera zgornje Pivke - Palško, Petelinjsko, Veliko in Malo Drskovško jezero	2.64	III
Slovenia	Pršjakova grapa	0.26	III
Slovenia	Rakova kotlina pri Rakeku (Rakov Škocjan)		III
Slovenia	Reka Dragonja s pritoki	0.25	III
Slovenia	Reka Lahinja od izvira do Pustega Gradca	1.94	III
Slovenia	Reka Kolpa	0.04	III
Slovenia	Rožeška koliševka	0.04	III
Slovenia	Rt Madona v Piranu	0.12	III
Slovenia	Sistem zatočnih jam in sistem ponornih jam potoka Šice	0.29	III
Slovenia	Skedenc	0.01	III
Slovenia	Slavnik - vrh in pobočja	2.50	III

Country	Protected Area	Surface (km^2)	IUCN category
Slovenia	Slivje - Slivarske ponikve	0.36	III
Slovenia	Smrečje v Trnovskem gozdu - mrazišče	2.85	III
Slovenia	Šolnovo brezno	0.04	III
Slovenia	Vremščica - vrh in pobočja	2.34	III
Slovenia	Vrhovske vrtače, Vrhovci	0.56	III
Slovenia	Zjot - kraško polje z izviri in ponornimi jamami	0.01	III
Slovenia	Golaki in Smrekova draga - botanična lokaliteta, mrazišče in gozdni rezervat	4.76	IV
Slovenia	Naravni rezervat Bukov vrh	0.21	IV
Slovenia	Naravni rezervat Lahinjske luge	0.09	IV
Slovenia	Naravni rezervat Nerajske luge	0.17	IV
Slovenia	Naravni rezervat Strunjan	1.25	IV
Slovenia	Naravni rezervat Strunjan - Stjuža	0.34	IV
Slovenia	Notranjski Snežnik	8.22	IV
Slovenia	Orlek – Orleška draga	0.07	IV
Slovenia	Potok Bičje in močvirski biotopi	0.19	IV
Slovenia	Pragozd Gorjanci	0.23	IV
Slovenia	Pragozd Ravna gora	0.59	IV
Slovenia	Pragozd Pečke	0.15	IV
Slovenia	Škocjanski zatok	1.22	IV
Slovenia	Beka - soteska Glinščice z dolino Griža, ponornimi jamami in arheološkimi lokalitetami Lorencom in grad nad Botačrm	2.45	V
Slovenia	Južni in zahodni obronki Nanosa	21.62	V
Slovenia	Južni obronki Trnovskega gozda	33.06	V
Slovenia	Krajinski park Kolpa	39.57	V
Slovenia	Krajinski park Strunjan	2.70	V
Slovenia	Lahinja	2.26	V
Slovenia	Mašun	0.88	V
Slovenia	Nanos - južna in zahodna pobočja z vrhovi Pleše, Grmade in Ture	10.10	V
Slovenia	Planina - območje, Planinsko polje, Planinska jama, Markova jama v Nartu, Škratovka, Izviri v Malnih, Unška koliševka	6.66	V
Slovenia	Rakova kotlina pri Rakeku (Rakov Škocjan)	1.25	V
Slovenia	Sečoveljske soline	7.11	V
Slovenia	Štanjel	0.29	V
Slovenia	Zgornja Idrijca	43.83	V
Slovenia	Regijski park Škocjanske jame	4.02	V/II
Slovenia	Notranjski regijski park	227.30	V/II
Slovenia	2 lipi pri cerkvi v Ivanjem Selu	*	III
Slovenia	4 lipe ob kapelici v Kožljeku	*	III
Slovenia	Ahnenloch	*	III
Slovenia	Banjšice, Brezno na Vodicah	*	III
Slovenia	Banjšice, Roupa-stopnjasto brezno	*	III
Slovenia	Beka - brezno na Škrklovci	*	III
Slovenia	Bisernica	*	III
Slovenia	Bor pri cerkvi v Podgrajah	*	III
Slovenia	Brezno ob Lenčajski cesti	*	III
Slovenia	Brezno pri Ogelnicah nad kočo Debeli kamen	*	III
Slovenia	Brezovica - Brimšca jama	*	III
Slovenia	Brezovica - lipe pred cerkvijo Sv. Štefana	*	III
Slovenia	Brusova bukev	*	III
Slovenia	Bukev in ginko pri Mlečni	*	III
Slovenia	Bukev in lipovec pri Celarcu	*	III

Country	Protected Area	Surface (km^2)	IUCN category
Slovenia	Bukev na Lanišu	*	III
Slovenia	Bukev na Lipovcu	*	III
Slovenia	Bukev na Meževnikih	*	III
Slovenia	Bukev na Padežu	*	III
Slovenia	Bukev pod Ostrim vrhom	*	III
Slovenia	Bukev pred stavbo občine Vrhnika	*	III
Slovenia	Bukev pri Krznarju	*	III
Slovenia	Bukev pri Turku	*	III
Slovenia	Bukev v Čukovem bregu	*	III
Slovenia	Bukev v Vuknastu	*	III
Slovenia	Bukovje - Volčja jama	*	III
Slovenia	Bukve "Trije kralji" na Gomanci	*	III
Slovenia	Bukvi pod Oblim vrhom	*	III
Slovenia	Cerkljanski vrh, Zaganjalka - presihajoči izvir v Volkovi grapi pod Cerkljanskim vrhom	*	III
Slovenia	Cerkvena lipa na Taboru	*	III
Slovenia	Cerkvena lipa v Brezju	*	III
Slovenia	Cerkvena lipa v Dobcu	*	III
Slovenia	Cerkvena lipa v Osredku	*	III
Slovenia	Cerkvena lipa v Pudobu	*	III
Slovenia	Cerkvena lipa v Škriljah	*	III
Slovenia	Cerkvena lipa v Žilcah	*	III
Slovenia	Cerkvene lipe v Studencu	*	III
Slovenia	Cerkveni lipi na Petkovcu	*	III
Slovenia	Cerkveni lipi v Kožljeku	*	III
Slovenia	Cerkveni lipi v Ravniku	*	III
Slovenia	Cerkveni lipi v Štrukljevi vasi	*	III
Slovenia	Cerkveni lipi v Velikih Blokah	*	III
Slovenia	Cigarovec in krilati oreškar ob šoli	*	III
Slovenia	Cinkov križ	*	III
Slovenia	Cipresasta smreka	*	III
Slovenia	Cipresasta smreka pred Bazinovo dolino	*	III
Slovenia	Čendova jama	*	III
Slovenia	Črmošnjiška jelka	*	III
Slovenia	Dane pri Divači - hrast oplutnik	*	III
Slovenia	Dane pri Divači - jama nad Škrinjarco	*	III
Slovenia	Deželova bukev	*	III
Slovenia	Divača - Divaška jama	*	III
Slovenia	Divača - Kačna jama	*	III
Slovenia	Divja kostanja pri spomeniku	*	III
Slovenia	Divji kostanj na Gradišču	*	III
Slovenia	Divji kostanj ob kapelici pri Topolu	*	III
Slovenia	Divji kostanj pri hiši Partizanska 26 na Rakeku	*	III
Slovenia	Dob v Lomu	*	III
Slovenia	Doblar, hrast nad Osredkarjem	*	III
Slovenia	Dobravlje - Debela peč	*	III
Slovenia	Drevesasti glog v Cerju	*	III
Slovenia	Drevje pri cerkvi v Sušaku	*	III
Slovenia	Duglazija v Strmih klancih	*	III
Slovenia	Duglazije pod Gradiščem	*	III
Slovenia	Duglaziji nad Grčarevcem	*	III
Slovenia	Dve bukvi v Lazah	*	III
Slovenia	Gabrovica pri Komnu - lipi pri cerkvi Sv. Petra	*	III
Slovenia	Gabrska jama	*	III
Slovenia	Geološke plasti pri Ključu	*	III
Slovenia	Gor. Kanomlja - slap na Klavžarici	*	III

Country	Protected Area	Surface (km^2)	IUCN category
Slovenia	Gor. Kanomlja - Studenčkova jama ali Jama pri Studenčku	*	III
Slovenia	Gor. Kanomlja - Vovkova jama ali Jama v podsteni	*	III
Slovenia	Gorenje - Konjičja jama	*	III
Slovenia	Gradišče pri Materiji - jama pod Mavrovcem	*	III
Slovenia	Gradišče pri materiji - Martinjska jama	*	III
Slovenia	Grajska lipa, Vinica	*	III
Slovenia	Hišna lipa v Fari	*	III
Slovenia	Hišna lipa v Iga vasi	*	III
Slovenia	Hišna lipa v Osredku - južnejša	*	III
Slovenia	Hotična - Široka jama	*	III
Slovenia	Hrast pri cerkvi v Brcah	*	III
Slovenia	Hrasti v vasi Velika Bukovica	*	III
Slovenia	Hrasti v Zarečici	*	III
Slovenia	Idrijski Log - Habečkovo brezno	*	III
Slovenia	Ivanji grad - Preserska jama	*	III
Slovenia	Jama izvira Bistrice (Kozlek)	*	III
Slovenia	Jama pod Letico	*	III
Slovenia	Jama Podrošce	*	III
Slovenia	Javor nad Vrbacovim kopišem	*	III
Slovenia	Javorniška koliševka	*	III
Slovenia	Jazbina	*	III
Slovenia	Jelka na Ravniku	*	III
Slovenia	Jelka v Za koritih	*	III
Slovenia	Kačja smreka pod Tolstim vrhom	*	III
Slovenia	Kačja smreka pri D. Logatcu	*	III
Slovenia	Kačja smreka v Koševniku	*	III
Slovenia	Kanalski vrh, Jazben-stopnjasto brezno	*	III
Slovenia	Kazlje - Komihcova jama	*	III
Slovenia	Klanec pri Kozini - lipa pri cerkvi Sv. Petra	*	III
Slovenia	Klek pri izviru Obrha	*	III
Slovenia	Klek v Lahovem	*	III
Slovenia	Klen v Sozah	*	III
Slovenia	Kobdilj - Fabijanijeva murva	*	III
Slovenia	Kozja luknja	*	III
Slovenia	Ledena jama pri Jelenici	*	III
Slovenia	Ledena jama pri Kunču	*	III
Slovenia	Ledeniki na Nanosu - Veliki trški ledenik, Slapenski ledenik,Tri brezna v Jamcah, Mali trški ledenik s Slapenski	*	III
Slovenia	Lipa "Pri bajti"	*	III
Slovenia	Lipa in hrasta v Harijah	*	III
Slovenia	Lipa na Brojskem polju	*	III
Slovenia	Lipa na Čevici	*	III
Slovenia	Lipa na Jerinovem Griču	*	III
Slovenia	Lipa na križišču v Iga vasi	*	III
Slovenia	Lipa na križišču v Babnem polju	*	III
Slovenia	Lipa na osnovnem trgu Tabor v Cerknici	*	III
Slovenia	Lipa na osrednjem trgu v Žilcah - KS Cajnarje - Žilce	*	III
Slovenia	Lipa na pobočju Ulake	*	III
Slovenia	Lipa na Veharšah	*	III
Slovenia	Lipa ob cerkvenem zidu v Begunjah	*	III
Slovenia	Lipa ob cerkvi v Mali Bukovici	*	III
Slovenia	Lipa ob cerkvi v Rjavčah	*	III
Slovenia	Lipa ob cerkvi v Smrjah	*	III

Country	Protected Area	Surface (km^2)	IUCN category
Slovenia	Lipa ob muzeju NOB v Ložu - KS Loška dolina	*	III
Slovenia	Lipa ob stari cerkvici v Hrušici	*	III
Slovenia	Lipa pod cerkvijo v Bezuljaku	*	III
Slovenia	Lipa pod Sekirico	*	III
Slovenia	Lipa pred cerkvijo na Pokojišču	*	III
Slovenia	Lipa pred cerkvijo v Begunjah	*	III
Slovenia	Lipa pri bivši šoli v Starem trgu - južnejša	*	III
Slovenia	Lipa pri Brenču	*	III
Slovenia	Lipa pri cerkvi - KS Grahovo	*	III
Slovenia	Lipa pri cerkvi sv. Roka pri Ložu	*	III
Slovenia	Lipa pri cerkvi v Begunjah - KS Begunje (spominska 91)	*	III
Slovenia	Lipa pri cerkvi v Čeljah	*	III
Slovenia	Lipa pri cerkvi v Martinjaku	*	III
Slovenia	Lipa pri cerkvi v Veliki Bukovici	*	III
Slovenia	Lipa pri gostilni Turšič	*	III
Slovenia	Lipa pri hiši Stari trg 38	*	III
Slovenia	Lipa pri hiši Stari trg 57	*	III
Slovenia	Lipa pri kamnolomu	*	III
Slovenia	Lipa pri kapelici ob cesti v Pudob	*	III
Slovenia	Lipa pri Martinj hribu	*	III
Slovenia	Lipa pri mostu v Fari	*	III
Slovenia	Lipa pri spomeniku J. V. Valvasorja - KS Cerknica	*	III
Slovenia	Lipa pri spomeniku NOB pri železniški postaji na Rakeku	*	III
Slovenia	Lipa pri tovarni v Begunjah	*	III
Slovenia	Lipa pri Turku	*	III
Slovenia	Lipa v D. Logatcu	*	III
Slovenia	Lipa v Hudem vrhu	*	III
Slovenia	Lipa v Koroščah	*	III
Slovenia	Lipa v Loščcu	*	III
Slovenia	Lipa v Mramorovem pri Pajkovem	*	III
Slovenia	Lipa v Podcerkvi pri hiši št. 42	*	III
Slovenia	Lipa v Prezidu	*	III
Slovenia	Lipa v Rovtah	*	III
Slovenia	Lipa v Stražišču	*	III
Slovenia	Lipa v vasi Podgrad	*	III
Slovenia	Lipa v vasi, Marindol	*	III
Slovenia	Lipa v Viševku za hišo št. 28	*	III
Slovenia	Lipa za sadovnjaki v Pudobu	*	III
Slovenia	Lipe ob cerkvi v Dolnjem Zemonu	*	III
Slovenia	Lipe ob cerkvi v Podbežah	*	III
Slovenia	Lipe ob cerkvi v Račicah	*	III
Slovenia	Lipe ob pokopališču v Jelšanah	*	III
Slovenia	Lipe pri cerkvi v Viševku	*	III
Slovenia	Lipe pri Peterču	*	III
Slovenia	Lipe v vasi Knežak	*	III
Slovenia	Lipi pri cerkvi v Krajiču	*	III
Slovenia	Lipi za tovarno Brest v Cerknici	*	III
Slovenia	Lipica - kamniti gobi	*	III
Slovenia	Lipica - Lipenjska jama	*	III
Slovenia	Lipovec na Kisovcu	*	III
Slovenia	Lipovec na Rabarju	*	III
Slovenia	Lipovec severno od odcepa za Koščake ob Zali	*	III
Slovenia	Lokev pri Divači - jama pod Gaugami	*	III
Slovenia	Lokev pri Divači - jama Vilenica	*	III

Country	Protected Area	Surface (km^2)	IUCN category
Slovenia	Lokovec, Brezno na Levpah	*	III
Slovenia	Lokvica, Jama pod Pečinko	*	III
Slovenia	Luknja v gradu	*	III
Slovenia	Maklen pod Jakovico	*	III
Slovenia	Marindolska lipa, Marindol	*	III
Slovenia	Marmena jama (pečina pod hruško)	*	III
Slovenia	Minutnik	*	III
Slovenia	Naravni spomenik Jama nad Kobilo	*	III
Slovenia	Obrov - Kaserova jama	*	III
Slovenia	Orehek - lipa ob poti proti graščini	*	III
Slovenia	Orlek - Golokratna jama	*	III
Slovenia	Pečina Jabučinov stržen	*	III
Slovenia	Pet lip v Mramorovem pri Lužarjih	*	III
Slovenia	Poljane pri Podgradu - Grde jame	*	III
Slovenia	Povžane - Kremplak	*	III
Slovenia	Račiška pečina (Jama pri Račicah)	*	III
Slovenia	Radoška jama	*	III
Slovenia	Rakitovec - jama pod Gabrkom	*	III
Slovenia	Rakitovec - pečina v Radotah	*	III
Slovenia	Ravne - Ravenska jama	*	III
Slovenia	Ravnica-vaške lipe	*	III
Slovenia	Ribniki v dolini Drage pri Igu	*	III
Slovenia	Rodik - Cikova jama	*	III
Slovenia	Rodik - Velika Kozinska jama	*	III
Slovenia	Sežana - Čebulcova jama	*	III
Slovenia	Sežana - jama Bukovnik	*	III
Slovenia	Sežana - jama ob Bazoviški cesti na Gropajski gmajni	*	III
Slovenia	Sežana - jama ob Bazoviški cesti na Trebanjski gmajni	*	III
Slovenia	Sežana - jama v Golokračini	*	III
Slovenia	Sežana - jama v Kanjadolcah I	*	III
Slovenia	Sežana - jama v partu pri Ogradi	*	III
Slovenia	Sežana - Koblarska jama	*	III
Slovenia	Sežana - Orleška in Tomaškova jama	*	III
Slovenia	Sežana - Škamprlova ali Škamprletova jama	*	III
Slovenia	Sežana - Ulčarjeva jama v Paredu	*	III
Slovenia	Skadanščina - jama Medvedjak	*	III
Slovenia	Skadanščina - pečina v Zjatih	*	III
Slovenia	Slivje - Dimnice	*	III
Slovenia	Slivje - lipa pri cerkvi Sv. Martina	*	III
Slovenia	Smoganica (jama)	*	III
Slovenia	Smreka na Slemenih	*	III
Slovenia	Smreka pod Ljubljanskim vrhom	*	III
Slovenia	Smreka pod Rigljem	*	III
Slovenia	Smreka pri Turku	*	III
Slovenia	Smreka v Novem svetu	*	III
Slovenia	Smreka v Povšnah	*	III
Slovenia	Smreka v Za koritih	*	III
Slovenia	Speleološki sistem podzemeljske Rakuljščice (med Sajevčami in Novo Sušico)	*	III
Slovenia	Spodnja Idrija - Ukovnik	*	III
Slovenia	Srebrnolistni javor ob Jelovškovi cesti	*	III
Slovenia	Stara lipa v Dolnjih Retjah	*	III
Slovenia	Strane - tisovec	*	III
Slovenia	Sveto - lipa pred vaško cerkvijo	*	III

Country	Protected Area	Surface (km^2)	IUCN category
Slovenia	Svetoantonska jama	*	III
Slovenia	Štehčeva bukev	*	III
Slovenia	Tisa v Slakah	*	III
Slovenia	Tisa za Cankarjevim spomenikom	*	III
Slovenia	Tri lipe v Koča vasi	*	III
Slovenia	Ulica pečina	*	III
Slovenia	Urški spodmol	*	III
Slovenia	Vaška lipa v Novi vasi	*	III
Slovenia	Vaška lipa v Uncu	*	III
Slovenia	Vaška lipa v Velikem vrhu	*	III
Slovenia	Velika Knežja jama	*	III
Slovenia	Želetova jama	*	III
Slovenia	Žirje - Belinca jama	*	III
Slovenia	Žirje - Junčja jama	*	III
Slovenia	Žužemberška lipa	*	III

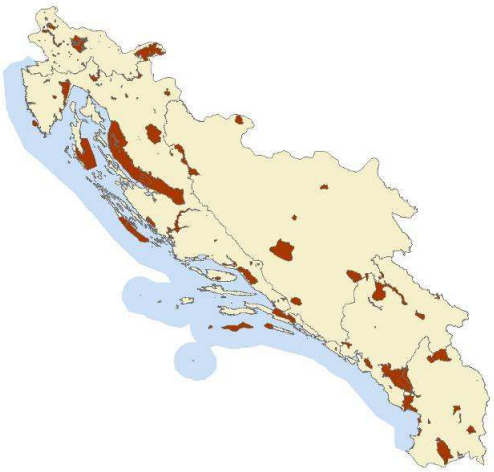


Figure 188: Shape of Protected areas in the DAE considered in Gap Analysis

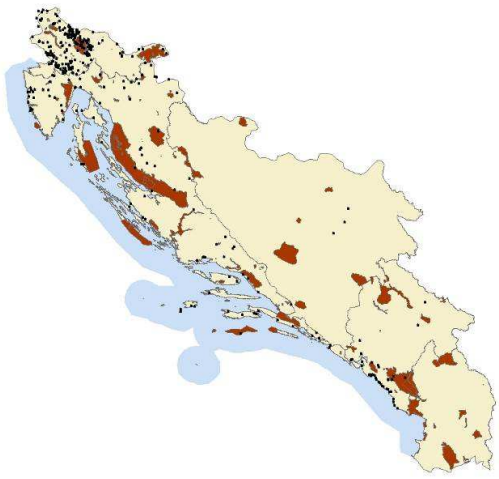


Figure 189: Shape of Protected areas in the DAE included in the analysis and Protected areas not included in the analysis (points).

In Montenegro a number of small protected areas were established for a proper protection of sandy and gravelly beaches. The map was constructed for the purposes of the project, since shape files of those PAs do not exist. On the prevalently rocky Adriatic coast, such habitats are rare and threatened, especially due to the high tourism pressure. Taking this into consideartion, therefore particular attention to such habitats should be payed.

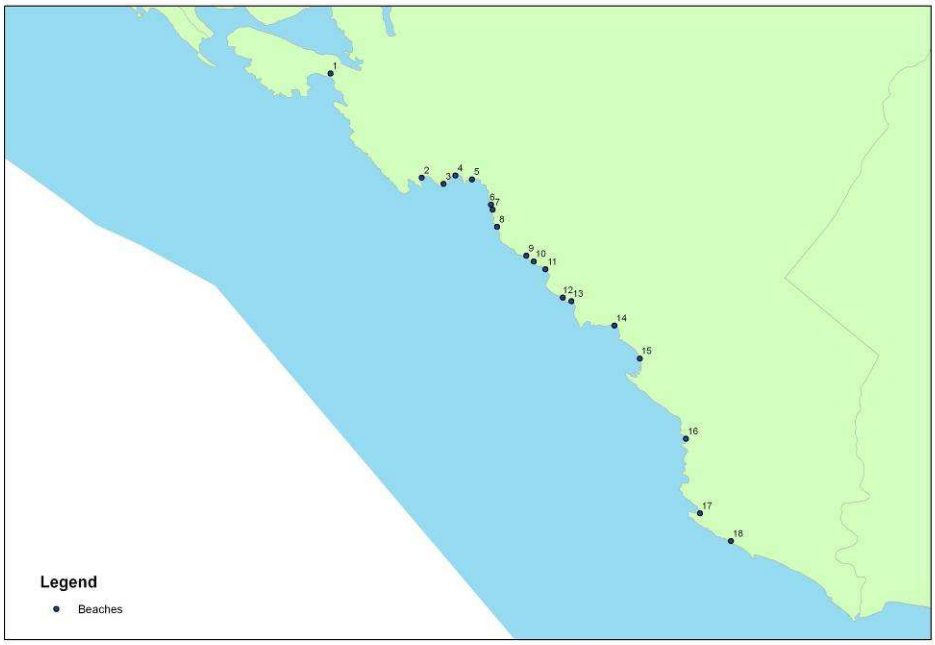


Figure 190: Beaches in Montenegro

Table 11 : Beaches in Montenegro

ID number	Name of the beach	Surface (km^2)	IUCN category
1	Plaža Pržno	0.020	III/V
2	Plaža Jaz	0.040	III/V
3	Plaža Mogren	0.020	III/V
4	Slovenska plaža	0.040	III/V
5	Plaža Bečići	0.050	III/V
6	Plaža Sveti Stefan	0.040	III/V
7	Plaža Milocer	0.010	III/V
8	Plaža Drobni pijesak	0.010	III/V
9	Plaža Petrovac	0.015	III/V
10	Plaža Lučica	0.009	III/V
11	Plaža Buljarica	0.040	III/V
12	Plaža Pećin	0.015	III/V
13	Plaža Canj	0.035	III/V
14	Plaža Sutomore	0.040	III/V
15	Plaža Topolica	0.020	III/V
16	Plaža Veliki Pijesak	0.005	III/V
17	Plaža Valdanos	0.030	III/V
18	Mala Ulcinjska plaža	0.015	III/V

In Montenegro Prokletije National Park in was established at the time when analysis had already been undertaken and therefore is not included, despite the fact that this PAs will significantly increase the extent of the total PAs in Montenegro. The surface area of the newly established National Park is 160,30 km^2, that's means that the total surface covered with PAs in Montenegro is 13812 km^2, representing 9,04 % of the country total surface.

Figure 191: Shape of Protected areas in the DAE with the newly established National Park Prokletije

4. PLANNED INFRASTRUCTURE

The layer of planned infrastructure was based on data obtained from the NSCs. The data obtained were very heterogenous, so it was necessary to execute their mapping, i.e. their transformation into a unique project system. For certain areas (Bosnia and Herzegovina, Montenegro), data on planned infrastructure structures were obtained in descriptive form, and available topographic data were the basis for approximate spatial positioning.

Figure 192: Planed infrastructure in the DAE

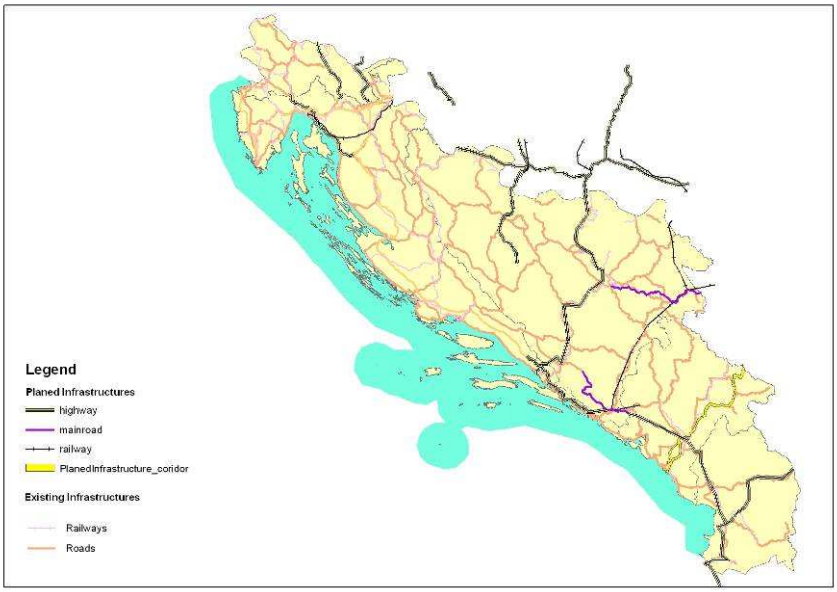


Figure 193: Planed and existing infrastructure in the DAE

5. GAP ANALYSIS

5.1. Altitudinal Distribution of PAs

5.1.1. Altitudinal Distribution of PAs in Slovenia

Table 12: Altitudinal distribution of PAs and land in Slovenia

Altitude belts	PAs (km^2)	Land surface area	Not covered land surface area	PAs (%)	Land surface area (%)
0 – 200	23.37	540.97	517.60	5.18	8.38
200 – 400	47.75	1,064.63	1,016.88	10.58	16.49
400 – 600	120.67	2,012.33	1,891.66	26.74	31.17
600 – 800	155.66	1,563.95	1,408.29	34.5	24.23
800 – 1000	59.33	825.42	766.09	13.25	12.79
1000 – 1200	20.28	320.26	299.98	4.49	4.96
1200 – 1400	10.18	107.33	97.15	2.26	1.66
1400 – 1600	7.57	15.23	7.66	1.68	0.24
1600 – 1800	1.01	1.01	0.00	0.22	0.02

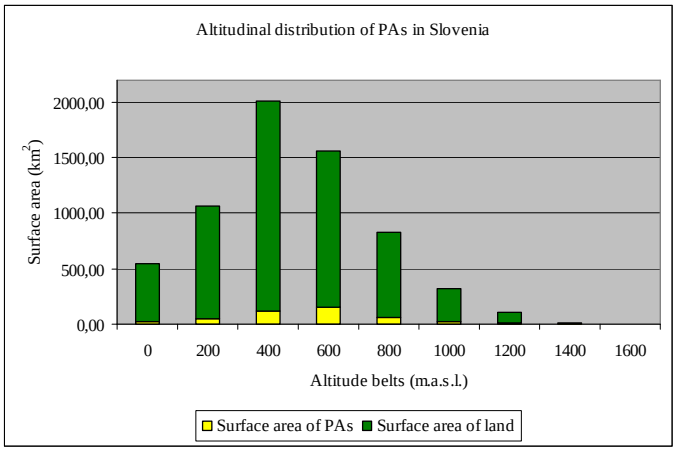


Figure 194: Altitudinal distribution of PAs and land in Slovenia expressed in km^2

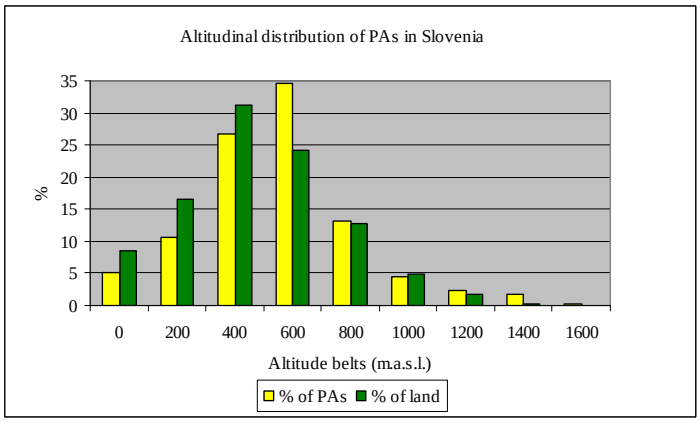


Figure 195: Altitudinal distribution of PAs and land in Slovenia expressed in %

Slovenia is not adequately covered with PAs, since only 450 km^2 (6,79 %) of the DAE part of the country are covered with PAs. PAs are not found to be adequately distributed at lower altitudes (0 – 600 m.a.s.l) where human pressures are the highest. PAs are more or less adequately represented at higher altitudes (600 m.a.s.l and above).

5.1.2. Altitudinal Distribution of PAs in Croatia

Table 13: Altitudinal distribution of PAs and land in Croatia

Altitude belts	PAs (km^2)	Land surface area	Not covered land surface area	PAs (%)	Land surface area (%)
0 – 200	817.10	8154.01	7,347.92	17.33	28.44
200 – 400	526.17	7,023.42	6,597.18	9.16	24.5
400 – 600	502.78	4,599.85	4,239.27	7.75	16.05
600 – 800	729.80	4,060.04	3,424.59	13.66	14.16
800 – 1000	639.65	2,636.88	2,031.58	13.01	9.2
1000 – 1200	427.07	1,407.22	987.01	9.03	4.91
1200 – 1400	283.89	567.24	283.55	6.1	1.98
1400 – 1600	134.45	193.17	58.23	2.9	0.67
1600 – 1800	6.75	14.15	7.40	0.15	0.05
1800 – 2000	0.00	0.04	0.04	0	0

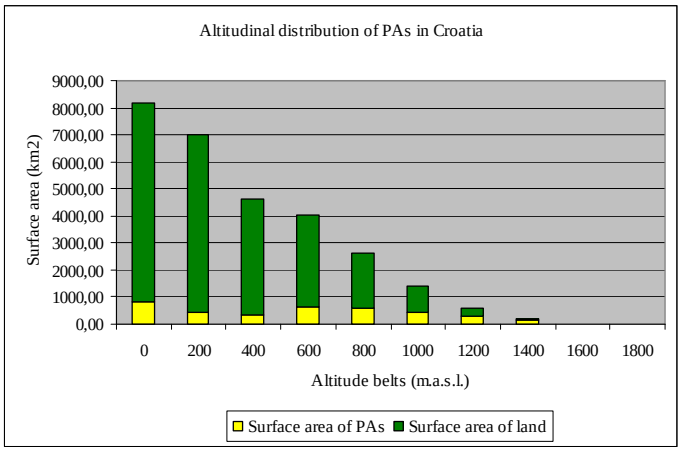


Figure 196: Altitudinal distribution of PAs and land in Croatia expressed in km^2

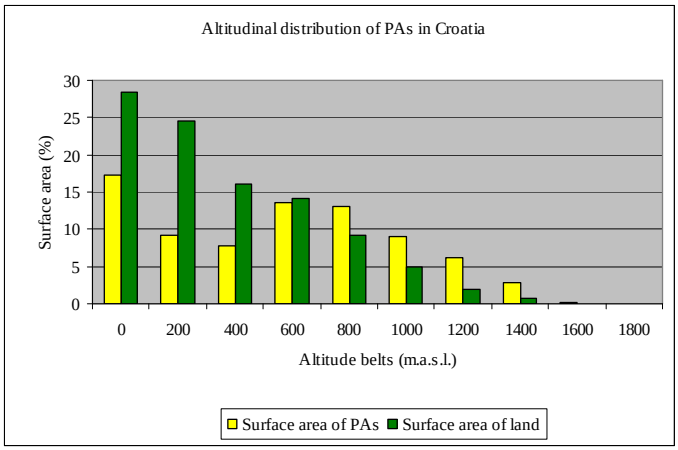


Figure 197: Altitudinal distribution of PAs and land in Croatia expressed in %

Croatia, according to the complete surface area under PAs, is not adequately covered with PAs, since 4984.11 km^2 (8.24 %) of the DAE part of the country are under PAs. The terrestrial part of the country is better covered within PAs (3975.57 km^2; 13.87 %), while marine PAs cover an area of only 1008.54 km^2 (3.17 %). Only land above 600 m.a.s.l. was found to be adequately covered with PAs. The major pressures from human activities are in lower lands. All the coastal region and the lowlands were found to be not adequately covered.

5.1.3. Altitudinal Distribution of PAs in Bosnia and Herzegovina

Table 14: Altitudinal distribution of PAs and land in Bosnia and Herzegovina

Altitude belts	PAs (km^2)	Land surface area	Not covered land surface area	PAs (%)	Land surface area (%)
0 – 200	96.88	1,542.46	1,445.58	8.96	3.74
200 – 400	71.36	5,946.86	5,875.50	6.6	14.43
400 – 600	148.65	6,164.04	6,015.39	13.74	14.95
600 – 800	151.66	7,031.77	6,880.11	14.02	17.06
800 – 1000	80.63	7,758.55	7,677.92	7.45	18.82
1000 – 1200	77.09	6,267.14	6,190.05	7.13	15.2
1200 – 1400	149.46	3,884.31	3,734.85	13.82	9.42
1400 – 1600	126.81	1,723.41	1,596.60	11.72	4.18
1600 – 1800	102.31	703.09	600.78	9.46	1.71
1800 – 2000	56.21	184.81	128.60	5.2	0.45
2000 – 2200	8.34	16.55	8.21	0.77	0.04
2200 – 2400	0.42	1.38	0.96	0.04	0.00

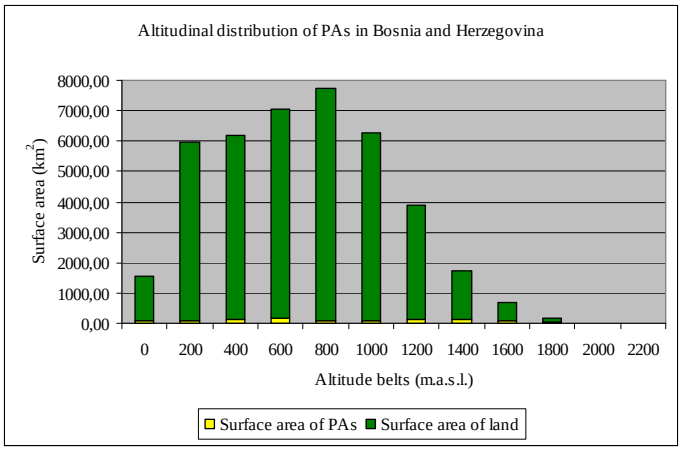


Figure 198: Altitudinal distribution of PAs and land in Bosnia and Herzegovina expressed in km^2

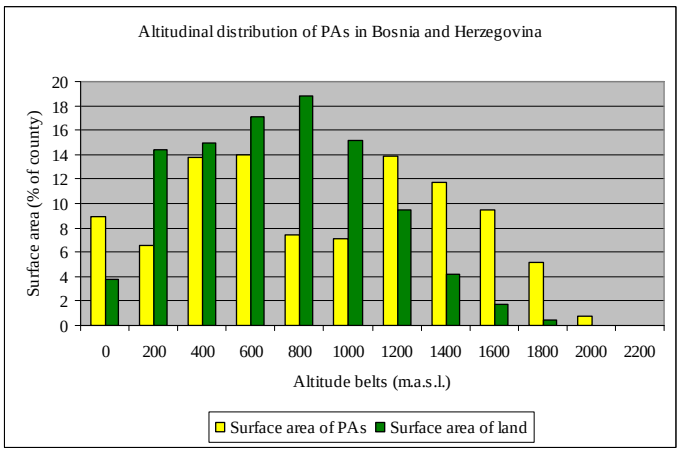


Figure 199: Altitudinal distribution of PAs and land in Bosnia and Herzegovina expressed in %.

Bosnia and Herzegovina was not found to be adequately covered with PAs, since only 1082.93 km^2 (2.63 %) of the DAE part of the country areas is under PAs. Only at higher altitudes (above 1200 m.a.s.l) PAs seem adequately distributed. The greatest gaps in PAs are present at lower altitudes.

5.1.4. Altitudinal Distribution of PAs and land in Montenegro

Table 15: Altitudinal distribution of PAs and land in Montenegro

Altitude belts	PAs (km^2)	Land surface area	Not covered land surface area	PAs (%)	Land surface area (%)
0 – 200	423.91	1,440.04	1,016.13	42.11	10.37
200 – 400	7.05	535.04	527.99	0.7	3.85
400 – 600	5.35	514.94	509.59	0.53	3.71
600 – 800	47.94	1,251.64	1,203.70	4.76	9.01
800 – 1000	68.09	2,249.79	2,181.70	6.76	16.2
1000 – 1200	78.02	2,470.26	2,392.24	7.75	17.79
1200 – 1400	91.92	2,068.69	1,976.77	9.13	14.9
1400 – 1600	83.56	1,633.28	1,549.72	8.3	11.76
1600 – 1800	91.59	1,117.76	1,026.17	9.1	8.05
1800 – 2000	72.74	465.99	393.25	7.22	3.36
2000 – 2200	30.07	118.64	88.57	2.99	0.85
2200 – 2400	5.42	18.24	12.82	0.54	0.13
2400 – 2600	0.13	0.29	0.16	0.01	0

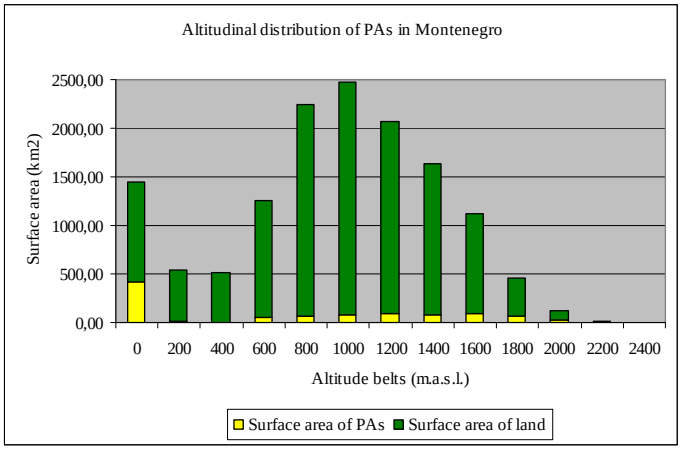


Figure 200: Altitudinal distribution of PAs and land in Montenegro expressed in km^2

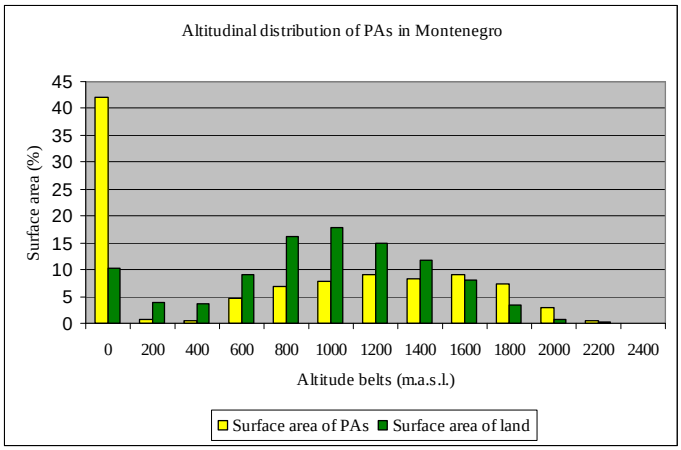


Figure 201: Altitudinal distribution of PAs and land in Montenegro expressed in %

Montenegro was found to be not adequately covered with PAs, since only 1009.91 km^2 (6.20 %) of the DAE part of the country is under PAs. The great majority of PAs are in the lowlands, where a big surface is covered by the lake of Skadar. PAs were found to be adequately distributed at higher altitudes (1800 m.a.s.l. and above).The biggest gap in PAs was found to be the land between 200 and 1800 m.a.s.l. There are no marine PAs in Montenegro.

5.1.5. Altitudinal Distribution of PAs in Albania

Table 16: Altitudinal distribution of PAs and land in Albania

Altitude belts	PAs (km^2)	Land surface area	Not covered land surface area	PAs (%)	Land surface area (%)
0 – 200	517.92	2,509.29	1,991.37	40.49	21.22
200 – 400	58.06	1,466.04	1,407.98	4.54	12.4
400 – 600	106.34	1,561.76	1,455.42	8.31	13.21
600 – 800	92.73	1,381.49	1,288.76	7.25	11.68
800 – 1000	89.21	1,179.01	1,089.80	6.97	9.97
1000 – 1200	85.19	1,038.04	952.85	6.66	8.78
1200 – 1400	106.13	932.12	825.99	8.3	7.88
1400 – 1600	80.76	711.28	630.52	6.31	6.01
1600 – 1800	46.26	507.93	461.67	3.62	4.29
1800 – 2000	37.44	314.25	276.81	2.93	2.66
2000 – 2200	28.09	148.62	120.53	2.2	1.26
2200 – 2400	15.45	50.2	34.75	1.21	0.42
2400 – 2600	2.59	9.53	6.94	0.2	0.08
2600 – 2800	0.00	0.52	0.52	0	0

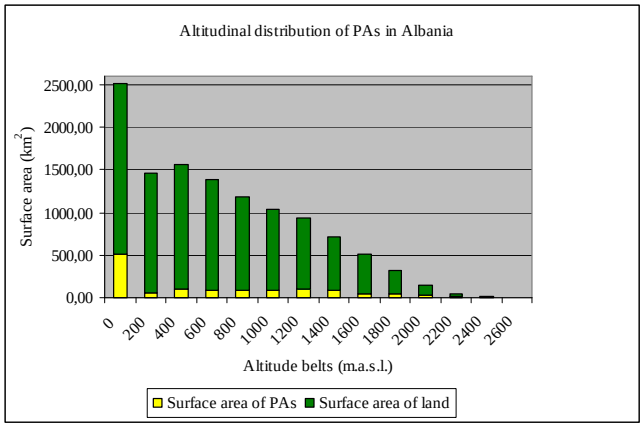


Figure 202: Altitudinal distribution of PAs and land in Albania expressed in km^2

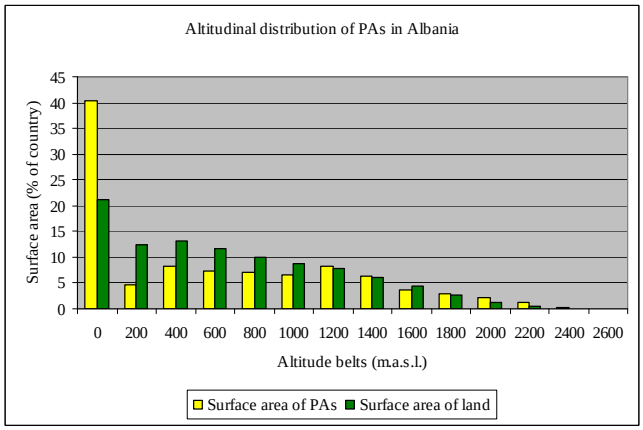


Figure 203: Altitudinal distribution of PAs and land in Albania expressed in %

Albania was not found to be adequately covered with PAs since only 1279.13 km^2 (9.86 %) of the DAE part of the country area is under PAs. PAs of Albania are mainly concentrated on the lowlands, mainly consisting of coastal lagoons and lakes which are all under PAs. The great majority of agricultural surfaces are in the lowlands, which considerably affects the existing PAs. The main gap in PAs is at altitudes between 200 and 1200 m.a.s.l. Land between 1200 to 2200 m.a.s.l. was found to be adequately covered with PAs. The highest peaks do not fall under PAs. There are no marine PAs in Albania.

5.1.6. Altitudinal Distribution of PAs in the DAE

Table 17: Altitudinal distribution of PAs and land in the DAE

Altitude belts	PAs (km^2)	Land surface area	Not covered land surface area	PAs (%)	Land surface area (%)
0 – 200	1,868.17	1,4186.77	12,318.60	25.02	13.91
200 – 400	610.47	1,6035.99	15,425.52	8.18	15.72
400 – 600	741.60	1,4852.92	14,111.32	9.93	14.56
600 – 800	1,083.44	1,5288.89	14,205.45	14.51	14.99
800 – 1000	902.56	1,4649.65	13,747.09	12.09	14.36
1000 – 1200	680.79	1,1502.92	10,822.13	9.12	11.27
1200 – 1400	641.38	7559.69	6,918.31	8.59	7.41
1400 – 1600	433.65	4276.37	3,842.72	5.81	4.19
1600 – 1800	247.92	2343.94	2,096.02	3.32	2.30
1800 – 2000	166.39	965.09	798.70	2.23	0.95
2000 – 2200	66.50	283.81	217.31	0.89	0.28
2200 – 2400	21.29	69.82	48.53	0.29	0.07
2400 – 2600	2.72	9.82	7.10	0.04	0.01
2600 – 2800	0.00	0.52	0.52	0.00	0.00

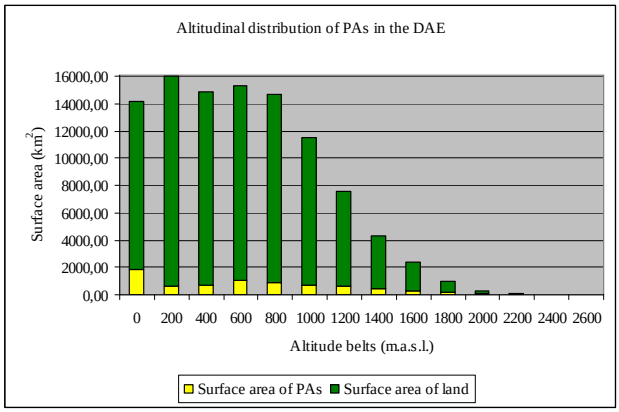


Figure 204: Altitudinal distribution of PAs and land in the DAE expressed in km^2

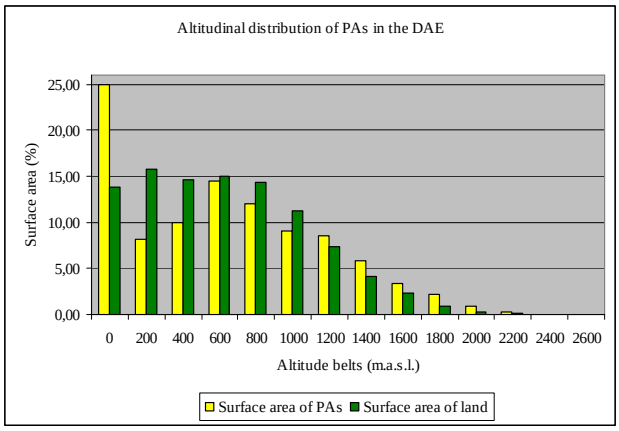


Figure 205: Altitudinal distribution of PAs and land in the DAE expressed in %

On a regional level, not enough surface is represented by PAs, since only 8806.72 km^2, which is 6.40 % of the region, are covered with PAs. Lower altitudes were found to be adequately covered, mainly due to great surfaces represented by the Skadar (Schkoder) Lake and the coastal lagoons in Albania, which are all in PAs. In Slovenia, Croatia and Bosnia and Herzegovina, lowlands were not found to be adequately covered with PAs. Land at higher altitudes throughout the region should be considered adequately represented by PAs. The biggest gap in PAs was found to be land between 200 and 1400 m.a.s.l., which together with the lowlands represents the area with the highest human pressures.

5.2. Distribution of gaps

The table below indicates the distribution of gaps according to targets and countries. Each target is marked respectively with “G” if it came up as as gap, “T” if it came up as a total gap and with “C” if it was found to be covered.

Table 337: Distribution of gaps according to countries and targets

Targets	Slovenia	Croatia	Bosnia and Herzegovina	Montenegro	Albania	DAE
Evergreen forests & scrubs	/	C	C	G	C	C
Oriental hornbeam forests	G	G	G	G	G	G
Thermophilous and supra-Mediterranean oak woods	G	G	G	G	C	G
Thermophilous beech forests	G	C	G	G	G	C
Montane and subalpine beech forests	G	C	G	G	C	G
Oak-hornbeam forests	G	G	G	T	G	G
Hygrophilic forests of common oak	C	G	T	/	/	G
Coastal flooded forests of ash and common oak	C	G	G	C	C	C
Spruce and fir forests	T	G	G	G	C	G
Omorika spruce forests	/	/	T	/	/	T
Forests of Heldreich’s pine	/	/	C	C	G	G
Forests of Macedonian pine	/	/	/	T	G	G
Shrubs of mountain pine	C	C	G	C	C	C
Bogs	G	G	G	C	C	C
Canyons	C	C	C	C	T	C
Streams and rivers	C	C	G	C	G	C
Mediterranean lakes	/	C	/	C	C	C
High mountain lakes	/	/	C	C	T	C
High mountain grasslands (‘rudine’)	C	C	G	C	G	G
Thermophilous grasslands	G	C	G	G	C	G
Oromediterranean rocky habitats	/	C	G	G	C	C
High-mountain rocky habitats	/	C	C	G	C	C
Karstic fields with surface hydrology	C	G	G	T	/	G
Coleoptera hotspots	C	G	G	G	/	G
Congeria kusceri	G	C	G	/	/	C
Marifugia cavatica	G	G	G	T	/	G
Velkovrhia enigmatica	C	G	T	/	/	G

Targets	Slovenia	Croatia	Bosnia and Herzegovina	Montenegro	Albania	DAE
Proteus anguinus	G	G	G	G	/	G
Sorex araneus	G	C	G	G	G	G
Sorex alpinus	G	C	G	G	C	G
Sorex minutus	G	C	G	G	G	G
Neomys fodiens	G	C	G	G	G	G
Neomys anomalus	G	C	G	G	G	G
Suncus etruscus	G	G	G	G	C	C
Talpa europaea	G	C	G	G	G	G
Talpa caeca	/	T	G	G	G	G
Talpa stankovici	/	/	/	G	C	C
Dinaromys bogdanovi	/	C	G	G	G	C
Myodes glareolus	G	G	G	G	G	G
Arvicola terrestris	G	G	G	C	C	G
Microtus arvalis	G	G	G	G	G	G
Microtus agrestis	G	C	/	/	/	G
Microtus subterraneus	G	G	G	G	G	G
Microtus liechtensteini	G	C	G	/	/	C
Microtus thomasi	/	/	T	G	G	G
Chionomys nivalis	G	C	G	C	C	C
Apodemus agrarius	G	C	G	/	/	G
Apodemus flavicollis	G	C	G	G	G	G
Apodemus epimelas	/	C	G	C	C	C
Micromys minutus	G	G	C	C	C	C
Mus spicilegus	/	/	/	G	C	C
Spalax leucodon	/	/	G	G	G	G
Muscardinus avellanarius	G	C	G	G	G	G
Dryomys nitedula	G	C	G	G	G	G
Eliomys quercinus	C	C	G	/	/	C
Testudo hermanni	/	G	G	C	C	C
Mauremys rivulata	/	G	T	C	C	C
Pseudapus apodus	G	G	G	C	C	C
Hemidactylus turcicus	G	G	C	C	C	C
Ablepharus kitaibelli	/	/	T	/	G	G
Algyroides nigropunctatus	G	C	G	G	G	C
Iberolacerta horvathi	C	C	/	/	/	C
Dinarolacerta mosorensis	/	C	G	G	/	G
Dinarolacerta montenegrina	/	/	/	T	C	C
Lacerta bilineata	G	G	/	/	/	G
Lacerta trilineata	/	C	G	G	C	C

Targets	Slovenia	Croatia	Bosnia and Herzegovina	Montenegro	Albania	DAE
Lacerta viridis	G	C	G	G	G	G
Dalmatolacerta oxycephala	/	C	G	G	C	G
Lacerta agilis	G	C	G	G	G	G
Podarcis erhardii	/	/	/	/	G	G
Podarcis melisellensis	G	C	G	G	C	C
Podarcis muralis	G	C	G	G	G	G
Podarcis sicula	G	C	G	T	/	C
Podarcis taurica	/	/	/	C	G	G
Zootoca vivipara	G	C	G	G	C	G
Typhlops vermicularis	/	/	/	C	C	C
Vipera ursinii	/	C	C	G	C	C
Vipera berus	G	C	G	G	C	G
Zamenis situla	/	C	G	G	G	C
Dolichopis caspius	/	C	G	G	G	G
Platyceps najadum	/	C	G	C	C	C
Elaphe quatuorlineata	G	G	G	C	C	C
Malpolon monspessulanus	G	G	G	G	G	G
Telescopus fallax	G	G	G	C	C	C
Hierophis gemonensis	G	G	G	G	C	C
Hierophis viridiflavus	G	C	/	/	/	C
Hyla arborea	G	G	G	G	C	G
Rana arvalis	G	C	/	/	/	C
Rana latastei	G	G	/	/	/	G
Rana graeca	/	T	G	G	G	G
Rana temporaria	G	G	G	G	G	G
Pelophylax kurtmuelleri	/	/	/	C	C	C
Pelophylax esculenta	G	C	/	/	/	G
Pelophylax lessonae	G	G	T	/	/	G
Pelophylax ridibunda	G	C	G	G	C	G
Pelophylax shqiperica	/	/	/	C	C	C
Salamandra atra	C	C	C	G	C	C
Triturus alpestris	G	C	G	G	G	G
Triturus carnifex	G	C	G	G	C	G
Salaria fluviatilis	/	C	G	G	C	G
Cobitis bileneata	G	C	T	/	/	C
Cobitis dalmatina	/	G	/	/	/	G
Cobitis narentana	/	G	G	/	/	G
Cobitis ohridana	/	/	/	C	G	C
Aulopyge huegeli	/	C	/	/	/	C

Targets	Slovenia	Croatia	Bosnia and Herzegovina	Montenegro	Albania	DAE
Barbus plebejus	G	C	/	/	/	C
Chondrostoma genei	G	/	/	/	/	G
Chondrostoma knerii	/	G	G	/	/	G
Chondrostoma phoxinus	/	G	T	/	/	G
Gobio benacensis	G	/	/	/	/	G
Leuciscus svallize	/	C	G	/	/	G
Pachychilon pictum	/	/	/	C	C	C
Phoxinellus adspersus	/	C	T	/	/	G
Phoxinellus alepidotus	/	G	T	/	/	G
Phoxinellus croaticus	/	C	T	/	/	C
Phoxinellus dalmaticus	/	C	/	/	/	C
Phoxinellus fontinalis	/	G	/	/	/	G
Phoxinellus ghetaldii	/	G	T	G	/	G
Phoxinellus jadovensis	/	T	/	/	/	T
Phoxinellus krbavensis	/	G	T	/	/	G
Phoxinellus metohiensis	/	C	T	T	/	G
Phoxinellus pseudalepidotus	/	/	T	/	/	T
Rutilus aula	G	G	/	/	/	G
Rutilus basak	/	G	G	T	/	G
Rutilus karamani	/	/	/	C	G	C
Rutilus ohridanus	/	/	/	C	C	C
Scardinius dergle	/	C	/	/	/	C
Squalius illyricus	/	G	T	/	/	G
Squalius microlepis	/	G	G	T	/	G
Squalius zrmanjae	/	C	/	/	/	C
Telestes montenegrinus	/	/	/	C	C	C
Telestes polylepis	/	G	/	/	/	G
Telestes turskyi	/	G	/	/	/	G
Telestes ukliva	/	G	T	/	/	G
Aphanius fasciatus	C	G	/	G	C	C
Knapowitschia croatica	/	G	G	/	/	G
Knapowitschia mrakovcici	/	C	/	/	/	C
Knapowitschia radovici	/	C	T	/	/	C
Padogobius bonelli	G	C	/	/	/	C
Lethenteron zanandreai	G	G	G	T	/	G
Salmo marmoratus	G	C	C	/	/	C
Salmo visovacensis	/	C	/	/	/	C
Salmo zrmanjensis	/	C	/	/	/	C
Salmothymnus	/	G	G	G	/	G

Targets	Slovenia	Croatia	Bosnia and Herzegovina	Montenegro	Albania	DAE
obtusirostris						
Ursus arctos	G	C	G	G	G	C
Lynx lynx	G	C	G	C	C	C
Canis lupus	G	C	G	G	G	G
Rupicapra rupicapra	C	C	G	C	C	C
Birds (IBA & SPA)	G	C	C	C	C	C
Sea caves	/	C	/	G	/	C
Sea grass meadows	T	C	/	T	T	C
Coastal lagoons	C	G	/	T	C	C
Bays	/	C	T	T	/	C
Salt marshes, standing brackish and saltwater	C	C	/	G	C	C
Dunes, salt steppes and salt scrubs	/	C	/	C	C	C
Fish spawning and feeding sites	G	C	/	C	C	C
Corridors for the Loggerheaded turtle	/	G	T	T	T	G
Important areas for bottlenose dolphin	G	C	/	T	T	C

The table below indicates numerical distribution of gaps according to countries.

Table 338: Numerical distribution of gaps

	Slovenia	Croatia	Bosnia and Herzegovina	Montenegro	Albania	DAE
Gap	68	52	79	60	38	81
Total Gap	2	3	21	15	5	3
Covered	15	78	11	34	54	72
Total targets	85	133	111	109	97	157

The table below indicates per cent distribution of gaps according to countries.

Table 339: Percentage of gaps

	Slovenia	Croatia	Bosnia and Herzegovina	Montenegro	Albania	DAE
Gap	80.0	39.1	71.2	55.0	41.2	52
Total Gap	2.4	2.3	18.9	13.8	5.2	2
Covered	17.6	58.6	9.9	31.2	53.6	46

5.2.1. Distribution of gaps in Slovenia

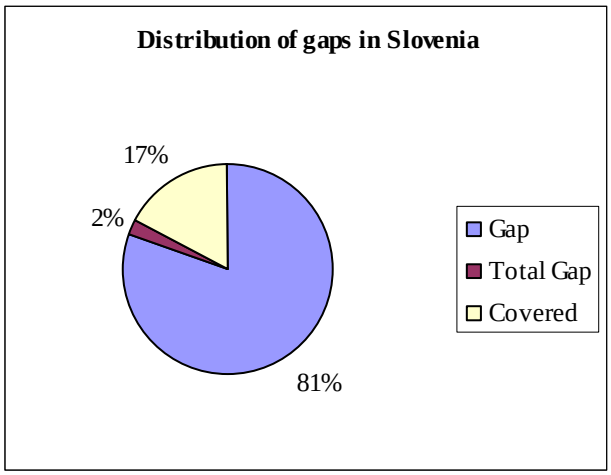


Figure 188: Percentage of gaps in Slovenia

Targets are not fully covered in Slovenia's PAs. Of a total 85 targets identified in Slovenia, only 15 (17.6 %) were found to be adequately covered within PAs, 68 (80.0 %) targets resulted in a gap and 2 (2.4 %) as a total gap. Although PAs seem to be adequately covered throughout different altitude belts, too little surface is covered with PAs (450.63 km^2, which is 6.79 % of the DAE part of the country). Gaps occur equally in all analysed groups of targets.

5.2.2. Distribution of gaps in Croatia

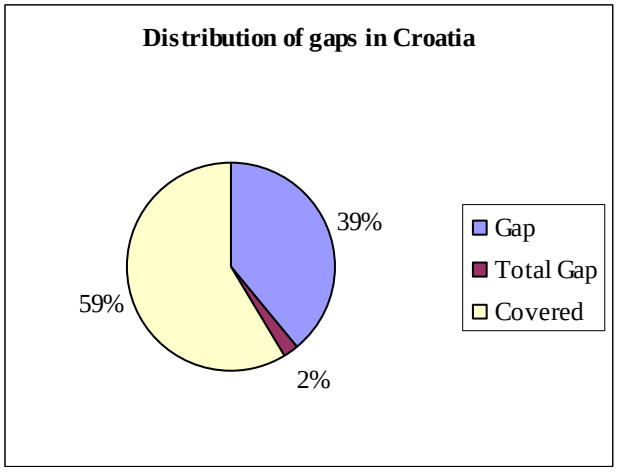


Figure 189: Percentage of gaps in Croatia

Altogether, 133 targets were identified in Croatia. 78 targets (58.6 %) were found to be covered, 52 (39.1 %) resulted in a gap and 3 (2 %) as a total gap.

In Croatia, terrestrial PAs cover a surface of 3975.57 km^2 (13.87 %), which should be considered adequately covered. However, important gaps were identified. According

to the results, Croatia's PAs system adequately covers land at higher altitudes, while lowlands and hilly areas (between 0 and 600 m.a.s.l.) are not adequately covered with PAs. This also appeared in the distribution of gaps, which predominantly occur in lowland targets. Forests of the coastal and mountain areas are adequately covered, while those in the lower hilly areas are found to be gaps. Karstic fields, which are widely distributed in the country, are not adequately covered with PAs.

Important gaps were also identified among reptiles, especially in species which occur in the warmest lowland areas. Important gaps were identified also in freshwater fish. The great majority of them are endemic to the region and in most cases they were found to be inadequately covered with PAs. The table below indicates the distribution of gaps among endemic fresh water fish species of Croatia.

Table 340: Distribution of gaps among endemic fresh water fish of Croatia

Species	
Cobitis dalmatina	G
Cobitis narentana	G
Aulopyge huegeli	C
Chondrostoma knerii	G
Chondrostoma phoxinus	G
Leuciscus svallize	C
Phoxinellus adspersus	C
Phoxinellus alepidotus	G
Phoxinellus croaticus	C
Phoxinellus dalmaticus	C
Phoxinellus fontinalis	G
Phoxinellus ghetaldii	G
Phoxinellus jadovensis	T
Phoxinellus krbavensis	G
Phoxinellus metohiensis	C
Rutilus basak	G
Scardinius dergle	C
Squalius illyricus	G
Squalius microlepis	G
Squalius zrmanjae	C
Telestes polylepis	G
Telestes turskyi	G
Telestes ukliva	G
Knapowitschia croatica	G
Knapowitschia mrakovcici	C
Knapowitschia radovici	C
Salmo visovacensis	C
Salmo zrmanjensis	C
Salmothymnus obtusirostris	G

5.2.3. Distribution of gaps in Bosnia and Herzegovina

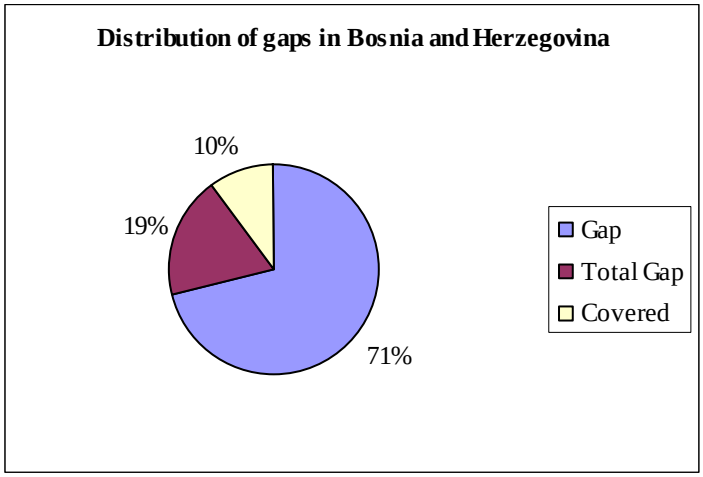


Figure 190: Percentage of gaps in Bosnia and Herzegovina

Bosnia and Herzegovina was found to have the most significant number of gaps in the region. This is mainly due to the scarce surface represented by PAs (1082.93 km^2 (2.63 %) of the area within the DAE). In total, 111 targets were identified in the country, of which 79 (71.2 %) resulted in a gap and 21 (18.9 %) as total gaps. Only 11 targets (9.9 %) can be considered covered. Gaps occur evenly in all analysed groups of targets. All marine targets are identified as gaps, since there are no marine PAs.

5.2.4. Distribution of gaps in Montenegro

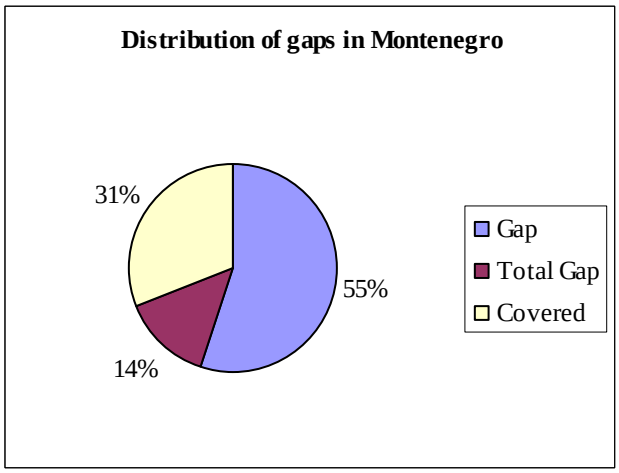


Figure 191: Percentage of gaps in Montenegro

In Montenegro, 109 targets were identified, of which 60 (55 %) resulted in a gap, while 15 (14 %) as a total gap. 34 targets were found to be covered. In Montenegro, only 1009.1 km^2 of the land (6.20 %) is covered with PAs. Even though the majority of PAs occur in the lowlands, a great number of gaps are also found in lowland targets. This is because the majority of the PA's surface is represented by lakes, which are not an adequate habitat for terrestrial targets and forests. Gaps are equally

distributed in all groups of targets. Only high mountain targets are found to be relatively well covered with PAs. There are no marine PAs in Montenegro.

5.2.5. Distribution of gaps in Albania

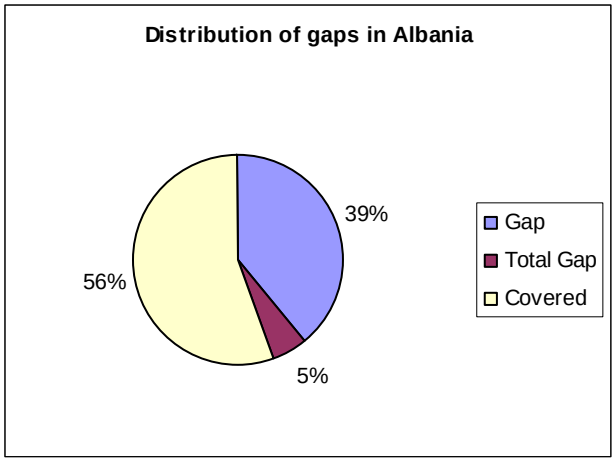


Figure 192: Percentage of gaps in Albania

In Albania, 97 targets were identified, of which 38 (39.2 %) were gaps and 5 (5 %) total gaps. 54 targets (55.6 %) were covered. 1279.13 km^2 (9.86 %) are covered with PAs. The great majority of PAs occur in the lowlands, therefore lowland targets were more adequately covered than targets of hilly areas and higher altitudes. There are no marine PAs in Albania.

5.2.6. Distribution of gaps in the DAE

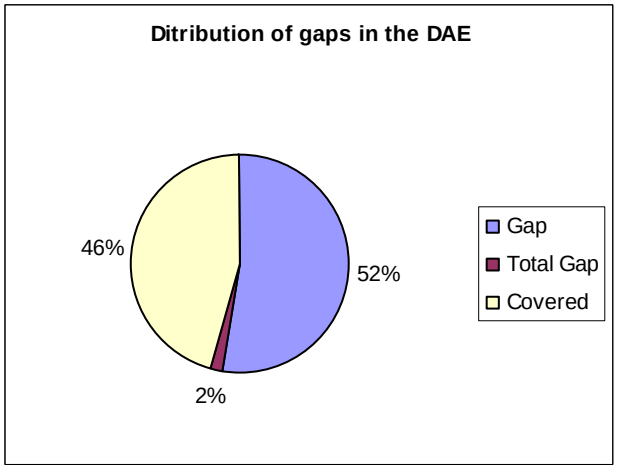


Figure 193: Percentage of gaps in the DAE

On a regional level, 157 targets were identified. 81 targets (52 %) were gaps, while 3 (2 %) total gaps. 72 targets (46 %) were adequately covered with PAs. A total of 8,806.72 km^2 are covered with PAs, which is only 6.40 % of the total DAE. On the regional scale, lowland and high mountain targets are better represented in PAs than hilly area targets.

5.3. Biodiversity targets Gap Analysis

Tables: 21 – 342

5.3.1. Forests

5.3.1.1. Evergreen forests & scrubs

Surface of target in DAE	**km²**		**%**	
	1,046.29		1.02	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	905.55	3.16	0.89
	Bosnia and Herzegovina	1.10	0.00	0.00
	Montenegro	115.28	0.83	0.11
	Albania	24.36	0.21	0.02

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	IV	5.40	22.17
	V	3.73	15. 31
	Total	9.13	37. 48
Bosnia and Herzegovina	I/IV	0.38	34.55
	Total	0.38	34.55
Croatia	I/IV	42.04	4.64
	II	17.55	1.94
	V	41.75	4.61
	V/VI	21.37	2.36
	Total	122.71	13.55
Montenegro	III	0.03	0.02
	Total	0.03	0.02
DAE	**Total**	132.25	12.63

Evergreen forests and shrubs cover an area of 1046.29 km^2, which is 1.02 % of the DAE. The great majority of the target is in Croatia. This vegetation type does not occur in Slovenia. In total, 132.25 km^2 (12.63 %) of the target is in PAs, therefore the target was found to be covered on the regional level. In Croatia, 122.71 km^2 (13.55 %) of the target is represented in PAs, only 17.55 km^2 (1.94 %) in IUCN II category. The target is well represented in PAs of Albania (9.13 km^2; 58.45 %). This target is a gap in Montenegro, with only 0.03 km^2 (0.02 %) being represented within PAs.

5.3.1.2. Oriental hornbeam forests

Surface of target in DAE	**km²**		**%**	
	2,778.45		2.71	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0.00	0.00	0.00
	Croatia	1.808.08	6.31	1.77
	Bosnia and Herzegovina	350.96	0.85	0.34
	Montenegro	348.41	2.51	0.34
	Albania	271.00	2.29	0.27

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	15.53	5.73
	IV	4.47	1.65
	V	3.21	1.18
	Total	23.21	8.56
Bosnia and Herzegovina	V	4.67	1.33
	Total	4.67	1.33
Croatia	I/IV	5.30	0.29
	II	22.52	1.25
	III	0.01	0.00
	V	46.12	2.55
	V/VI	24.85	1.37
	Total	98.79	5.46
Montenegro	II	12.59	3.61
	III/V	0.75	0.22
	Total	13.34	3.83
Slovenia	III	0.01	0.00
	V	0.01	0.00
	Total	0.02	0.00
DAE	**Total**	140.03	5.04

Oriental hornbeam forests cover an area of 2778.45 % km^2. This target is a gap in all DAE countries because just 140.03 km^2 (5.04 %) are represented in PAs. The target is practically non existing in Slovenia. In Croatia, where the target is the most abundant (1808.08 km^2), only 78.82 km2 (4.36 %) are represented in PAs (Only 22.52 km^2 in IUCN category II). The situation is similar in Bosnia and Herzegovina (4.67 km^2; 1.33 %), Albania (23.21 km^2; 8.56 %) an Montenegro (13.34 km^2; 3.83 %).

5.3.1.3. Thermophilous and supra-Mediterranean oak woods

Surface of target in DAE	**km²**		**%**	
	5.150.45			5.02
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	668.21	10.35	0.65
	Croatia	1,101.13	3.84	1.08
	Bosnia and Herzegovina	1,997.84	4.85	1.96
	Montenegro	1,092.67	7.87	1.07
	Albania	290.60	2.46	0.28

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	29.25	10.07
	IV	0.00	0.00
	V	0.00	0.00
	Total	29.25	10.07
Bosnia and Herzegovina	II	23.81	1.19
	V	31.06	1.55
	Total	54.87	2.75
Croatia	I/IV	0.73	0.07
	II	0.67	0.06
	III	0.01	0.00
	V	13.75	1.25
	V/VI	70.77	6.43
	Total	85.93	7.80
Montenegro	II	75.47	6.91
	III/V	16.20	1.48
	Total	91.67	8.40
Slovenia	III	2.12	0.32
	IV	0.22	0.03
	V	36.23	5.42
	V/II	2.86	0.43
	Total	41.42	6.20
DAE	**Total**	303.14	5.89

Thermophilous and supra-Mediterranean oak woods are relatively widespread targets in DAE (5150.45 km^2), but underrepresented in PAs (303.14 km^2; 5.89 %). The only country where the target is not a gap is Albania, with 29.25 km^2 (10.07 %) covered with PAs. In Bosnia and Herzegovina, where the target is the most abundant (1997.84 km^2) only 54.87 km^2 (2.75 %) are present in PAs, 23.81 km^2 (1.19 %) in IUCN II. In Croatia 85.93 km^2 (7.80 %) are represented in PAs, only 0.67 km^2 (0.06 %) in IUCN category II. This target is a gap also in Montenegro with 91.67 km^2 (8.40 %) in PAs, of which 75.47 km^2 (6.91 %) in IUCN category II, and in Slovenia, where 41.42 km^2 (6.20 %) are in PAs.

5.3.1.4. Thermophilous beech forests

Surface of target in DAE	**km²**		**%**	
	3,462.54		3.37	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	486.19	7.53	0.48
	Croatia	1,131.84	3.95	1.11
	Bosnia and Herzegovina	604.82	1.47	0.59
	Montenegro	308.65	2.22	0.30
	Albania	931.04	7.87	0.91

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	15.39	1.65
	VI	1.53	0.17
	Total	16.91	1.82
Bosnia and Herzegovina	V	57.45	9.50
	Total	57.45	9.50
Croatia	I/IV	0.75	0.07
	II	46.55	4.11
	V	19.27	1.70
	V/VI	296.91	26.23
	Total	363.48	32.11
Montenegro	II	8.02	2.60
	Total	8.02	2.60
Slovenia	III	6.79	1.40
	V	23.28	4.79
	V/II	4.58	0.94
	Total	34.65	7.13
DAE	**Total**	480.51	13.87

Thermophilous beech forests are not gaps in the DAE. 480.51 km^2 (13.87 %) of the target is represented in PAs, of which 363.48 km^2 (32.11 %) in PAs of Croatia where this target is the most abundant (1131 km^2). The target is underrepresented in the other countries of the region. In Albania only 16.91 km^2 (1.82 %) of the target is present in PAs. PAs of Bosnia and Herzegovina encompass 57.45 km^2 (9.50 %), which is still a gap. In PAs of Montenegro the target occurs only on 8.02 km^2 (2.60 %), all in IUCN category II. The target is a gap also in Slovenia, with 34.65 km^2 (7.13 %) represented within PAs.

5.3.1.5. Montane and subalpine beech forests

Surface of target in DAE	**km²**		**%**	
	24,120.21		23.53	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	2,829.54	43.83	2.77
	Croatia	5,630.46	19.64	5.52
	Bosnia and Herzegovina	11,395.72	27.64	11.17
	Montenegro	2,499.27	18.00	2.45
	Albania	1,765.22	14.93	1.73

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	198.82	11.92
	III	0.12	0.01
	IV	0.45	0.03
	V	18.35	1.10
	VI	40.69	2.44
	Total	258.43	15.49
Bosnia and Herzegovina	II	182.50	1.60
	III	46.77	0.41
	V	43.83	0.39
	Total	273.09	2.40
Croatia	I	14.89	0.26
	I/IV	7.39	0.13
	II	343.32	6.10
	III	0.21	0.00
	IV	0.00	0.00
	V	45.00	0.80
	V/VI	955.62	16.97
	Total	1,366.45	24.27
Montenegro	II	68.49	2.92
	III/V	5.67	0.24
	Total	74.16	3.16
Slovenia	III	8.13	0.29
	IV	11.06	0.39
	V	40.74	1.44
	V/II	147.87	5.23
	Total	207.80	7.34
DAE	**Total**	2,179.93	9.04

Montane and subalpine beech forests are the most widespread types of forest occurring in the DAE (24,120.21 km^2). It is a predominant forest type on higher altitudes and cooler conditions, especially in inland regions. The target is a gap, since it is underrepresented in PAs (2179.93 km^2; 9.04 %). This target is adequately represented only in PAs of Croatia (1366.45 km^2; 24.27 %) and Albania (258.43 km^2; 15.49 %). Although the great majority of the target is in Bosnia and Herzegovina, it is a gap, because only 273.09km^2 (2.40 %) are represented in PAs. In Slovenia this target covers 43.83 % of the Dinaric part of the country, but just 207.80 km^2 (7.34 %) are represented in PAs. In Montenegro, 2499.27 km^2 (18.00 %) are covered, only 74.16 km^2 (3.16 %) in PAs.

5.3.1.6. Oak-hornbeam forests

Surface of target in DAE	**km^2**		**%**	
	6,308.09		6.15	
Surface of target in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	339.02	5.25	0.33
	Croatia	866.16	3.02	0.85
	Bosnia and Herzegovina	4151.61	10.07	4.07
	Montenegro	313.56	2.26	0.31
	Albania	637.74	5.39	0.62

Country	**PA category**	**Surface in PA (km^2)**	**Surface in PA (%)**
Albania	II	7.74	1.21
	III	0.11	0.02
	VI	7.68	1.20
	Total	15.53	2.44
Bosnia and Herzegovina	II	85.01	2.05
	Total	85.01	2.05
Croatia	II	3.03	0.35
	III	1.24	0.14
	V	1.03	0.12
	V/VI	16.78	1.94
	Total	22.08	2.55
Montenegro	**Total**	0	0
Slovenia	III	1.15	0.34
	IV	0.06	0.02
	V	16.64	4.91
	Total	17.86	5.27
DAE	**Total**	140.48	2.22

Oak-hornbeam forests are common in the DAE (6308.09 km^2). With just 140.48 km^2 (2.22 %) in PAs, this target is a gap. It is a gap in all the DAE countries. In Montenegro it is a total gap. In other DAE countires the target is covered as follows: Albania 15.53 km^2 (2.44 %), Bosnia and Herzegovina 85.01 km^2 (2.05 %), Croatia 22.08 km^2 (2.55 %) and Slovenia 17.86 km^2 (5.27 %).

5.3.1.7. Hygrophilic forests of common oak

Surface of target in DAE	**km²**		**%**	
	507.39		0.49	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	14.98	0.23	0.01
	Croatia	100.51	0.35	0.10
	Bosnia and Herzegovina	391.90	0.95	0.38
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	V/VI	0.87	0.87
	Total	0.87	0.87
Slovenia	V	0.03	0.20
	V/II	4.31	28.77
	Total	4.35	28.97
DAE	**Total**	5.22	1.02

Hygrophilic forests of common oak occur mainly on wet lowlands in the northern part of the region. With only 5.22 km^2 (1.02 %) covered with PAs this target is a gap in the region. The majority of the target is in Bosnia and Herzegovina, 391.90 km^2, but it does not occur in any PAs, therefore it is a total gap. This target is a gap also in Croatia, with only 0.87 km^2 (0.87 %) covered with PAs. In Slovenia 14.98 km^2 are adequately covered (4.35km^2; 28.97 %) by PAs.

5.3.1.8. Coastal flooded forests of ash and common oak

Surface of target in DAE	**km²**		**%**	
	168.06		0.16	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	4.35	0.07	0.00
	Croatia	61.85	0.47	0.13
	Bosnia and Herzegovina	71.07	0.17	0.07
	Montenegro	26.01	0.19	0.03
	Albania	4.78	0.04	0.00

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	IV	2.32	48.54
	V	0.25	5.23
	Total	2.56	53.56
Bosnia and Herzegovina	V	0.39	0.55
	Total	0.39	0.55
Croatia	I/IV	2.91	4.71
	III	0.00	0.01
	V	1.94	3.14
	V/VI	2.56	4.13
	Total	7.42	11.99
Montenegro	II	6.22	23.90
	Total	6.22	23.90
Slovenia	III	0.01	0.23
	V	0.03	0.70
	V/II	0.58	13.33
	Total	0.62	14.25
DAE	Total	17.21	10.24

Coastal flooded forests of ash and common oak occur on 240.57 km^2, which is 0.23 % of the total DAE. 17.21 km^2 (10.24 %) are covered with PAs, therefore the target is adequately covered at the regional level. In Albania 2.56 km^2 (70.36 %) of the total 4.35 km^2 are covered with PAs. The target does not occur in IUCN category II PAs of Albania. In Slovenia it also occurs on small surface areas (4.35 km^2) where 0.62 km^2 (13.42 %) are covered with PAs. In Croatia 7.42 km^2 (11.99 %) of total 61.85 km^2 are covered with PAs. It is not represented in IUCN category II PAs. In Montenegro 6.22 km^2 (23.90 %) are in PAs, all in IUCN category II. This target is a gap in Bosnia and Herzegovina, where only 0.39 km^2 (0.55 %) of total 71.07 km^2 are covered with PAs.

5.3.1.9. Spruce and fir forests

Surface of target in DAE	**km²**		**%**	
	1658.64		1.62	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	20.30	0.31	0.02
	Croatia	81.68	0.28	0.08
	Bosnia and Herzegovina	755.18	1.83	0.74
	Montenegro	790.74	5.69	0.77
	Albania	10.74	0.09	0.00

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	2.82	26.26
	Total	2.82	26.26
Bosnia and Herzegovina	II	3.44	0.46
	III	6.03	0.80
	V	0.78	0.10
	Total	10.25	1.36
Croatia	I/IV	5. 59	3.35
	II	0.56	0.69
	V	2.49	3.05
	Total	8.61	7.09
Montenegro	II	33.43	4.23
	III/V	1.50	0.20
	Total	34.93	4.42
Slovenia	**Total**	0	0
DAE	**Total**	56.61	3.41

Spruce and fir forests are gaps in all the DAE, because just 56.61 km^2 (3.41 %) are found within PAs. Only in Albania, where only small patches of spruce and fir forests occur, the target is well represented in PAs (2.82 km^2 26.26 %). The largest areas of the target occur in Bosnia and Herzegovina (755.18 km^2) where only 10.25 km^2 (1.36 %) are found in PAs. In Montenegro the target occurs on 790.74 km^2 and only 34.93 km^2 (4.42 %) are covered with PAs. 8.61 km^2 (7.09 %) are on PAs in Croatia. In Slovenia this target is identified as a total gap (no occurance on PAs).

5.3.1.10. Omorika spruce forests

Surface of target in DAE	**km²**		**%**	
	6.02		0	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	6.02	0.01	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
DAE	**Total**	0	0

Omorika spruce forests are found only in Bosnia and Herzegovina on a small surface of 6.02 km², but not a part of this area is included in PAs . Therefore, it is a total gap at the country level (BiH) and at the regional level too.

5.3.1.11. Forests of Heldreich's pine

Surface of target in DAE	**km²**		**%**	
	287.07		0.28	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	56.09	0.14	0.05
	Montenegro	120.61	0.83	0.12
	Albania	110.37	0.93	0.11

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	0.90	0.82
	Total	0.90	0.82
Bosnia and Herzegovina	V	6.67	11.90
	Total	6.67	11.90
Montenegro	II	7.72	6.40
	III/V	10.29	8.53
	Total	18.00	14.93
DAE	**Total**	25.57	8.90

Forests of Heldreich's pine occur on 287.07 km² in Albania, Bosnia and Herzegovina and Montenegro. With 25.57 km² (8.90 %) within PAs, it is a gap, although the target is well covered within PAs of Bosnia and Herzegovina (6.67 km²; 11.90 %) and Montenegro (18.00 km²; 14.93 %). In Albania the target is covered only in IUCN category V. In Albania it is a gap, since only 0.90 km² (0.82 %) are covered within PAs.

5.3.1.12. Forests of Macedonian pine

Surface of target in DAE	**km^2**		**%**	
	181.05		0.17	
Surface of target in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	143.41	1.03	0.14
	Albania	37.64	0.32	0.04

Country	**PA category**	**Surface in PA (km^2)**	**Surface in PA (%)**
Albania	II	3.14	8.34
	Total	3.14	8.34
Montenegro	**Total**	0	0
DAE	**Total**	3.14	1.73

Forests of Macedonian pine occur on 181.05 km^2 in Montenegro and Albania. Only 3.14 km^2 (1.73 %) are covered with PAs, which are all located in Albania (3.14 km^2; 8.34 %). The target is a total gap in Montenegro.

5.3.1.13. Shrubs of mountain pine

Surface of target in DAE	**km^2**		**%**	
	327.97		0.32	
Surface of target in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	3.94	0.06	0
	Croatia	110.84	0.39	0.11
	Bosnia and Herzegovina	83.39	0.20	0.08
	Montenegro	113.27	0.82	0.11
	Albania	16.53	0.14	0.02

Country	**PA category**	**Surface in PA (km^2)**	**Surface in PA (%)**
Albania	II	4.37	26.44
	Total	4.37	26.44
Bosnia and Herzegovina	II	4.29	5.14
	V	0.89	1.07
	Total	5.18	6.21
Croatia	I	3.80	3.43
	I/IV	0.18	0.17
	II	33.10	29.86
	V/VI	37.90	34.20
	Total	74.99	67.66
Montenegro	II	10.71	9.46
	III/V	12.97	11.45
	Total	23.68	20.91
Slovenia	IV	1.34	34.01
	Total	1.34	34.01
DAE	**Total**	109.56	33.40

Shrubs of mountain pine occur on highest elevations throughout the DAE, on surface area of 327.97 km^2. The target is adequately covered with PAs, since 109.56 km^2 (33.40 %) are within PAs. Only in Bosnia and Herzegovina it is a gap, with 5.18 km^2 (6.21 %) in PAs. The target is well represented in IUCN category I (only in Croatia) and category II.

5.3.2. Other terrestrial targets

5.3.2.1. Bogs

Surface of target in DAE	**km^2**		**%**	
	228.31		0.22	
Surface of target in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	24.07	0.37	0.02
	Croatia	31.58	0.11	0.03
	Bosnia and Herzegovina	42.33	0.10	0.04
	Montenegro	121.31	0.87	0.12
	Albania	9.02	0.08	0.01

Country	**PA category**	**Surface in PA (km^2)**	**Surface in PA (%)**
Albania	II	0.35	3.87
	IV	8.67	96.13
	Total	9.02	100.00
Bosnia and Herzegovina	III	0.16	0.38
	Total	0.16	0.38
Croatia	II	1.49	4.71
	Total	1.49	4.71
Montenegro	II	120.88	99.65
	Total	120.88	99.65
Slovenia	**Total**	0	0
DAE	**Total**	131.55	57.61

Bogs occur on a surface area of 228.31 km^2, which represents 0.22 % of the region. The largest areas of bogs are in Montenegro (121.31 km^2). On the regional level, bogs are adequately covered, with 131.55 km^2 (57.61 %) within PAs. In Slovenia the target is a total gap. The target is not adequately covered in Bosnia and Herzegovina, with only 0.16 km^2 (0.38 %) and in Croatia, with 1.49 km^2 (4.71 %) within PAs. The target is adequately covered in Montenegro and Albania. In Montenegro, the target is totally covered within IUCN category II PA.

5.3.2.2. Canyons

Surface of target in DAE	**km²**		**%**	
	1,001.35		0.98	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	18.84	0.29	0.02
	Croatia	110.91	0.39	0.08
	Bosnia and Herzegovina	452.15	1.10	0.44
	Montenegro	395.08	2.85	0.39
	Albania	24.37	1.10	0.02

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	**Total**	0	0
Bosnia and Herzegovina	II	23.71	5.24
	III	0.20	0.04
	III/V	5.64	1.25
	V	27.29	6.03
	Total	56.83	12.57
Croatia	I/IV	8.70	7.84
	II	23.95	21.60
	III	0.02	0.02
	V	32.34	29.16
	V/VI	5.03	4.53
	Total	70.03	63.14
Montenegro	II	125.67	31.81
	III/V	40.55	10.26
	Total	166.22	42.07
Slovenia	III	0.13	0.68
	V	2.04	10.84
	V/II	1.90	10.09
	Total	4.07	21.60
DAE	**Total**	297.15	29.67

Canyons are well represented in PAs of the region (297.15 km^2; 29.67 %). In Albania the target is a total gap. In other countries of the region the target is adequately covered. In Croatia and in Montenegro the target is well represented in IUCN category II PAs.

5.3.2.3. Streams and rivers

Country	PA category	Length of rivers in PAs (km)	% of river in PAs
Albania	II	76.51	4.27
	IV	23.98	1.34
	V	70.86	3.95
	VI	0.42	0.02
	Total	171.78	9.58
Bosnia and Herzegovina	V	5.39	1.25
	Total	5.39	1.25
Croatia	I/IV	25.60	2.72
	II	37.53	3.98
	III	1.39	0.15
	V	68.75	7.30
	V/VI	39.59	4.20
	Total	172.86	18.35
Montenegro	II	35.70	11.79
	III/V	0.17	0.06
	V	0.89	0.29
	Total	36.76	12.14
Slovenia	III	5.88	3.52
	V	18.02	10.79
	V/II	3.17	1.90
	Total	27.07	16.21
DAE	**Total**	413.86	

Altitude class	Country	PA Category	Total Length	Length	% of lenght in PA
0-100	Albania	IV	832.72	47.46	5.70
0-100		V	832.72	141.19	16.96
Total				**188.65**	**22.65**
100-750	Albania	II	2,230.63	108.83	4.88
100-750		VI	2,230.63	0.85	0.04
Total				**109.67**	**4.92**
750-2750	Albania	II	519.60	44.20	8.51
Total				**44.20**	**8.51**
0-100	Bosnia and Herzegovina	V	247.15	10.77	4.36
Total				**10.77**	**4.36**
0-100	Croatia	I/IV	523.26	26.49	5.06
0-100		II	523.26	20.49	3.92
0-100		III	523.26	2.43	0.46
0-100		V	523.26	44.96	8.59
0-100		V/VI	523.26	28.30	5.41
Total				**122.67**	**23.44**
100-750	Croatia	I/IV	1,322.54	23.31	1.76
100-750		II	1,322.54	54.57	4.13
100-750		III	1,322.54	0.25	0.02
100-750		V	1,322.54	91.61	6.93
100-750		V/VI	1,322.54	42.28	3.20
Total				**212.01**	**16.03**

Altitude class	Country	PA Category	Total Length	Length	% of lenght in PA
750-2750	Croatia	V	34.02	0.85	2.50
750-2750		V/VI	34.02	8.61	25.30
Total				**9.46**	**27.80**
0-100	Montenegro	II	332.62	70.42	21.17
0-100		III/V	332.62	0.30	0.09
0-100		V	332.62	1.77	0.53
Total				**72.50**	**21.80**
100-750	Montenegro	II	238.07	0.66	0.28
Total				**0.66**	**0.28**
0-100	Slovenia	III	43.08	3.91	9.08
Total				**3.91**	**9.08**
100-750	Slovenia	III	119.41	0.64	0.54
100-750		V	119.41	15.29	12.80
100-750		V/II	119.41	3.17	2.65
Total				**19.10**	**15.99**
750-2750	Slovenia	V	2.73	2.73	100.00
Total				**2.73**	**100.00**

Total length of rivers was used for analyzing how they are represented in PAs. Only main water courses were selected, supposing that if sufficient portion of river length is covered with PAs, then its smaller tributaries should also be considered as covered. The same methodology was used for other targets. Rivers of Albania and Bosnia and Herzegovina are not adequately represented within PAs, with respectively 171.78 km^2 (9.58 %) and 5.39 km (1.25 %) of watercourses in PAs. In Slovenia, Croatia and Montenegro, watercourses are adequately covered.

5.3.2.4. Mediterranean lakes

Surface of target in DAE	**km^2**		**%**	
	432.37		0.42	
Surface of target in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	63.36	0.22	0.06
	Bosnia and Herzegovina	0.05	0.00	0.00
	Montenegro	214.72	1.55	0.21
	Albania	154.24	1.30	0.15

Country	**PA category**	**Surface in PA (km^2)**	**Surface in PA (%)**
Albania	IV	154.07	99.89
	Total	154.07	99.89
Croatia	I/IV	4.24	6.69
	II	6.77	10.68
	V	12.00	18.93
	V/VI	27.71	43.73
	Total	50.72	80.04
Montenegro	IV	0.12	0.06
	II	211.36	98.43
	Total	211.48	98.49
DAE	**Total**	416.27	96.27

Mediterranean lakes occupy a surface area of 432.37km^2. This target has been identified in Croatia, Montenegro and Albania. In all the three countries, the target is adequately represented on PAs. In Croatia 50.72 km2 (80.04 %), in Montenegro 211.48 km2 (98.49 %), in Albania 154,07 km2 (99.89 %) are within PAs. Only in Croatia and in Montenegro the target is adequately represented within IUCN category II PAs.

5.3.2.5. High mountain lakes

Surface of target in DAE	**km²**		**%**	
	7.18		0.01	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	4.86	0.01	0.00
	Montenegro	1.73	0.01	0.00
	Albania	0.59	0.00	0.00

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	**Total**	0	0
Bosnia and Herzegovina	V	3.37	69.34
	Total	3.37	69.34
Montenegro	II	1.07	61.85
	Total	1.07	61.85
DAE	**Total**	4.44	61.83

High mountain lakes are adequately covered with PAs of the DAE (4.44 km^2; 61.83 %). On country level, the target is adequately covered in Bosnia and Herzegovina, with 3.37 km^2 (69.34 %) and in Montenegro, with 1.07 km^2 (61.85 %) covered within PAs. In Albania the target is a total gap.

5.3.2.6. High mountain grasslands (‘rudine’)

Surface of target in DAE	**km²**		**%**	
	1,398.99		1.36	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0.10	0.00	0.00
	Croatia	21.15	0.02	0.07
	Bosnia and Herzegovina	459.53	0.45	1.11
	Montenegro	561.57	0.55	4.04
	Albania	356.64	0.35	3.02

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	17.78	4.99
	Total	17.78	4.99
Bosnia and Herzegovina	III	2.60	0.57
	V	12.47	2.71
	II	18.91	4.11
	Total	33.98	7.39
Croatia	I/IV	0.11	0.52
	II	4.13	19.55
	V/VI	0.94	4.45
	Total	5.18	24.49
Montenegro	II	60.71	10.81
	Total	60.71	10.81
Slovenia	III	0.10	100.00
	Total	0.10	100.00
DAE	**Total**	117.75	8.41

High mountain grasslands (‘rudine’) occur on highest altitudes throughout the DAE. In Croatia and Slovenia, only small areas can be found, respectively 21.5 km^2 and 0.10 km^2. The target is more abundant in Bosnia and Herzegovina (459.53 km^2), Montenegro (561.57 km^2) and Albania (356.64 km^2). The target is not well represented on the regional level (117.70 km^2; 8.41 %). In Slovenia (0.10 km^2; 100 %), Croatia (5.18 km^2; 24.49 %) and Montenegro (60.71 km^2; 10.81 %) the target is not a gap. In Montenegro, the target is completely covered within IUCN category II. The target is a gap in Bosnia and Herzegovina, and in Albania, where respectively 33.98 km^2 (7.39 %) and 17,78 km^2 (4.99 %) are represented within PAs.

5.3.2.7. Thermophilous grasslands

Surface of target in DAE	**km²**		**%**	
	2431.52		2.37	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	89.23	1.38	0.09
	Croatia	964.19	3.36	0.94
	Bosnia and Herzegovina	998.35	2.42	0.98
	Montenegro	206.86	1.49	0.20
	Albania	172.89	1.46	0.17

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	7.62	4.41
	IV	10.15	5.87
	Total	17.78	10.28
Bosnia and Herzegovina	II	5.69	0.57
	V	13.46	1.35
	Total	19.15	1.92
Croatia	I/IV	2.98	0.31
	II	20.10	2.08
	III	0.01	0.00
	V	6.18	0.64
	V/VI	110.73	11.48
	Total	140.01	14.52
Montenegro	II	3.80	1.84
	Total	3.80	1.84
Slovenia	V/II	3.53	3.95
	III	1.42	1.59
	V	1.97	2.20
	Total	6.91	7.75
DAE	**Total**	187.65	7.71

Thermophilous grasslands cover 2.431.52 km^2 of the DAE. On a regional level, the target is a gap, since only 187.65 km^2 (7.71 %) are represented on PAs. Only in Albania and Croatia the target is covered, respectively 17.78 km^2 (10.28 %) and 140.01 km^2 (14.52 %). In Albania 7.62 km^2 (4.41 %) and in Croatia 20.10 km^2 (2.08 %) of the target were found to be within IUCN category II. In Bosnia and Herzegovina, where the target is the most abundant (998.35 km^2), only 5.69 km^2 (1.92 %) are within PAs. In Montenegro 3.80 km^2 (1.84 %) were found to be within PAs, all in IUCN category II. In Slovenia 6.91 km^2 (7.75 %) are on PAs.

5.3.2.8. Oromediterranean rocky habitats

Surface of target in DAE	**km²**		**%**	
	132.45		0.12	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	86.88	0.30	0.06
	Bosnia and Herzegovina	6.81	0.11	0.01
	Montenegro	19.02	0.14	0.02
	Albania	19.74	0.17	0.02

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	2.60	13.18
	Total	2.60	13.18
Bosnia and Herzegovina	II	0.50	7.34
	Total	0.50	7.34
Croatia	I/IV	2.61	3.00
	II	7.33	8.43
	V	1.01	1.16
	V/VI	19.32	22.24
	Total	30.27	34.84
Montenegro	III/V	0.33	1.71
	II	0.64	3.39
	Total	0.97	5.10
DAE	**Total**	34.34	25.92

Oromediterranean rocky habitats cover an area of 78.26 km^2. The great majority of the target is in Croatia. This target was not found in Slovenia. On a regional level, the target is adequately represented on PAs (34.34 km^2; 25.92 %). The target is a gap in Montenegro, where only 0.97 km^2 (5.10 %) are represented in PAs, and in Bosnia and Herzegovina, with 0.50 km^2 (7.34 %) on PAs. In Albania and Croatia the target is adequately represented in PAs. In Croatia 2.60 km^2 (13.28 %) are covered with PAs (all in IUCN category II), while in Albania 30.27 km^2 (34.84 %) are covered, of this 7.33 km^2 (8.43 %) within IUCN category II PAs.

5.3.2.9. High-mountain rocky habitats

Surface of target in DAE	**km²**		**%**	
	225.48		0.22	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0.17	0.00	0.00
	Bosnia and Herzegovina	26.12	0.06	0.03
	Montenegro	76.97	0.55	0.08
	Albania	122.22	1.03	0.12

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	38.24	31.29
	Total	38.24	31.29
Bosnia and Herzegovina	II	4.17	15.96
	Total	4.17	15.96
Croatia	II	0.14	79.17
	V/VI	0.04	20.83
	Total	0.17	100.00
Montenegro	III/V	2.16	2.81
	II	2.20	2.85
	Total	4.36	5.66
DAE	**Total**	46.95	20.82

High-mountain rocky habitats cover an area of 225.48 km^2. This target does not exist in Slovenia. It is very scarce in Croatia (0.17 km^2), and totally covered. On the regional level, it is well represented within PAs (46.95 km^2; 20.82 %). The majority of the target is in Montenegro (76.97 km^2) where it is a gap, since only 4.36 km2 (5.66 %) are covered. In Bosnia and Herzegovina 4.17 km^2 (15.96 %) are represented on PAs (all in IUCN category II). Also in Albania, the target is adequately represented (38.34 km^2 (31.29 %) (all in IUCN category II).

5.3.2.10. Karstic fields with surface hydrology

Surface of target in DAE	**km^2**		**%**	
	3,051.63		2.98	
Surface of target in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	201.16	3.11	3.12
	Croatia	1,283.11	4.47	4.48
	Bosnia and Herzegovina	1,496.60	3.63	3.63
	Montenegro	70.76	0.51	0.51
	Albania	0	0	0

Country	**PA category**	**Surface in PA (km^2)**	**Surface in PA (%)**
Bosnia and Herzegovina	V	51.85	3.46
	Total	51.85	3.46
Croatia	I/IV	1.57	0.12
	II	22.36	1.74
	III	0.20	0.02
	V	7.19	0.56
	V/VI	32.66	2.55
	Total	63.98	4.99
Montenegro	**Total**	0	0
Slovenia	III	1.41	0.70
	V	5.75	2.86
	V/II	34.80	17.30
	Total	41.95	20.86
DAE	**Total**	157.78	5.17

Karstic fields with surface water occupy an area of 3051.63 km^2, which is 2.98 % of the total DAE. This target is not present in Albania. On the regional level, the target is a gap, since only 157.78 km^2 (5.17 %) are represented on PAs. The target is adequately represented only in Slovenia (41.95 km^2; 20.86 %). In Croatia, the target is represented by 63.98 km^2 (4.99 %) within PAs. In Bosnia and Herzegovina, 51.85 km^2 (3.46 %) are covered with PAs. The target is a total gap in Montenegro.

5.3.3. Cave biodiversity

5.3.3.1. Coleoptera hotspots

Range in DAE	**km²**		**%**	
		8,045.58		7.84
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	3,163.80	49.01	3.10
	Croatia	1,263.78	4.41	1.24
	Bosnia and Herzegovina	2,529.56	6.14	2.48
	Montenegro	1,088.44	7.84	1.07
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	II	6.54	0.26
	Total	6.54	0.26
Croatia	I	3.71	0.29
	I/IV	13.10	1.04
	V	12.96	1.03
	N/A	1.57	0.12
	Total	31.34	2.48
Montenegro	II	32.44	2.98
	III/V	23.21	2.13
	V	0.05	0.00
	Total	55.7	5.11
Slovenia	III	19.12	0.60
	IV	13.13	0.42
	V	117.86	3.73
	V/II	222.76	7.04
	Total	372.87	11.79
DAE	**Total**	466.46	5.79

Coleoptera hotspots occur in cave ecosystems on an area of 8045.58 km^2. The great majority of C*oleoptera* hotspots were found in Slovenia (3163.80 km^2) and Bosnia and Herzegovina (2529.56 km^2). In Slovenia 372.87 km^2 (11.79 %) of this target is covered within PAs. However, it should be emphasized that great majority of PAs are designated for the protection of surface biodiversity and do not include all underground ecosystems, while a good system of PAs must ensure viable conditions also for underground ecosystems. This is especially true for Karstic areas where surface and underground ecosystems are directly connected. In Croatia, Bosnia and Herzegovina and Montenegro existing PA systems do not ensure sufficient protection of this target. In Croatia 31.34 km^2 (2.48 %) of the target are represented within PAs. Only 6.54 km^2 (0.26 %) are represented in Bosnia and Herzegovina. In Montenegro, only 55.7 km^2 (5.11 %) are within PAs.

5.3.3.2. *Congeria kusceri*

Range in DAE	**km²**		**%**	
	4,265.55		4.16	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	223.57	3.46	0.22
	Croatia	1,609.09	5.61	1.58
	Bosnia and Herzegovina	2,432.89	5.90	2.38
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	I/IV	10.12	0.42
	V	87.89	3.61
	Total	98.00	4.03
Croatia	I	12.98	0.81
	I/IV	41.65	2.59
	II	52.04	3.23
	V	6.37	0.40
	V/VI	223.99	13.92
	N/A	1.57	0.10
	Total	338.60	21.04
Slovenia	IV	0.22	0.10
	Total	0.22	0.10
DAE	**Total**	436.83	10.24

Congeria kusceri occurs in cave ecosystems on a surface of 4265.55 km². This target does not represent a gap in the DAE (436.83 km² (10.24 %)), but needs discussion as the previous target (see 5.3.3.1. *Coleoptera* hotspots). On country level, only in Croatia it does not represent a gap, since 338.60 km² (21.04 %) are represented in PAs. The major part of the range is in Bosnia and Herzegovina (2432.89 km²), where only 98.00 km² (4.03 %) are represented in PAs. Therefore the target has to be considered a gap in Bosnia and Herzegovina. Also in Slovenia the target should be considered a gap, since only 0.22 km² (0.10 %) are represented in PAs.

5.3.3.3. *Marifugia cavatica*

Range in DAE	**km²**		**%**	
	1,3761.91		13.42	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	3,118.89	48.32	3.06
	Croatia	5,547.08	19.35	5.44
	Bosnia and Herzegovina	5,072.87	12.31	4.97
	Montenegro	23.07	0.17	0.02
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	I/IV	10.12	0.20
	II	21.33	0.42
	V	87.91	1.73
	Total	119.35	2.35
Croatia	I	12.98	0.23
	I/IV	42.03	0.76
	II	192.64	3.47
	III	0.21	0.00
	V	27.62	0.50
	V/VI	225.98	4.07
	N/A	3.48	0.06
	Total	504.94	9.10
Montenegro	**Total**	0	0
Slovenia	III	13.09	0.24
	IV	2.36	0.08
	V	44.59	1.43
	V/II	4.02	0.13
	Total	64.05	2.05
DAE	**Total**	688.34	5.00

Marifugia cavatica occurs in underground ecosystems, occupying an area of 13,761.91 km^2. According to the existing system of PAs, this target is a gap, since only 688.34 km^2 (5.00 %) were found to be within PAs. The target is a gap in all Dinaric countries. In Slovenia, 64.05 km^2 (2.05 %) of the target are within PAs, in Croatia 504.94 km^2 (9.10 %) and in Bosnia and Herzegovina 119.35 km^2 (2.35 %). In Montenegro, the target was not found within PAs, and therefore it is as total gap. This target needs discussion as the previous target (see 5.3.3.1. *Coleopter*a hotspots).

5.3.3.4. *Velkovrhia enigmatica*

Range in DAE	**km²**		**%**	
	1,481.24		1.44	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	746.88	11.57	0.73
	Croatia	592.10	2.07	0.58
	Bosnia and Herzegovina	142.26	0.35	0.14
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	10.31	1.74
	Total	10.31	1.74
Slovenia	III	2.92	0.39
	V	7.90	1.06
	V/II	121.77	16.30
	Total	132.60	17.75
DAE	**Total**	142.91	9.65

Velkovrhia enigmatica occurs in underground ecosystems, occupying an area of 1481.24 km^2. The majority of the range is in Slovenia (746.88 km^2). According to the existing system of PAs, this target is a gap, since only 142.91 km^2 (9.65 %) are within PAs. The target is a gap also in Croatia with 10.32 km^2 (1.74 %) represented in PAs, and a total gap in Bosnia and Herzegovina, where the target is not represented on PAs at all. In Slovenia the target was found to be adequately covered (132.60 km^2; 17.75 %). This target needs discussion as the previous target (see 5.3.3.1. Coleoptera hotspots).

5.3.3.5. *Proteus anguinus*

Range in DAE	**km²**		**%**	
	1,6169.26		15.77	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	5,239.52	81.17	5.13
	Croatia	7,362.95	25.68	7.21
	Bosnia and Herzegovina	3,250.36	7.88	3.18
	Montenegro	316.43	2.28	0.31
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	I/IV	10.12	0.31
	V	18.25	0.56
	Total	28.37	0.87
Croatia	I/IV	36.03	0.49
	II	51.51	0.70
	III	0.38	0.01
	IV	33.22	0.45
	V/VI	375.77	5.10
	N/A	3.28	0.04
	Total	500.21	6.79
Montenegro	III/V	19.91	6.29
	Total	19.91	6.29
Slovenia	III	20.44	0.39
	IV	14.96	0.29
	V	145.26	2.77
	V/II	231.32	4.41
	Total	411.99	7.86
DAE	**Total**	960.48	5.94

Proteus anguinus occurs in underground ecosystems, occupying an area of 16,169.26 km^2. According to the existing system of PAs, this target is a gap, since only 960.48 km^2 (5.94 %) are within PAs. The target is also a gap in all countries of the region. In Slovenia 411.99 km^2 (7.86 %) of the target are covered with PAs, in Croatia 500.21 km^2 (6.79 %), in Bosnia and Herzegovina 28.37 km^2(0.87 %) and in Montenegro 19.91 km^2 (6.29 %). This target needs discussion as the previous target (see 5.3.3.1. *Coleoptera* hotspots).

5.3.4. Species

5.3.4.1. Small terrestrial mammals

5.3.4.1.1. *Sorex araneus*

Range in DAE	**km^2**		**%**	
	6,7090.46		65.74	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	6,455.32	100.00	6.33
	Croatia	13,000.58	45.35	12.74
	Bosnia and Herzegovina	33,809.96	82.02	33.13
	Montenegro	8,209.92	59.12	8.04
	Albania	5,614.68	47.48	5.50

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Albania	II	276.34	4.92
	III	0.58	0.01
	IV	0.47	0.01
	V	20.95	0.37
	VI	89.75	1.60
	Total	388.08	6.91
Bosnia and Herzegovina	II	430.88	1.27
	III	61.06	0.18
	V	241.93	0.72
	Total	733.86	2.17
Croatia	I	24.25	0.19
	I/IV	15.11	0.12
	II	472.38	3.63
	III	2.19	0.02
	V	86.41	0.66
	V/VI	1,655.58	12.73
	Total	2,255.92	17.35
Montenegro	II	414.37	5.05
	III/V	90.47	1.10
	Total	504.84	6.15
Slovenia	III	30.28	0.23
	IV	16.62	0.26
	V	170.72	1.31
	V/II	231.32	3.58
	Total	448.94	6.95
DAE	**Total**	4,331.64	6.45

Sorex araneus is a relatively widespread species that occurs on 67,090.46 km^2 (65.74 % of DAE). On the regional level, it is not adequately represented within PAs (4331.64 km^2; 6.45 %). Only in Croatia it was found to be covered, with 1932.56 km^2 (19.46 %) in PAs, of which 490.97 km^2 (3.78 %) are within IUCN category I and II. In Slovenia, Bosnia and Herzegovina, Montenegro and Albania this target is a gap, with 448.94 km^2 (5.39 %), 733.86 km^2 (4.21 %), 504.84 km^2 (6.15 %) and 388.08 km^2 (6.91 %) respectively within PAs.

5.3.4.1.2. *Sorex alpinus*

Range in DAE	**km^2**		**%**	
	45,444.6		44.53	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	5,279.94	81.80	5.17
	Croatia	9,929.80	34.64	9.73
	Bosnia and Herzegovina	22,169.95	53.78	21.72
	Montenegro	7,280.50	52.43	7.13
	Albania	784.41	6.63	0.77

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Albania	II	228.63	29.15
	Total	228.63	29.15
Bosnia and Herzegovina	II	226.01	1.02
	III	23.42	0.11
	V	470.07	2.12
	Total	719.49	3.25
Croatia	I	23.11	0.23
	I/IV	10.63	0.11
	II	427.42	4.30
	III	1.85	0.02
	V	53.14	0.54
	V/VI	1,416.41	14.26
	Total	1,932.56	19.46
Montenegro	II	414.37	5.69
	III/V	88.31	1.21
	Total	502.68	6.90
Slovenia	III	24.17	0.46
	IV	13.93	0.26
	V	135.73	2.57
	V/II	230.12	4.36
	Total	403.95	7.65
DAE	**Total**	3,787.31	8.33

Sorex alpinus occurs on 45,444.6 km^2 (44.53 % of DAE). The majority of the range is in Bosnia and Herzegovina (22169.95 km^2). The species is a gap on the regional level since not adequately (3787.31 km^2; 8.33 %) represented within PAs. On country level, it can be considered covered only in Croatia, with 1932.56 km^2 (19.46 %) (450.37 km^2; 4.53 % in IUCN category I and II) and Albania with 228.63 km^2 (29.15 %) (all in IUCN II) within PAs. The species is a gap in Slovenia, Bosnia and Herzegovina, and Montenegro, with respectively 403.95 km^2 (7.65 %), 719.49 km^2 (3.25 %) and 502.68 km^2 (6.90 %) in PAs.

5.3.4.1.3. *Sorex minutus*

Range in DAE	**km²**		**%**	
	74,371.06		72.87	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,455.38	100.00	6.33
	Croatia	13,756.82	47.99	13.48
	Bosnia and Herzegovina	36,530.24	88.61	35.79
	Montenegro	10,440.63	75.19	10.23
	Albania	7,187.99	60.78	7.04

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	306.24	4.26
	III	0.58	0.01
	IV	0.47	0.01
	V	20.95	0.29
	VI	106.11	1.48
	Total	434.34	6.04
Bosnia and Herzegovina	II	430.88	1.18
	III	61.06	0.17
	V	470.07	1.29
	Total	962.00	2.63
Croatia	I	24.25	0.18
	I/IV	16.00	0.12
	II	527.69	3.84
	III	2.04	0.01
	V	73.66	0.54
	V/VI	1,913.87	13.91
	Total	2,557.51	18.59
Montenegro	II	414.53	3.97
	III	1.26	0.01
	III/V	67.26	0.64
	V	0.05	0.00
	Total	483.10	4.63
Slovenia	III	30.33	0.47
	IV	16.62	0.26
	V	171.00	2.05
	V/II	231.32	3.58
	Total	449.27	6.96
DAE	**Total**	4,886.22	6.57

Sorex minutus is a relatively widespread species in the region with a range of 74,371.06 km^2 (which is 72.87 % of total DAE). The species can be considered a gap on the regional level, since it is insufficiently represented within PAs (4886.22 km^2; 6.57 %). Only in Croatia the species can be considered covered (2557.51 km^2; 18.59 %) within PAs. In Slovenia, Bosnia and Herzegovina, Montenegro and Albania the target is a gap, with respectively 449.27 km^2 (6.96 %), 962.00 km^2 (2.63 %), 483.10 km^2 (4.63 %), 434.34 km^2 (6.04 %) of the range represented in PAs.

5.3.4.1.4. *Neomys fodiens*

Range in DAE	**km²**		**%**	
		53,801.09		52.71
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	4,889.34	75.74	4.79
	Croatia	1,010.67	3.53	0.99
	Bosnia and Herzegovina	33,373.82	80.96	32.70
	Montenegro	8,532.59	61.45	8.36
	Albania	5,994.67	50.69	5.87

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	276.34	4.61
	III	0.58	0.01
	IV	0.47	0.01
	VI	106.11	1.77
	Total	383.49	6.40
Bosnia and Herzegovina	II	415.72	1.25
	III	61.06	0.18
	V	187.50	0.56
	Total	664.28	1.99
Croatia	I/IV	2.82	0.28
	II	8.44	0.83
	III	0.39	0.04
	V	2.60	0.26
	V/VI	338.64	33.51
	Total	352.89	34.92
Montenegro	II	414.37	4.86
	III	1.26	0.01
	III/V	67.26	0.79
	Total	482.88	5.66
Slovenia	III	16.95	0.35
	IV	9.64	0.20
	V	97.33	1.99
	V/II	227.30	4.65
	Total	351.22	7.18
DAE	**Total**	2,234.76	4.15

Neomys fodiens occurs on 53,801.09 km^2 (52.71 % of DAE). The majority of the range is in Bosnia and Herzegovina (33373.82 km^2). The species is a gap on the regional level, with only 2234.76 km^2 (4.15 %) within PAs. The target can be considered covered in Croatia, with 352.89 km^2 (34.92 %) within PAs, mainly in IUCN category V/VI. It can be considered a gap in the other four countries. The target is represented in PAs as follows: Slovenia 351.22 km^2 (7.18 %), Bosnia and Herzegovina 664.28 km^2 (1.99 %), Montenegro 482,88 km^2 (5.66 %) and Albania 383.49 km^2 (6.40 %).

5.3.4.1.5. *Neomys anomalus*

Range in DAE	**km²**		**%**	
	63,167.14		61.89	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,454.46	100.00	6.32
	Croatia	7,463.70	26.03	7.31
	Bosnia and Herzegovina	35,004.98	84.91	34.30
	Montenegro	7,954.29	57.28	7.79
	Albania	6,289.71	53.19	6.16

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	276.34	4.39
	III	0.58	0.01
	IV	0.47	0.01
	V	1.04	0.02
	VI	106.11	1.69
	Total	384.53	6.11
Bosnia and Herzegovina	II	430.47	1.23
	III	61.06	0.17
	V	470.07	1.34
	Total	961.59	2.75
Croatia	I	3.72	0.05
	I/IV	14.97	0.20
	II	168.89	2.26
	III	0.84	0.01
	V	75.06	1.01
	V/VI	595.64	7.98
	Total	859.13	11.51
Montenegro	II	414.37	5.21
	III/V	67.26	0.85
	Total	481.63	6.05
Slovenia	III	30.30	0.47
	IV	16.62	0.26
	V	170.61	2.64
	V/II	231.32	3.58
	Total	448.86	7. 00
DAE	**Total**	3,135.74	4.96

Neomys anomalus occurs on 63,167.14 km² (61.89 % of DAE). The majority of the range is in Bosnia and Herzegovina (35004.98 km²). This widespread species is a gap on the regional level (3135.74 km²; 4.96 %). The target can be considered covered in Croatia, with 859.13 km² (11.51 %) within PAs, mainly in IUCN category V/VI. In the other countries the target is a gap, represented in PAs as follows: Slovenia 448.86 km² (7.00 %), Bosnia and Herzegovina 961.59 km² (2.75 %), Montenegro 481.63 km² (6.05 %) and Albania 384.53 km² (6.11 %).

5.3.4.1.6. *Suncus etruscus*

Range in DAE	**km²**		**%**	
	21,020.75		20.60	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	894.35	13.86	0.88
	Croatia	11,876.37	41.43	11.64
	Bosnia and Herzegovina	2,496.89	6.06	2.45
	Montenegro	1,993.00	14.35	1.95
	Albania	3,760.14	31.80	3.68

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	35.91	0.96
	IV	311.85	8.29
	V	223.40	5.94
	VI	0.06	0.00
	Total	571.22	15.19
Bosnia and Herzegovina	I/IV	17.51	0.70
	V	116.24	4.66
	Total	133.75	5.36
Croatia	I/IV	176.89	1.49
	II	163.58	1.38
	III	0.69	0.01
	V	234.22	1.97
	V/VI	470.28	3.96
	Total	1,045.66	8.80
Montenegro	II	423.24	21.24
	III	1.31	0.07
	III/V	4.51	0.23
	V	0.05	0.00
	Total	429.11	21.53
Slovenia	III	1.76	0.01
	IV	1.89	0.21
	V	18.30	2.05
	Total	21.96	2.46
DAE	**Total**	2,201.70	10.47

Suncus etruscus occurs on 21,020.75 km^2 (20.60 % of DAE). On a regional level this target is adequately covered within PAs (2201.70 km^2; 10.47 %). The majority of the range of this target is in Croatia (11876.37 km^2), where it is not adequately covered (1045.66 km^2; 8.80 %). In Slovenia only 21.96 km^2 (2.46 %) are covered with PAs, and the target can be considered a gap. The target is a gap also in Bosnia and Herzegovina, where 133.75 km^2 (5.36 %) are covered within PAs. In Montenegro and Albania this target can be considered as covered, since respectively 429.11 km^2 (21.53 %) and 571.22 km^2 (15.19 %) are represented in PAs.

5.3.4.1.7. *Talpa europaea*

Range in DAE	**km²**		**%**	
	69,237.78		67.84	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,455.38	100.00	6.33
	Croatia	15,301.50	53.37	14.99
	Bosnia and Herzegovina	36,644.12	88.89	35.90
	Montenegro	7,631.24	54.96	7.48
	Albania	3,205.54	27.11	3.14

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	262.31	8.18
	IV	0.47	0.01
	Total	262.77	8.20
Bosnia and Herzegovina	II	430.88	1.18
	III	61.06	0.17
	V	470.07	1.28
	Total	962.00	2.63
Croatia	I	24.25	0.16
	I/IV	19.66	0.13
	II	481.92	3.15
	III	2.23	0.01
	V	107.18	0.70
	V/VI	1,631.97	10.67
	Total	2,267.22	14.82
Montenegro	II	414.37	5.43
	III/V	67.26	0.88
	Total	481.63	6.31
Slovenia	III	30.33	047
	IV	16.62	0.26
	V	171.00	2.65
	V/II	231.32	3.58
	Total	449.27	6.96
DAE	**Total**	4,422.89	6.38

Talpa europaea is a relatively widespread species occurring on 69,237.78 km^2, which is 67.84 % of the region. On the regional level, this target is a gap, since only 4422.89 km^2 (6.38 %) are represented in PAs. Only in Croatia with 2267.22 km^2 (14.82 %) the target can be considered covered. 500,51 km^2 (3.27 %) are covered within IUCN category I and II. It is a gap in all other countries. It occurs within PAs with 449.27 km^2 (6.96 %) in Slovenia, 962.00 km^2 (2.63 %) in Bosnia and Herzegovina, 481.63 km^2 (6.31 %) in Montenegro and 262.77 km^2 (8.20 %) in Albania respectively.

5.3.4.1.8. *Talpa caeca*

Range in DAE	**km²**		**%**	
	17,761.43		17.40	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	17.36	0.06	0.02
	Bosnia and Herzegovina	4,596.62	11.15	4.50
	Montenegro	6,325.62	45.55	6.20
	Albania	6,821.83	57.69	6.68

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	282.10	4.14
	III	0.58	0.01
	IV	0.47	0.01
	V	20.95	0.31
	VI	106.11	1.56
	Total	410.20	6.01
Bosnia and Herzegovina	II	50.71	1.10
	Total	50.71	1.10
Croatia	**Total**	0	0
Montenegro	II	179.55	2.84
	III	1.26	0.02
	III/V	49.21	0.78
	Total	230.02	3.64
DAE	**Total**	690.93	3.89

Talpa caeca occurs on 17,761.43 km^2 (17.40 % of the region). It can be considered a gap in the entire region, with 690.93 km^2 (3.89 %) within PAs. In Croatia it has a small range (17.36 km^2) and is not covered, therefore can be considered as a total gap. Only 50.71 km^2 (1.10 %) are covered with PAs in Bosnia and Herzegovina. The majority of the range is in Montenegro and Albania, 6325.62 km^2 and 6821.83 km^2 respectively. In both countries the target is a gap, with 230.02 km^2 (3.64 %) in PAs of Montenegro and 410.20 km^2 (6.01 %) in PAs of Albania, mainly IUCN category II. This target is not found in Slovenia.

5.3.4.1.9. *Talpa stankovici*

Range in DAE	**km²**		**%**	
	5,034.72		4.93	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	91.77	0.66	0.09
	Albania	4,942.95	41.80	4.84

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	321.53	6.50
	IV	59.28	1.20
	V	150.88	3.05
	VI	59.08	1.20
	Total	590.77	11.95
Montenegro	III/V	6.00	6.53
	Total	6.00	6.53
DAE	**Total**	596.76	11.85

Talpa stankovici occurs in Montenegro, on 91.77 km^2, and in Albania, on 4942.95 km^2. In the region it can be considered covered, with 596.76 km^2 (11.85 %) within PAs. The great majority of the range is covered within PAs of Albania (590.77 km^2;11.95 %), where 321.53 km^2 (6.50 %) are within IUCN category II PAs. In Montenegro it is a gap, since not adequately represented in PAs (6.00 km^2; 6.53 %). There is no range covered within IUCN category I or II in Montenegro.

5.3.4.1.10. *Dinaromys bogdanovi*

Range in DAE	**km²**		**%**	
		36,382.71		35.65
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	4,781.61	16.68	4.69
	Bosnia and Herzegovina	15,353.31	37.24	15.04
	Montenegro	9,720.06	70.00	9.52
	Albania	6,527.73	55.20	6.40

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	276.34	4.23
	III	0.58	0.01
	IV	16.24	0.25
	VI	106.11	1.63
	Total	399.27	6.12
Bosnia and Herzegovina	I/IV	0.04	0.00
	II	171.91	1.12
	V	550.01	3.58
	Total	721.96	4.70
Croatia	I	12.98	0.27
	I/IV	109.63	2.29
	II	224.93	4.70
	III	0.64	0.01
	V	51.28	1.07
	V/VI	1,476.69	30.88
	Total	1,876.14	39.24
Montenegro	II	582.11	5.99
	III	1.26	0.01
	III/V	72.43	0.75
	Total	655.80	6.75
DAE	**Total**	3,653.17	10.04

Dinaromys bogdanovi occurs in all countries, except Slovenia, on a range of 36,382.71 km^2, and is not a gap (3653.17 km^2; 10.04 %). This is the only small mammal endemic species of the Dinaric region, which occurs in specific habitats at higher altitudes, and according to recent studies, seems that its occurrence is very patchy throughout the area. Therefore strategies toward adequate conservation of this target are needed. The target is a gap in all Dinaric countries except Croatia, where 1876.14 km^2 (39.24 %) of the range are covered with PAs. In Bosnia and Herzegovina, with the majority of the range (15,353.31 km^2), 721.96 km^2 (4.70 %) are within PAs. 171.91 km^2 (1.12 %) are in IUCN category II. In Montenegro it is also a gap, since 655.80 km^2 (6.75 %) are covered. With 399.27 km^2 (6.12 %) within PAs, it is a gap also in Albania.

5.3.4.1.11. *Myodes glareolus*

Range in DAE	**km²**		**%**	
		60,935.22		59.70
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,126.91	94.92	6.00
	Croatia	10,476.33	36.54	10.26
	Bosnia and Herzegovina	32,796.07	79.56	32.13
	Montenegro	7,666.35	55.21	7.51
	Albania	3,869.56	32.72	3.79

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	241.34	6.24
	IV	0.47	0.01
	VI	48.28	1.25
	Total	290.08	7.50
Bosnia and Herzegovina	II	430.88	1.31
	III	61.06	0.19
	V	139.71	0.43
	Total	631.65	1.93
Croatia	I	24.25	0.23
	I/IV	10.64	0.10
	II	405.67	3.87
	III	1.91	0.02
	V	80.39	0.77
	V/VI	802.53	7.66
	Total	1,325.40	12.65
Montenegro	II	414.37	5.41
	III/V	67.26	0.88
	Total	481.63	6.28
Slovenia	III	29.97	0.49
	IV	14.67	0.24
	V	161.98	2.64
	V/II	231.32	3.78
	Total	437.94	7.15
DAE	**Total**	3,166.70	5.19

Myodes glareolus is a relatively widespread species which occurs on 60,935.22 km^2 (59.70 % of DAE). The majority of the range is in Bosnia and Herzegovina (32796.07 km^2). The species is a gap on the regional level since only 3166.70 km^2 (5.19 %) of the range are within PAs. The target is covered in Croatia, with 1325.40 km^2 (12.65 %), mainly in IUCN category V/VI. It can be considered a gap in the other four countries. The target is represented in PAs as follows: Slovenia 437.94 km^2 (7.15 %), Bosnia and Herzegovina 631.65 km^2 (1.93 %), Montenegro 481.63 km^2 (6.28 %) and Albania 290.08 km^2 (7.50 %).

5.3.4.1.12. *Arvicola terrestris*

Range in DAE	**km²**		**%**	
	59,698.48		58.49	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	4,961.76	76.87	4.86
	Croatia	10,497.14	36.62	10.29
	Bosnia and Herzegovina	30,886.11	74.92	30.26
	Montenegro	7,428.52	53.50	7.28
	Albania	5,924.95	50.10	5.81

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	276.34	4.66
	III	0.58	0.01
	IV	259.21	4.37
	V	90.68	1.53
	VI	101.50	1.71
	Total	728.31	12.29
Bosnia and Herzegovina	I/IV	11.23	0.04
	II	405.41	1.31
	III	61.06	0.20
	Total	477.69	1.55
Croatia	I	5.40	0.05
	I/IV	28.30	0.27
	II	324.44	3.09
	III	2.10	0.02
	V	66.66	0.64
	V/VI	538.15	5.13
	Total	965.05	9.19
Montenegro	II	816.41	10.99
	III/V	67.26	0.91
	Total	883.67	11.90
Slovenia	III	20.96	0.42
	IV	14.56	0.29
	V	159.48	3.21
	V/II	227.30	4.58
	Total	422.31	8.51
DAE	**Total**	3,477.03	5.82

Arvicola terrestris is a relatively widespread species occurring on 59,698.48 km^2, which is 58.49 % of the region. On a regional level this target is a gap, since only 3477.03 km^2 (5.82 %) are represented in PAs. It can be considered covered in Montenegro, with 883.67 km^2 (11.90 %), and in Albania, with 728.31 km^2 (12.29 %) in PAs. In Montenegro the great majority of the covered range (816.41 km^2; 10.99 %) is within IUCN category II PAs, while in Albania 276.34 km^2 (4.66 %) are represented within IUCN Category II PAs. It is a gap in Bosnia and Herzegovina

(477.69 km^2; 1.55 %) where the majority of the DAE range occurs (30,886.11 km^2). With 965.05 km^2 (9.19 %) within PAs, it was found to be a gap also in Croatia.

5.3.4.1.13. *Microtus arvalis*

Range in DAE	**km^2**		**%**	
	62,267.69		61.01	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	3,450.47	53.45	3.38
	Croatia	9,187.84	32.05	9.00
	Bosnia and Herzegovina	36,266.33	87.97	35.53
	Montenegro	8,716.76	62.77	8.54
	Albania	4,646.29	39.29	4.55

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Albania	II	276.25	5.95
	III	0.58	0.01
	IV	0.47	0.01
	VI	76.61	1.65
	Total	353.91	7.62
Bosnia and Herzegovina	II	430.88	1.19
	III	61.06	0.17
	V	426.88	1.18
	Total	918.81	2.53
Croatia	I/IV	10.62	0.12
	II	316.55	3.45
	III	2.10	0.02
	V	61.99	0.67
	V/VI	422.26	4.60
	Total	813.52	8.85
Montenegro	II	414.37	4.75
	III	1.26	0.01
	III/V	67.26	0.77
	Total	482.88	5.54
Slovenia	III	4.34	0.13
	IV	9.64	0.28
	V	50.62	1.47
	V/II	227.30	6.59
	Total	291.89	8.46
DAE	**Total**	2,861.01	4.59

Microtus arvalis is a relatively widespread species occurring on 62,267.69 km^2, which is 61.01 % of the region. With 2861.01 km^2 (4.59 %) within PAs it can be considered a gap. It is a gap in all the five countries: Slovenia 291.89 km^2 (8.46 %), Croatia 813.52 km^2 (8.85 %), Bosnia and Herzegovina 918.81 km^2 (2.53 %), Montenegro 482.88 km^2 (5.54 %) and Albania 353.91 km^2 (7.62 %).

5.3.4.1.14. *Microtus agrestis*

Range in DAE	**km^2**		**%**	
	7,010.73		6.87	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	4,795.70	74.29	4.70
	Croatia	2,215.03	7.73	2.17
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Croatia	I/IV	4.89	0.22
	II	63.31	2.86
	III	0.39	0.02
	V	7.76	0.35
	V/VI	338.64	15.29
	Total	414.99	18.74
Slovenia	III	19.58	0.41
	IV	14.60	0.30
	V	159.49	3.33
	V/II	227.30	4.74
	Total	420.98	8.78
DAE	**Total**	835.97	11.92

Microtus agrestis occurs only in Slovenia and Croatia. Its range in the DAE is of 7010.73 km^2, which is 6.87 % of the entire region. The target is adequately represented on a regional level, with 835.97 km^2 (11.92 %) within PAs. In Croatia 414.99 km^2 (18.74 %) are in PAs. The target is a gap in Slovenia, where 420.98 km^2 (8.78 %) are within PAs.

5.3.4.1.15. *Microtus subterraneus*

Range in DAE	**km²**		**%**	
		63,014.45		61.74
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	4,198.46	65.04	4.11
	Croatia	9,983.16	34.82	9.78
	Bosnia and Herzegovina	35,538.30	86.21	34.82
	Montenegro	8,081.39	58.20	7.92
	Albania	5,213.14	44.08	5.11

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	243.74	4.68
	III	0.58	0.01
	IV	0.47	0.01
	V	20.95	0.40
	VI	106.11	2.04
	Total	371.84	7.13
Bosnia and Herzegovina	II	430.88	1.2.1
	III	61.06	0.17
	V	428.11	1.20
	Total	920.04	2.59
Croatia	I	11.27	0.11
	I/IV	7.22	0.07
	II	365.34	3.66
	III	1.91	0.02
	V	57.46	0.58
	V/VI	359.51	3.60
	Total	802.72	8.04
Montenegro	II	477.75	5.91
	III/V	87.66	1.08
	Total	565.42	7.00
Slovenia	III	11.44	0.27
	IV	9.64	0.23
	V	53.23	1.27
	V/II	227.30	5.41
	Total	301.61	7.18
DAE	**Total**	2,961.63	4.69

Microtus subterraneus is a relatively widespread species occurring on 63,014.45 km^2, which is 61.74 % of the region. With 2961.63 km^2 (4.69 %) in PAs it is a gap on a regional level. On country level it can be considered a gap in all five countries: Slovenia 301.61 km^2 (7.18 %), Croatia 802.72 km^2 (8.04 %), Bosnia and Herzegovina 920.04 km^2 (2.59 %), Montenegro 565.42 km^2 (7.00 %) and Albania 37.184 km^2 (7.13 %).

5.3.4.1.16. *Microtus liechtensteini*

Range in DAE	**km²**		**%**	
	17,832.91		17.47	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,299.17	97.59	6.17
	Croatia	11,061.51	38.58	10.84
	Bosnia and Herzegovina	472.23	1.15	0.46
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	II	0.02	0.00
	V	7.47	1.58
	Total	7.49	1.59
Croatia	I	24.25	0.22
	I/IV	13.27	0.12
	II	538.86	4.87
	III	2.04	0.02
	V	57.16	0.52
	V/VI	1,874.58	16.95
	Total	2,510.16	22.69
Slovenia	III	30.20	0.48
	IV	16.03	0.25
	V	170.97	2.71
	V/II	231.32	3.67
	Total	448.52	7.12
DAE	**Total**	2,966.17	16.63

Microtus liechtensteini is a species occurring on 17,832.91 km^2. The majority of the range is in Croatia (11061.51 km^2). It can be considered covered on the regional level (2966.17 km^2; 16.63 %), but on country level is covered only in Croatia (2510.16 km^2; 22.69 %). In Slovenia it is a gap, since 448.52 km^2 (7.12 %) are covered with PAs. In Bosnia and Herzegovina only 7.49 km^2 (1.59 %) are within PAs.

5.3.4.1.17. *Microtus thomasi*

Range in DAE	**km²**		**%**	
	8,645.52		8.47	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	1,424.82	3.46	1.40
	Montenegro	3,256.53	23.45	3.19
	Albania	3,963.95	33.52	3.88

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	314.35	7.93
	IV	27.89	0.70
	V	23.73	0.60
	Total	365.97	9.23
Bosnia and Herzegovina	**Total**	0	0
Montenegro	II	18.84	0.58
	III	1.26	0.04
	III/V	15.15	0.47
	Total	35.25	1.08
DAE	**Total**	401.22	4.64

Microtus thomasi occurs on 8645.52 km^2. The majority of the range is in Montenegro (3256.53 km^2) and in Albania (3963.95 km^2). In Bosnia and Herzegovina it occurs on 1424.82 km^2, but it a total gap because it was not found within PAs. With 35.25 km^2 (1.08 %) within PAs it is a gap in Montenegro. In Albania the target is also insufficiently represented (365.97 km^2; 9.23 %).

5.3.4.1.18. *Chionomys nivalis*

Range in DAE	**km²**		**%**	
	21,897.92		21.46	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	3,424.24	53.05	3.36
	Croatia	7,545.69	26.32	7.39
	Bosnia and Herzegovina	5,961.62	14.46	5.84
	Montenegro	3,135.91	22.58	3.07
	Albania	1,830.46	15.48	1.79

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	250.04	13.66
	VI	14.17	0.77
	Total	264.22	14.43
Bosnia and Herzegovina	II	168.04	2.82
	V	223.89	3.76
	Total	391.92	6.57
Croatia	I	24.25	0.32
	I/IV	17.50	0.23
	II	453.17	6.01
	III	0.98	0.01
	V	22.21	0.29
	V/VI	1,621.50	21.49
	Total	2,139.62	28.36
Montenegro	II	331.24	10.56
	III/V	16.82	0.54
	Total	348.06	11.10
Slovenia	III	26.13	0.76
	IV	13.18	0.39
	V	120.43	3.52
	V/II	148.58	4.34
	Total	308.31	9.00
DAE	**Total**	3,452.13	15.76

Chionomys nivalis occurs on 21,897.92 km^2 (21.46 % of DAE). On the regional level the target is adequately covered (3452.13 km^2; 15.76 %). The majority of the range is in Croatia (7545.69 km^2) where it is adequately covered with PAs (2139.62 km^2; 28.36 %), of which 477.42 km^2 (6.33 %) are within IUCN category I and II. It is adequately covered also in Montenegro (348.06 km^2; 11.10 %) and in Albania (264.22 km^2; 14.43 %), where the great majority of the range is in IUCN category II. This target is a gap in Slovenia, with 308.31 km^2 (9.00 %) covered with PAs, and in Bosnia and Herzegovina, where only 391.92 km^2 (6.57 %) are within PAs.

5.3.4.1.19. *Apodemus agrarius*

Range in DAE	**km²**		**%**	
	8,743.28		8.57	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	1,811.21	28.06	1.77
	Croatia	2,019.76	7.05	1.98
	Bosnia and Herzegovina	4,912.31	11.92	4.81
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	III	25.04	0.51
	Total	25.04	0.51
Croatia	I/IV	3.95	0.20
	III	0.12	0.01
	V	37.01	1.83
	V/VI	284.61	14.09
	Total	325.69	16.13
Slovenia	III	12.99	0.72
	IV	2.40	0.13
	V	76.55	4.23
	V/II	4.02	0.22
	Total	95.96	5.30
DAE	**Total**	446.69	5.11

Apodemus agrarius occurs on 8743.28 km^2, which is 8.57 % of DAE. The majority of the range is in Bosnia and Herzegovina (4912.31 km^2). The target is a gap on the regional level with 446.69 km^2 (5.11 %) within PAs. The target can be considered covered only in Croatia, with 325.69 km^2 (16.13 %) within PAs, mainly in IUCN category V/VI. It is a gap in the other two countries, occuring in PAs as follows: in Slovenia with 95.96 km^2 (5.30 %) and in Bosnia and Herzegovina with 25.04 km^2 (0.51 %) within PAs.

5.3.4.1.20. *Apodemus flavicollis*

Range in DAE	**km²**		**%**	
	82,630.20		80.96	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,455.38	100.00	6.33
	Croatia	15,045.42	52.48	14.74
	Bosnia and Herzegovina	36,534.08	88.62	35.80
	Montenegro	12,964.14	93.36	12.70
	Albania	11,631.18	98.35	11.40

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	590.69	5.08
	III	0.58	0.00
	IV	329.07	2.83
	V	99.32	0.85
	VI	106.11	0.91
	Total	1,125.76	9.68
Bosnia and Herzegovina	II	430.88	1.18
	III	61.06	0.17
	V	470.07	1.29
	Total	962.00	2.63
Croatia	I	24.25	0.16
	I/IV	19.21	0.13
	II	471.25	3.13
	III	2.23	0.01
	V	123.52	0.82
	V/VI	1,475.80	9.81
	Total	2,116.25	14.07
Montenegro	II	901.09	6.95
	III	1.26	0.01
	III/V	95.84	0.74
	Total	998.18	7.70
Slovenia	III	30.33	0.47
	IV	16.62	0.26
	V	171.00	2.65
	V/II	231.32	3.58
	Total	449.27	6.96
DAE	**Total**	5,651.46	6.84

Apodemus flavicollis is a relatively widespread species occurring on 82,630.2 km^2, which is 80.96 % of the region. With 5651.46 km^2 (6.84 %) in PAs it is a gap on the regional level. Only in Croatia the target is adequately represented (2116.25 km^2; 14.07 %). On country level it is a gap in the other four countries: Slovenia 449.27 km^2 (6.96 %), Bosnia and Herzegovina 962.00 km^2 (2.63 %), Montenegro 998.18 km^2 (7.70 %) and Albania 1125.76 km^2 (9.68 %).

5.3.4.1.21. *Apodemus epimelas*

Range in DAE	**km²**		**%**	
	30,031.97		29.42	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	10,392.75	36.25	10.18
	Bosnia and Herzegovina	4,015.87	9.74	3.93
	Montenegro	4,666.98	33.61	4.57
	Albania	10,956.37	92.65	10.74

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	508.06	4.64
	III	0.58	0.01
	IV	329.07	3.00
	V	250.28	2.28
	VI	106.11	0.97
	Total	1,194.10	10.90
Bosnia and Herzegovina	I/IV	17.91	0.45
	V	105.74	2.63
	Total	123.65	3.08
Croatia	I/IV	136.75	1.32
	II	263.21	2.53
	III	0.64	0.01
	V	115.07	1.11
	V/VI	1,135.45	10.93
	Total	1,651.13	15.89
Montenegro	II	486.71	10.43
	III	1.31	0.03
	III/V	34.58	0.74
	V	0.05	0.00
	Total	522.65	11.20
DAE	**Total**	3,491.53	11.62

Apodemus epimelas occurs on 30,031.97 km^2. The majority of the range is in Croatia (10,392.75 km^2) and in Albania (10,956.37 km^2) which is 20.92 % of the region. On the regional level the target is covered (3491.53 km^2; 11.62 %), because it is sufficiently represented within PAs of all countries except Bosnia and Herzegovina (123.65 km^2; 3.08 %). In Croatia 1651.13 km^2 (15.89 %) are in PAs, 263.21 km^2 (2.53 %) in IUCN category II. 522.65 km^2 (11.20 %) are covered in Montenegro, mainly in IUCN category II (486.71 km^2; 10.43 %). In Albania 1194.52 km^2 (15.81 %) are covered with PAs (508.06 km^2; 4.64 % in IUCN category II).

5.3.4.1.22. *Micromys minutus*

Range in DAE	**km²**		**%**	
		7,632.28		7.48
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	1,935.00	29.98	1.90
	Croatia	1,831.26	6.39	1.79
	Bosnia and Herzegovina	516.12	1.25	0.51
	Montenegro	1,121.21	8.07	1.10
	Albania	2,228.69	18.85	2.18

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	0.38	0.02
	IV	323.11	14.50
	V	219.55	9.85
	Total	543.03	24.37
Bosnia and Herzegovina	I/IV	1.85	0.36
	V	70.35	13.63
	Total	72.20	13.99
Croatia	I/IV	8.56	0.47
	II	54.03	2.95
	III	0.15	0.01
	V	35.30	1.93
	V/VI	3.04	0.17
	Total	101.08	5.52
Montenegro	II	417.28	37.22
	III/V	6.00	0.53
	Total	423.28	37.75
Slovenia	III	5.05	0.26
	IV	3.37	0.17
	V	88.24	4.56
	Total	96.66	4.99
DAE	**Total**	1,236.25	16.19

Micromys minutus occurs on 7632.28 km², which is 7.48 % of the region. With 1236.25 km² (16.19 %) within PAs it can be considered covered on the regional level. On country level it is covered in Bosnia and Herzegovina (72.20 km²; 13.99 %), Montenegro (423.28 km²; 37.75 %) and Albania (543.04 km²; 24.37 %). Only in Montenegro it can be considered adequately covered within IUCN category II (417.28 km²; 37.22 %). With 96.66 km² (4.99 %) covered, it is a gap in Slovenia. Also in Croatia it is a gap, since only 101.08 km² (5.52 %) are considered within PAs.

5.3.4.1.23. *Mus spicilegus*

Range in DAE	**km²**		**%**	
	1,800.5		1.76	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	219.70	1.58	0.22
	Albania	1,580.80	13.37	1.55

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	IV	50.46	3.19
	V	152.91	9.67
	Total	203.37	12.87
Montenegro	III/V	6.00	2.73
	Total	6.00	2.73
DAE	**Total**	209.37	11.62

Mus spicilegus occurs on 1800.5 km^2 (which is 1.76 % of the DAE), only in Albania and Montenegro. The great majority of the range is in Albania (1580.80 km^2). On the regional level it can be considered covered (209.37 km^2; 11.62 %). On country level is adequately covered only in Albania (203.37 km^2; 12.87 %). In Montenegro it is a gap with only 6.00 km^2 (2.73 %) covered within PAs.

5.3.4.1.24. *Spalax leucodon*

Range in DAE	**km²**		**%**	
	26,830.7		26.29	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	12,756.82	30.94	12.50
	Montenegro	8,041.52	57.91	7.88
	Albania	6,025.52	50.95	5.90

Country	**PA category**	**Range in PA (km²)**	**Rangein PA (%)**
Albania	II	276.34	4.59
	III	0.58	0.01
	IV	0.47	0.01
	V	5.34	0.09
	VI	106.11	1.76
	Total	388.83	6.45
Bosnia and Herzegovina	II	161.74	1.27
	III	23.42	0.18
	V	383.94	3.01
	Total	569.10	4.46
Montenegro	II	414.37	5.15
	III/V	67.26	0.84
	Total	481.63	5.99
DAE	**Total**	1,439.56	5.36

Spalax leucodon occurs on a range of 26,830.7 km², which is 26.29 % of the DAE. The majority of the range is in Bosnia and Herzegovina (12,756.82 km²). The target is a gap both on the regional and country level. In Bosnia and Herzegovina, 569.10 km² (4.46 %) are covered with PAs. In Montenegro, 481.63 km² (4.46 %) are within PAs, mainly IUCN category II. In Albania 388.83 km² (6.45 %) are within PAs.

5.3.4.1.25. *Muscardinus avellanarius*

Range in DAE	**km²**		**%**	
	72,506.45		71.04	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,454.53	100.00	6.33
	Croatia	11,718.26	40.88	11.48
	Bosnia and Herzegovina	36,019.99	87.38	35.29
	Montenegro	8,164.11	58.79	8.00
	Albania	10,149.56	85.82	9.94

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	590.69	5.82
	III	0.58	0.01
	IV	27.66	0.27
	V	20.95	0.21
	VI	106.11	1.05
	Total	745.98	7.35
Bosnia and Herzegovina	II	430.88	1.20
	III	61.06	0.17
	V	470.07	1.31
	Total	962.00	2.67
Croatia	I	24.25	0.21
	I/IV	13.93	0.12
	II	517.87	4.42
	III	1.95	0.02
	V	82.48	0.70
	V/VI	1,499.05	12.79
	Total	2,139.53	18.26
Montenegro	II	414.37	5.08
	III/V	67.26	0.82
	Total	481.63	5.90
Slovenia	III	30.27	0.47
	IV	16.62	0.26
	V	169.93	2.63
	V/II	231.32	3.58
	Total	448.14	6.94
DAE	Total	4,777.28	6.59

Muscardinus avellanarius is a relatively widespread species which occurs on 72506.45 km^2 (71.04 % of the region). With 4777.28 km^2 (6.59 %) covered with PAs it is a gap on a regional level. Only in Croatia the target is adequately represented in PAs (2139.53 km^2; 18.26 %). 542.12 km^2 (4.63 %) are represented in IUCN category I and II PAs. On country level it can be considered gap in the other four countries. The target is represented in PAs as follows: Slovenia 448.14 km^2 (6.94 %), Bosnia and Herzegovina 962.00 km^2 (2.67 %), Montenegro 481.63 km^2 (5.90 %) and Albania 745.98 km^2 (7.35 %).

5.3.4.1.26. *Dryomys nitedula*

Range in DAE	**km²**		**%**	
	42,149.56		41.30	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	3,518.62	54.51	3.45
	Croatia	5,138.52	17.92	5.03
	Bosnia and Herzegovina	19,678.71	47.74	19.28
	Montenegro	7,859.96	56.60	7.70
	Albania	5,953.75	50.34	5.83

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	276.34	4.64
	III	0.58	0.01
	IV	0.47	0.01
	V	17.93	0.30
	VI	106.11	1.78
	Total	401.42	6.74
Bosnia and Herzegovina	I/IV	0.03	0.00
	II	288.93	51.47
	III	23.42	0.12
	V	421.32	2.14
	Total	733.70	3.73
Croatia	I	24.25	0.47
	I/IV	54.95	1.07
	II	442.54	8.61
	III	0.21	0.00
	V	23.93	0.47
	V/VI	775.51	15.09
	Total	1,321.39	25.72
Montenegro	II	445.41	5.67
	III/V	89.94	1.14
	V	0.05	0.00
	Total	535.40	6.81
Slovenia	III	11.59	0.33
	IV	13.36	0.38
	V	59.48	1.69
	V/II	227.30	6.46
	Total	311.73	8.86
DAE	**Total**	3,303.64	7.84

Dryomys nitedula occurs on 42,149.56 km^2 (41.30 % of the region). With 3303.64 km^2 (7.84 %) covered within PAs it is a gap on a regional level. Only in Croatia the target is adequately represented in PAs (1321.39 km^2; 25.72 %). 466.79 km^2 (9.08 %) are represented in IUCN category I and II PAs. On country level it can be considered a gap in the other four countries. The target is represented in PAs as follows: Slovenia 311.73 km^2 (8.86 %), Bosnia and Herzegovina 733.70 km^2 (3.73 %), Montenegro 535.40 km^2 (6.81 %) and Albania 401.42 km^2 (6.74 %).

5.3.4.1.27. *Eliomys quercinus*

Range in DAE	**km^2**		**%**	
	16,041.05		15.71	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	190.49	2.95	0.19
	Croatia	13,644.55	47.60	13.37
	Bosnia and Herzegovina	2,206.01	5.35	2.16
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Bosnia and Herzegovina	I/IV	17.91	0.81
	V	96.03	4.35
	Total	113.93	5.16
Croatia	I	5.38	0.04
	I/IV	172.31	1.26
	II	319.22	2.34
	III	0.64	0.00
	V	159.17	1.17
	V/VI	1,610.37	11.80
	Total	2,267.10	16.62
Slovenia	V	0.41	0.22
	V/II	29.68	15.58
	Total	30.09	15.80
DAE	**Total**	2,411.12	15.03

Eliomys quercinus occurs on 16,041.05 km^2 which is 15.71 % of DAE. On a regional level is not a gap (2411.12 km^2; 15.03 %). The majority of the range is in Croatia (13,644.55 km^2), where it is adequately covered with PAs (2267.10 km^2; 16.62 %) In IUCN category I and II 324.6 km^2 (2.38 %) of the range are represented. The target is covered also in Slovenia (30.09 km^2; 15.80 %). In Bosnia and Herzegovina the target is as gap since only 113.93 km^2 (5.16 %) are represented in PA.

5.3.4.2. Reptiles

5.3.4.2.1. *Testudo hermanni*

Range in DAE	**km²**		**%**	
	17,526.50		17.10	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	9,024.13	31.48	8.84
	Bosnia and Herzegovina	2,369.57	5.75	2.32
	Montenegro	2,279.98	16.42	2.23
	Albania	3,852.82	32.58	3.78

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	IV	156.00	4.05
	V	229.34	5.95
	Total	385.34	10.00
Bosnia and Herzegovina	I/IV	17.91	0.76
	V	87.96	3.71
	Total	105.86	4.47
Croatia	I/IV	164.46	1.82
	II	166.07	1.84
	III	0.01	0.00
	V	141.32	1.57
	V/VI	418.22	4.63
	Total	890.07	9.86
Montenegro	II	208.41	9.14
	III	1.31	0.06
	III/V	6.00	0.26
	V	0.05	0.00
	Total	429.77	18.85
DAE	**Total**	1,811.04	10.33

Testudo hermanni occurs on 17,526.5 km^2 which is 17.10 % of the region, where this target is adequately covered with PAs (1811.04 km^2; 10.33 %). This target does not occur in Slovenia. The majority of the range of this target is in Croatia (9024.13 km^2) where it is insufficiently represented in PAs (890.07 km^2; 9.86 %). This target is a gap also in Bosnia and Herzegovina, where 105.86 km^2 (4.47 %) are present in PAs. In Montenegro and Albania it can be considered covered, since respectively 429.77 km^2 (18.85 %) and 385.34 km^2 (10.00 %) are represented in PAs.

5.3.4.2.2. *Mauremys rivulata*

Range in DAE	**km²**		**%**	
	5,030.97		4.91	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	467.68	1.63	0.46
	Bosnia and Herzegovina	207.79	0.50	0.20
	Montenegro	2,125.84	15.31	2.08
	Albania	2,229.66	18.85	2.18

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	IV	299.99	13.45
	V	218.53	9.80
	Total	518.52	23.26
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	27.02	5.78
	V	8.75	1.87
	Total	35.77	7.65
Montenegro	II	475.23	22.35
	III	0.07	0.00
	III/V	32.61	1.53
	V	0.05	0.00
	Total	507.97	23.89
DAE	**Total**	1,062.26	21.11

Mauremys rivulata occurs on a range of 30,031.97 km² (4.91 % of the region). The majority of the range is in Montenegro (2125.84 km²) and Albania (2229.66 km²) which represents 2.26 % of the region. On a regional level it is not a gap (1062.26 km²; 21.11 %). In Bosnia and Herzegovina it can be considered a total gap, with no range represented in PAs. It is a gap in Croatia, with 35.77 km² (7.65 %) covered within PAs. In Montenegro 507.97 km² (23.89 %) of the range are represented in PAs, the great majority (475.23 km²; 22.35 %) in IUCN category II. This target is adequately represented in PAs of Albania. 518.52 km² (23.26 %) are covered with PAs, but no range is covered in IUCN category II PAs.

5.3.4.2.3. *Pseudapus apodus*

Range in DAE	**km²**		**%**	
	22,194.93		21.65	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	13,059.44	45.55	12.80
	Bosnia and Herzegovina	2,501.97	6.07	2.45
	Montenegro	1,994.54	14.36	1.95
	Albania	3,729.56	31.54	3.65

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	35.26	0.95
	IV	139.46	3.74
	V	223.56	5.99
	VI	0.06	0.00
	Total	398.34	10.68
Bosnia and Herzegovina	I/IV	17.51	0.70
	V	116.43	4.65
	Total	133.94	5.35
Croatia	I/IV	173.73	1.33
	II	199.54	1.53
	III	0.59	0.01
	V	224.09	1.72
	V/VI	504.44	3.86
	Total	1,102.39	8.44
Montenegro	II	209.24	10.49
	III	1.31	0.07
	III/V	4.51	0.23
	V	0.05	0.00
	Total	429.11	21.51
DAE	**Total**	2,236.37	10.07

Pseudapus apodus occurs on a range of 22,194.93 km², which is 21.65 % of the region. The great majority of the range is in Croatia (13059.44 km²). On a regional level it is adequately covered with PAs, since 2236.37 km² (10.07 %) of the range occur in PAs. On country level it is well covered only in Montenegro (429.11 km²; 21.51 %) and Albania (398.34km²; 10.68 %). In the other three countries it is a gap. The target is covered within PAs as follows: In Croatia 1102.39 km² (8.44 %) and in Bosnia and Herzegovina 133.94 km² (5.35 %).

5.3.4.2.4. *Hemidactylus turcicus*

Range in DAE	**km²**		**%**	
	11,956.68		11.66	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	347.86	5.39	0.34
	Croatia	6,962.64	24.29	6.82
	Bosnia and Herzegovina	714.74	1.73	0.70
	Montenegro	1,435.43	10.34	1.41
	Albania	2,496.01	21.11	2.45

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	1.27	0.05
	IV	129.73	5.19
	V	203.06	8.14
	Total	334.06	13.38
Bosnia and Herzegovina	I/IV	16.19	2.26
	V	78.34	10.96
	Total	94.52	13.22
Croatia	I/IV	119.04	1.71
	II	127.75	1.83
	III	0.52	0.01
	V	167.36	2.40
	V/VI	225.92	3.24
	Total	640.58	9.20
Montenegro	II	202.61	14.11
	III	0.63	0.04
	III/V	4.51	0.31
	V	0.05	0.00
	Total	207.80	14.48
Slovenia	III	0.36	0.10
	IV	1.82	0.52
	V	4.60	1.32
	Total	6.79	1.95
DAE	**Total**	1,283.75	10.73

Hemidactylus turcicus occurs on a range of 11,956.68 km², which represents 11.66 % of the region. The great majority of the range is in Croatia (6962.64 km²). On a regional level it is adequately covered with PAs, with 1283.75 km² (10,73 %) of the range occurring in PAs. On country level it can be considered adequately covered in Bosnia and Herzegovina (94.52 km²; 13.22 %), Montenegro (207.80 km²; 14.48 %) and Albania (334.06 km²; 13.38 %). In Slovenia and Croatia, this target is a gap, with respectively 6.79 km² (1.95 %) and 640.58 km² (9.20 %) represented in PAs.

5.3.4.2.5. *Ablepharus kitaibelli*

Range in DAE	**km^2**		**%**	
	10,610.78		10.35	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	163.86	0.40	0.16
	Montenegro	0	0	0
	Albania	10,446.92	88.34	10.24

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Albania	II	557.13	5.33
	III	0.58	0.01
	IV	56.24	0.54
	V	140.37	1.34
	VI	106.11	1.02
	Total	860.42	8.24
Bosnia and Herzegovina	**Total**	0	0
DAE	**Total**	860.42	8.11

Ablepharus kitaibelli occurs on 10,610.78 km^2 (which is 10.35 % of the DAE), only in Bosnia and Herzegovina and Albania. The great majority of the range is in Albania (10,446.92 km^2). In Bosnia and Herzegovina it occurs on a small range (163.86 km^2) and is not represented in any PA. Therefore, in this country it can be considered as a total gap. It is a gap also in Albania, since not adequately represented in PAs (860.42 km^2; 8.24 %). In Albania 557.13 km^2 are within IUCN category II PAs.

5.3.4.2.6. *Algyroides nigropunctatus*

Range in DAE	**km²**		**%**	
	36,950.20		36.20	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	1,936.81	30.00	1.90
	Croatia	21,489.81	74.96	21.06
	Bosnia and Herzegovina	3,825.14	9.28	3.75
	Montenegro	3,614.60	26.03	3.54
	Albania	6,083.84	51.44	5.96

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	1.41	0.02
	IV	320.43	5.27
	V	228.08	3.75
	Total	549.92	9.04
Bosnia and Herzegovina	I/IV	16.92	0.44
	V	87.96	2.30
	Total	104.88	2.74
Croatia	I	24.25	0.11
	I/IV	173.18	0.81
	II	415.43	1.93
	III	1.14	0.01
	V	257.67	1.20
	V/VI	2,250.94	10.47
	Total	3,122.61	14.53
Montenegro	II	272.71	7.54
	III	1.31	0.04
	III/V	32.07	0.89
	V	0.05	0.00
	Total	306.14	8.47
Slovenia	III	13.08	0.68
	IV	6.41	0.33
	V	87.27	4.51
	V/II	4.02	0.21
	Total	110.78	5.73
DAE	**Total**	4,194.33	11.35

Algyroides nigropunctatus is an endemic Dinaric species that occurs on 36,950.2 km^2, which is 36.20 % of the region. The great majority of occurrence is in Croatia (21,489.81 km^2). On a regional level it is adequately represented in PAs (4194.33 km^2; 11.3 %). On country level it can be considered covered only in Croatia (3122.61 km^2; 14.53 %) where, with 439.68 km^2 (2.04 %), is represented also in IUCN category I an II PAs. This target is a gap in Slovenia, with 110.78 km^2 (5.73 %), in Bosnia and Herzegovina, with 104.88 km^2 (2.74 %), in Montenegro, with 306,14 km^2 (8.47 %) and in Albania, with 549.92 km^2 (9.04 %) covered with PAs.

5.3.4.2.7. *Iberolacerta horvathi*

Range in DAE	**km²**		**%**	
	5,072.49		4.95	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	429.14	6.65	0.42
	Croatia	4,643.35	16.20	4.55
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I	24.25	0.52
	I/IV	7.19	0.15
	II	380.40	8.19
	V	33.70	0.73
	V/VI	1,276.37	27.49
	Total	1,721.90	37.08
Slovenia	III	7.95	1.85
	IV	4.97	1.16
	V	65.07	15.16
	Total	77.99	18.17
DAE	**Total**	1,799.89	35.48

Iberolacerta horvathi occurs only in Slovenia and Croatia on a range of 5072.49 km^2 which represents 4.95 % of total DAE surface. The majority of the range is in Croatia (4643.35 km^2). With 1799.89 km^2 (35.48 %) represented in PAs the target can be considered adequately covered on a regional level. It is covered also on country level, occurring on 77.99 km^2 (18.17 %) in PAs of Slovenia and on 1721.90 km^2 (37.08 %) in those of Croatia. In Croatia it is also adequately represented in IUCN category I and II PAs (404.65 km^2; 8.71 %).

5.3.4.2.8. *Dinarolacerta mosorensis*

Range in DAE	**km^2**		**%**	
	7,399.48		7.22	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	1,307.92	4.56	1.28
	Bosnia and Herzegovina	2,316.41	5.62	2.27
	Montenegro	3,775.15	27.19	3.70
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Bosnia and Herzegovina	II	115.39	4.98
	V	93.48	4.04
	Total	208.87	9.02
Croatia	V	37.26	2.85
	V/VI	135.98	10.40
	Total	173.25	13.25
Montenegro	II	302.28	8.01
	III	0.28	0.01
	III/V	29.39	0.78
	Total	331.94	8.79
DAE	**Total**	714.06	9.65

Dinarolacerta mosorensis is an endemic species of the central and southern parts of the region. It occurs on a range of 7399.48 km^2, which is 7.22 % of the total DAE surface. On a regional level, with 714.06 km^2 (9.65 %) occurring in PAs, the target cannot be regarded as covered. Only in Croatia enough range is represented in PAs (173.25 km^2; 13.25 %), therefore can be considered covered. In Croatia the target is not represented in any IUCN category I and II PA. In Bosnia and Herzegovina and Montenegro the target is not adequately represented in PAs, with 208.87km^2 (9.02 %) and 331.94 km^2 (9.20 %) respectively covered with PAs.

5.3.4.2.9. *Dinarolacerta montenegrina*

Range in DAE	**km²**		**%**	
	784.49		7.65	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	316.49	2.28	0.31
	Albania	468.00	3.96	0.46

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	113.53	24.26
	Total	113.53	24.26
Montenegro	**Total**	0	0
DAE	**Total**	113.53	14.47

Dinarolacerta montenegrina is an endemic Dinaric species, occurring only on a small range (784.49 km^2) in the mountains on the border between Montenegro and Albania. The target can be considered covered on a regional level, but there's no range represented in PAs of Montenegro. Therefore in this country the species has to be considered as a total gap. In Albania 113.53 km^2 (14.47 %) are represented in PAs, therefore the species can be considered covered. In Albania all covered range is within IUCN category II PAs.

5.3.4.2.10. *Lacerta bilineata*

Range in DAE	**km²**		**%**	
	5,101.87		4.98	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	1,613.95	25.00	1.58
	Croatia	3,487.92	12.17	3.42
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I/IV	13.79	0.40
	III	0.12	0.00
	V	87.81	2.52
	V/VI	159.75	4.58
	Total	261.46	7.50
Slovenia	III	11.58	0.72
	IV	1.44	0.09
	V	25.02	1.55
	V//2	4.02	0.25
	Total	42.06	2.61
DAE	**Total**	303.52	5.94

Lacerta bilineata occurs only in Slovenia and Croatia on a range of 5101.87 km^2 which represents 4.98 % of the DAE. The target is a gap on a regional level with 303.52 km^2 (5.94 %) represented in PAs. It can be considered a gap also on country level, occurring in Slovenia and Croatia with 42.06 km^2 (5.45 %) and 261.46 km^2 (7.50 %) respectively in PAs.

5.3.4.2.11. *Lacerta trilineata*

Range in DAE	**km²**		**%**	
	23,251.26		22.68	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	12,552.84	43.79	12.30
	Bosnia and Herzegovina	3,214.71	7.80	3.15
	Montenegro	2,793.65	20.12	2.74
	Albania	4,690.06	39.66	4.60

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	96.35	2.05
	IV	147.36	3.14
	V	228.08	4.86
	Total	471.79	10.05
Bosnia and Herzegovina	I/IV	16.92	0.53
	V	87.96	2.74
	Total	104.88	3.26
Croatia	I/IV	157.89	1.26
	II	191.92	1.53
	III	0.64	0.01
	V	165.50	1.32
	V/VI	785.58	6.26
	Total	1,301.54	10.37
Montenegro	II	246.17	8.81
	III	1.31	0.05
	III/V	8.86	0.32
	V	0.05	0.00
	Total	256.34	9.18
DAE	**Total**	2,390.89	10.28

Lacerta trilineata occurs on 23,251.26 km² which is 22.68 % of the region, where the target can be considered adequately covered with PAs (2390.89 km²; 10.28 %). This target does not occur in Slovenia. The majority of the range is in Croatia (12552.84 km²) where it is adequately covered within PAs (1301.54 km²; 10.37 %). In Albania this target can be considered covered, since 471.79 km² (10.05 %) are represented in PAs. It is a gap in Bosnia and Herzegovina and in Montenegro, where 104.88 km² (3.26 %) and 256.34 km² (9.18 %) respectively are represented within PAs.

5.3.4.2.12. *Lacerta viridis*

Range in DAE	**km²**		**%**	
	92,440.31		90.18	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,211.27	96.22	6.09
	Croatia	19,344.81	67.48	18.95
	Bosnia and Herzegovina	41,223.39	100.00	40.39
	Montenegro	13,860.08	100	13.58
	Albania	11,800.76	100	11.56

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	590.69	5.01
	III	0.58	0.00
	IV	147.83	1.25
	V	249.03	2.11
	VI	106.11	0.90
	Total	1,094.24	9.27
Bosnia and Herzegovina	I/IV	16.92	0.04
	II	430.88	1.05
	III	61.06	0.15
	V	558.02	1.35
	Total	1,066.87	2.59
Croatia	I	24.25	0.13
	I/IV	133.21	0.69
	II	590.00	3.05
	III	2.56	0.01
	V	157.19	0.81
	V/VI	2,441.35	12.62
	Total	3,348.55	17.31
Montenegro	II	901.09	6.50
	III	2.57	0.02
	III/V	99.33	0.72
	V	0.05	0.00
	Total	1,003.04	7.24
Slovenia	III	29.97	0.48
	IV	14.67	0.24
	V	161.98	2.61
	V/II	231.32	3.72
	Total	437.94	7.05
DAE	**Total**	6,950.64	7.51

Lacerta viridis is a widespread species that occurs on 92,440.31 km^2, which is 90.18 % of the region. On a regional level this target is a gap, since only 6950.64 km^2 (7.51 %) of the range are represented within PAs. On country level it can be considered covered only in Croatia and in Albania, with 3348.55 km^2 (17.31 %) and 1266.83 km^2 (10.74 %) respectively within PA. In both countries the species is well represented in IUCN category I and II PAs. It is a gap in the other three countries, with 437.94 km^2 (7.05 %) of the range within PAs in Slovenia, 1066.87 km^2 (2.59 %) in Bosnia and Herzegovina, 1003.04 km^2 (7.24 %) in Montenegro.

5.3.4.2.13. *Dalmatolacerta oxycephala*

Range in DAE	**km²**		**%**	
	26,729.37		26.07	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	10,460.65	36.49	10.25
	Bosnia and Herzegovina	9,047.80	21.95	8.87
	Montenegro	7,024.90	50.59	6.88
	Albania	196.02	1.66	0.19

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	IV	153.97	78.55
	Total	153.97	78.55
Bosnia and Herzegovina	I/IV	16.92	0.19
	II	28.60	0.32
	V	172.09	1.90
	Total	217.61	2.41
Croatia	I/IV	124.40	1.19
	II	122.62	1.17
	III	0.19	0.00
	V	131.05	1.25
	V/VI	668.14	6.39
	Total	1,046.40	10.00
Montenegro	II	649.43	9.24
	III	2.57	0.04
	III/V	32.60	0.46
	V	0.05	0.00
	Total	684.65	9.75
DAE	**Total**	2,102.63	7.86

Dalmatolacerta oxycephala is an endemic species of central and southern parts of the region. It occurs on a range of 26,729.37 km², which is 26.07 % of the total DAE surface. On a regional level, with 2102.63 km² (7.86 %) occurring in PAs, it cannot be considered covered. In Albania enough range is represented in PAs (153.97 km²; 78.55 %). In Albania the target is not represented in any IUCN category I and II PA. In Croatia the target is adequately covered with PAs (1046 km²; 10.00 %). In Bosnia and Herzegovina and Montenegro the target is a gap, with 217.61 km² (2.41 %) and 684.65 km² (9.75 %) respectively covered within PAs.

5.3.4.2.14. *Lacerta agilis*

Range in DAE	**km²**		**%**	
		55,658.07		54.29
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	1,677.81	25.99	1.64
	Croatia	3,798.07	13.25	3.72
	Bosnia and Herzegovina	34,283.82	83.16	33.59
	Montenegro	9,082.12	65.40	8.90
	Albania	6,816.25	57.64	6.68

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	276.34	4.05
	III	0.58	0.01
	IV	0.47	0.01
	V	20.95	0.31
	VI	106.11	1.56
	Total	404.44	5.93
Bosnia and Herzegovina	II	430.88	1.26
	III	61.06	0.18
	V	418.14	1.22
	Total	910.08	2.65
Croatia	I/IV	1.86	0.05
	II	46.83	1.23
	III	0.18	0.00
	V	44.24	1.16
	VI/I	338.64	8.92
	Total	431.76	11.37
Montenegro	II	414.37	4.56
	III	1.26	0.01
	III/V	67.26	0.74
	Total	482.88	5.32
Slovenia	III	3.87	0.23
	IV	1.42	0.08
	V	41.84	2.50
	Total	47.13	2.81
DAE	**Total**	2,276.29	4.08

Lacerta agilis is a relatively widespread species that occurs on 55,658.07 km^2 (54.29 % of the region). With 2276.29 km^2 (4.08 %) represnted within PAs it can be considered a gap on a regional level. The target is covered only in Croatia with 431.76 km^2 (11.37 %) within PAs. It is as gap in the other DAE countries. In Slovenia only 47.13 km^2 (2.81 %) are represented in PAs. Bosnia and Herzegovina, with the great majority of the range (34,283.82 km^2) has only 910.08 km^2 (2.65 %) within PAs. In Montenegro 482.88 km^2 (5.32 %) are represented in PAs. In the Albanian PAs 404.44 km^2 (5.93 %) are represented.

5.3.4.2.15. *Podarcis erhardii*

Range in DAE	**km²**		**%**	
	5,364.28		5.26	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	5,364.28	45.36	5.26

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	326.44	6.09
	III	0.58	0.01
	IV	0.47	0.01
	V	20.95	0.39
	VI	106.11	1.98
	Total	454.54	8.47
DAE	**Total**	454.54	8.47

Podarcis erhardii occurs only in Albania on 5364.28 km^2. With 454.54 km^2 (8.47 %) within PAs the target can be considered a gap, both, on country and a regional level. The target is relatively well represented in IUCN category II PAs (326.44 km^2; 6.09 %).

5.3.4.2.16. *Podarcis melisellensis*

Range in DAE	**km²**		**%**	
	30,071.02		29.33	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	1,309.53	20.29	1.28
	Croatia	17,307.59	60.37	16.96
	Bosnia and Herzegovina	4,015.29	9.74	3.93
	Montenegro	4,354.71	31.36	4.27
	Albania	3,083.90	26.08	3.02

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	0.38	0.01
	IV	142.01	4.60
	V	228.08	7.40
	Total	370.47	12.01
Bosnia and Herzegovina	I/IV	16.92	0.42
	V	87.96	2.19
	Total	104.88	2.61
Croatia	I	12.98	0.07
	I/IV	164.03	0.95
	II	344.93	1.99
	III	0.58	0.00
	V	251.52	1.45
	V/VI	2,010.37	11.62
	Total	2,784.41	16.09
Montenegro	II	272.71	6.26
	III	1.31	0.03
	III/V	32.07	0.74
	V	0.05	0.00
	Total	306.14	7.03
Slovenia	III	8.98	0.69
	IV	1.44	0.11
	V	11.37	0.87
	V/II	4.02	0.31
	Total	25.81	1.97
DAE	**Total**	3,591.71	11.94

Podarcis melisellensis is an endemic Dinaric species that occurs on 30,071.02 km², which is 29.33 %. The great majority of occurrence is in Croatia (17,307.59 km²). On a regional level it is adequately represented in PAs (3591.71 km²; 11.94 %). On country level it is covered only in Croatia (2741.16 km²; 15.84 %) and in Albania (370.47 km²; 12.01 %). This target is considered a gap in Slovenia, with only 25.81 km² (1.97 %), Bosnia and Herzegovina, with 104.88 km² (2.61 %) and in Montenegro, with 306.14 km² (7.03 %) covered within PAs.

5.3.4.2.17. *Podarcis muralis*

Range in DAE	**km²**		**%**	
	101,462.40		98.99	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,452.29	100	6.32
	Croatia	28,125.89	98.11	27.56
	Bosnia and Herzegovina	41,223.39	100.00	40.39
	Montenegro	13,860.08	100	13.58
	Albania	11,800.76	100	11.56

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	590.69	5.01
	III	0.58	0.00
	IV	147.83	1.25
	V	249.03	2.11
	VI	106.11	0.90
	Total	1,094.24	9.27
Bosnia and Herzegovina	I/IV	16.92	0.04
	II	430.88	1.05
	III	61.06	0.15
	V	558.02	1.35
	Total	1,066.87	2.59
Croatia	I	24.25	0.09
	I/IV	175.52	0.62
	II	717.80	2.55
	III	2.68	0.01
	V	311.19	1.11
	V/VI	2,629.14	9.35
	Total	3,860.58	13.73
Montenegro	II	901.09	6.50
	III	2.57	0.02
	III/V	99.33	0.72
	V	0.05	0.00
	Total	1,003.04	7.24
Slovenia	III	30.33	0.47
	IV	16.05	0.25
	V	170.90	2.65
	V/II	231.32	3.59
	Total	448.60	6.95
DAE	**Total**	7,473.33	7.36

Podarcis muralis is a widespread species that occurs on 101,462.4 km^2, which is 98.99 % of the total DAE surface. On a regional level this target is considered a gap, since only 7473.33km^2 (7.36 %) of the range are represented in PAs. On country level it can be considered covered only in Croatia with 3860.58 km^2 (13.73 %) represented in PA, where it is also adequately covered with IUCN category I and II. It was found to be a gap in the other countries. 448.60 km^2 (6.95 %) of the range is represented in PAs of Slovenia, 1066.87 km^2 (2.59 %) in Bosnia and Herzegovina, 1003.04 km^2 (7.24 %) in Montenegro and in Albania 1094.24 km^2 (9.27 %) respectively.

5.3.4.2.18. *Podarcis sicula*

Range in DAE	**km²**		**%**	
	1,4831,83		14,53	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	301.87	4.68	0.30
	Croatia	14,268.43	49.77	13.98
	Bosnia and Herzegovina	260.94	0.63	0.26
	Montenegro	0.59	0.00	0.00
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	I/IV	16.92	6.49
	Total	16.92	6.49
Croatia	I	15.18	0.11
	I/IV	151.33	1.06
	II	322.11	2.26
	III	0.58	0.00
	V	216.14	1.51
	V/VI	1,710.84	11.99
	Total	2,416.18	16.93
Montenegro	**Total**	0	0
Slovenia	III	0.19	0.08
	IV	0.61	0.27
	V	2.84	1.27
	Total	3.64	1.62
DAE	**Total**	2,436.74	16.42

Podarcis sicula occurs on 14,831.83 km² which is 14.53 % of the total DAE surface. This target does not occur in Albania. On a regional level this target can be considered covered (2436.74 km²; 16.42 %). The great majority of the range is in Croatia (14,268.43 km²) where the target is adequately covered with PAs (12,416.18 km²; 16.93 %). In the other three countries the target is a gap. In Montenegro it occurs on a very small surface (0.59 km²; 0.00 %), not covered with any PA. Therefore can be considered as a total gap. It is a gap also in Slovenia, with 3.64 km² (1.62 %) and Bosnia and Herzegovina, with 16.92 km² (6.49 %) within PAs.

5.3.4.2.19. *Podarcis taurica*

Range in DAE	**km²**		**%**	
	8,785.11		8.57	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	25.99	0.19	0.03
	Albania	8759.12	74.07	8.58

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	328.38	3.75
	III	0.58	0.01
	IV	36.56	0.41
	V	243.93	2.78
	VI	106.11	1.21
	Total	715.56	8.16
Montenegro	II	8.73	33.60
	Total	8.73	33.60
DAE	**Total**	724.29	8.24

Podarcis taurica occurs on 8785.11 km^2 (which is 8.57 % of the DAE), only in Albania and Montenegro. The great majority of the range is in Albania (8759.12 km^2). On a regional level it is not well represented (724.29 km^2; 8.24 %) within PAs. On country level is covered in Montenegro, with 8.73 km^2 within PAs, all in IUCN category II PA. In Albania it is a gap with 715.56 km^2 (8.16 %) within PAs.

5.3.4.2.20. *Zootoca vivipara*

Range in DAE	**km²**		**%**	
	30,620.38		29.87	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	1,269.25	19.66	1.24
	Croatia	4,807.70	16.77	4.71
	Bosnia and Herzegovina	20,460.45	49.63	20.05
	Montenegro	3,351.72	24.14	3.28
	Albania	731.26	6.18	0.72

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	149.02	20.38
	Total	149.02	20.38
Bosnia and Herzegovina	II	175.79	0.86
	III	44.47	0.22
	V	381.03	1.86
	Total	601.29	2.94
Croatia	I	24.25	0.50
	I/IV	7.58	0.16
	II	343.69	7.15
	V	25.50	0.53
	V/VI	1,090.80	22.69
	Total	1,491.81	31.03
Montenegro	II	255.78	7.63
	III/V	27.26	0.81
	Total	283.04	8.44
Slovenia	III	9.77	0.77
	IV	14.16	1.12
	V	38.16	3.01
	V/II	36.30	2.86
	Total	98.38	7.75
DAE	**Total**	2,623.54	8.56

Zootoca vivipara is a relatively widespread species that occurs on 30,620.38 km^2 (29.87 % of DAE). On a regional level this can be considered a gap since 2623.54 km^2 (8.56 %) are within PAs. The great majority of the range of this target is in Bosnia and Herzegovina (20,460.45 km^2) where the target is not adequately represented within PAs (601.29 km^2 (2.94 %)). This target is a gap also in Slovenia, with 98.38 km^2 (7.75 %) and in Montenegro, with 283.04 km^2 (8.44 %) within PAs. It is covered in Croatia (1491.81 km^2; 31.03 %) and in Albania (149.02 km^2; 20.38 %). In both countries the great majority of the covered range is within IUCN category II PAs.

5.3.4.2.21. *Typhlops vermicularis*

Range in DAE	**km²**		**%**	
	3,293.28		3.21	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	851.12	6.13	0.83
	Albania	2,442.16	20.65	2.39

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	IV	320.18	13.11
	V	229.34	9.39
	Total	549.52	22.50
Montenegro	II	414.31	48.68
	III/V	6.00	0.70
	Total	420.31	49.38
DAE	**Total**	969.83	29.45

Typhlops vermicularis occurs on 3293.28 km^2 (which is 3.21 % of the DAE), only in Albania and Montenegro. The majority of the range is in Albania (8759.12 km^2). The target is covered on the regional level, with 969.83 km^2 (29.45 %) represented in PAs. Also on country level it can be considered covered, with 420.31 km^2 (49.38 %) covered in Montenegro and 549.52 km^2 (22.50 %) in Albania respectively. Only in Montenegro the target is adequately represented in IUCN category II PAs (414.31 km^2; 48.68 %).

5.3.4.2.22. *Vipera ursinii*

Range in DAE	**km²**		**%**	
	4,707.59		4.59	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	27.04	0.09	0.03
	Bosnia and Herzegovina	1,579.88	3.83	1.55
	Montenegro	2,474.97	17.82	2.43
	Albania	625.70	5.29	0.61

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	131.03	20.94
	Total	131.03	20.94
Bosnia and Herzegovina	II	71.49	4.53
	III	15.28	0.97
	V	144.54	9.15
	Total	231.31	14.64
Croatia	V/VI	3.82	14.13
	Total	3.82	14.13
Montenegro	II	223.31	9.02
	III/V	19.59	0.79
	Total	242.91	9.81
DAE	**Total**	609.07	12.93

Vipera ursinii occurs in all countries except Slovenia on a range of 4707.59 km^2 (which is 4.59 % of the entire DAE). According to data on a regional level it does not result as a gap (609.07 km^2; 12.93 %). The target was found to be covered in all countries except Montenegro (242 km^2; 12.93 %), where the majority of the range of this target is (2474.97 km^2). The target seems also well represented in IUCN category I and II PAs, except in Croatia. In the IUCN Red List the target is listed as “Endangered”, therefore adequate conservation strategies have to be ensured for the proper protection of the species.

5.3.4.2.23. *Vipera berus*

Range in DAE	**km²**		**%**	
	27,012.00		26.35	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	443.83	6.88	0.43
	Croatia	2181.83	7.61	2.14
	Bosnia and Herzegovina	12780.70	31.00	12.52
	Montenegro	7893.15	56.84	7.73
	Albania	3712.49	31.39	3.64

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	311.77	8.40
	III	0.58	0.02
	IV	0.47	0.01
	V	20.95	0.56
	VI	68.14	1.84
	Total	401.91	10.83
Bosnia and Herzegovina	II	138.77	1.09
	III	29.64	0.23
	V	352.23	2.76
	Total	520.64	4.07
Croatia	I	24.25	1.11
	I/IV	5.54	0.25
	II	180.83	8.29
	V	12.88	0.59
	V/VI	628.67	28.81
	Total	852.16	39.06
Montenegro	II	399.62	5.06
	III/V	53.84	0.68
	Total	453.46	5.74
Slovenia	III	3.97	0.89
	IV	13.42	3.02
	V	18.48	4.16
	V/II	3.18	0.72
	Total	39.05	8.80
DAE	**Total**	2,231.35	8.26

Vipera berus occurs on 27,012 km² (26.35 % of DAE). On a regional level this target is a gap, since 2231.35 km ² (8.26 %) are represented within PAs. The great majority of the range of the target is in Bosnia and Herzegovina (12,780.70 km²) where the target is not adequately covered with PAs (520.64 km²; 4.07 %). This target is a gap in Slovenia, with 39.05 km² (8.80 %), and in Montenegro, with 453.46 km² (5.74 %) within PAs. It can be considered covered in Croatia (852.16 km²; 39.06 %) and in Albania (401.91 km²; 10.83 %). In both countries the target is adequately represented within IUCN category II PAs.

5.3.4.2.24. *Zamenis situla*

Range in DAE	**km²**		**%**	
	42,828.83		41.78	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	18,441.58	64.33	18.07
	Bosnia and Herzegovina	12,071.02	29.28	11.83
	Montenegro	3,898.82	28.08	3.82
	Albania	8,417.41	71.18	8.25

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	328.38	3.90
	III	0.58	0.01
	IV	147.36	1.75
	V	249.03	2.96
	VI	106.11	1.26
	Total	831.46	9.88
Bosnia and Herzegovina	I/IV	16.92	0.14
	V	558.02	4.62
	Total	574.94	4.76
Croatia	I	23.56	0.13
	I/IV	164.15	0.89
	II	359.79	1.95
	III	0.80	0.00
	V	169.87	0.92
	V/VI	2,130.75	11.55
	Total	2,848.91	15.45
Montenegro	II	272.71	6.99
	III	1.31	0.03
	III/V	32.07	0.82
	V	0.05	0.00
	Total	306.14	7.84
DAE	**Total**	4,561.31	10.65

Zamenis situla occurs on 42,828.83 km^2 which is 41.78 % of the region, where the target can be considered adequately represented within PAs (4561.31 km^2; 10.65 %). This target does not occur in Slovenia. The majority of the range is in Croatia (18,441.58 km^2) where it is adequately covered with PAs (2848.91 km^2;15.45 %). The target is as gap in Montenegro, with 306.14 km^2 (7.84 %) and in Albania, with 831.46 km^2 (9.88 %) within PAs. It is a gap in Bosnia and Herzegovina, where 574.94 km^2 (4.76 %)within PAs.

5.3.4.2.25. *Dolichopis caspius*

Range in DAE	**km²**		**%**	
	51,742.32		50.47	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	1,280.96	4.47	1.26
	Bosnia and Herzegovina	24,748.93	60.04	24.25
	Montenegro	13,886.06	100.00	13.61
	Albania	11,826.37	100.00	11.59

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	590.69	4.99
	III	0.58	0.00
	IV	156.46	1.32
	V	250.28	2.12
	VI	106.11	0.90
	Total	1,104.12	9.33
Bosnia and Herzegovina	I/IV	17.91	0.07
	II	161.74	0.65
	III	61.06	0.25
	V	87.96	0.36
	Total	328.66	1.33
Croatia	I/IV	115.79	9.04
	V	14.35	1.12
	V/VI	40.84	3.19
	Total	170.98	13.35
Montenegro	II	901.09	6.49
	III	2.57	0.02
	III/V	101.83	0.73
	V	0.05	0.00
	Total	1,005.54	7.24
DAE	**Total**	2,609.30	5.04

Dolichopis caspius occurs on 51,742.32 km^2 which is 50.47 % of the region. The target can not be considered adequately covered with PAs (2609.30 km^2; 5.04 %). This target does not occur in Slovenia. The majority of the range is in Croatia (12,552.84 km^2) where it is adequately covered with PAs (170.98 km^2; 13.35 %). In Bosnia and Herzegovina, Montenegro and Albania this target is a gap, since only 328.66 km^2 (1.33 %), 1005.54 km^2 (7.24 %) and 1104.12 km^2 (9.33 %) respectively are represented in PAs.

5.3.4.2.26. *Platyceps najadum*

Range in DAE	**km²**		**%**	
	26,579.25		25,93	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	9,497.93	33.13	9.31
	Bosnia and Herzegovina	5,097.73	12.37	4.99
	Montenegro	3,229.26	23.26	3.16
	Albania	8,754.33	74.03	8.58

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	590.69	6.75
	III	0.58	0.00
	IV	156.47	1.78
	V	250.28	2.36
	VI	106.11	1.21
	Total	1,104.13	12.61
Bosnia and Herzegovina	I/IV	17.91	0.35
	II	161.74	3.17
	III	61.06	1.20
	V	87.96	1.73
	Total	328.66	6.45
Croatia	I	12.98	0.14
	I/IV	145.18	1.53
	II	230.50	2.43
	III	0.46	0.00
	V	121.68	1.28
	V/VI	1,353.59	14.25
	Total	1,864.38	19.63
Montenegro	II	901.09	27.90
	III	2.57	0.08
	III/V	101.83	3.51
	V	0.05	0.00
	Total	1,005.54	31.14
DAE	**Total**	4,302.71	16.19

Platyceps najadum occurs on 26,579.25 km^2 which is 25.93 % of the region, where the target is adequately covered with PAs (4302.71 km^2; 16.19 %). This target does not occur in Slovenia. The majority of the range is in Croatia (9497.93 km^2) where it can be considered adequately covered with PAs (1864.38 km^2; 19.63 %). It is adequately covered also in Montenegro, with 1005.54 km^2 (31.14 %) and in Albania, with 1104.13 km^2 (12.61 %) within PAs. It is a gap in Bosnia and Herzegovina, where 328.66 km^2 (6.45 %) are within PAs.

5.3.4.2.27. *Elaphe quatuorlineata*

Range in DAE	**km²**		**%**	
	20,162.97		19.76	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	222.82	3.45	0.22
	Croatia	12,870.64	44.90	12.61
	Bosnia and Herzegovina	1,921.69	4.66	1.88
	Montenegro	1,913.70	13.78	1.88
	Albania	3,234.12	27.35	3.17

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	182.77	5.65
	IV	289.22	8.94
	V	224.41	6.94
	Total	696.41	21.53
Bosnia and Herzegovina	I/IV	17.36	0.90
	V	87.96	4.58
	Total	105.32	5.48
Croatia	I/IV	172.61	1.34
	II	164.78	1.28
	III	0.57	0.00
	V	235.75	1.83
	V/VI	596.81	4.64
	Total	1,170.52	9.09
Montenegro	II	194.31	10.15
	III	1.31	0.07
	III/V	4.70	0.25
	V	0.05	0.00
	Total	200.37	10.47
Slovenia	III	0.19	0.08
	IV	0.61	0.27
	V	2.84	1.27
	Total	3.64	1.62
DAE	**Total**	2,176.26	10.79

Elaphe quatuorlineata occurs on a range of 20,162.97 km^2, which is 19.76 % of the region. The great majority of the range is in Croatia (12,870.64 km^2). On a regional level it can be considered adequately covered, since 2176.26 km^2 (10.79 %) of the range occur in PAs. On country level it was fount to be adequately covered in Montenegro (200.37 km^2; 10.47 %) and in Albania (696.41 km^2; 21.53 %). In the other three countries it is a gap and is represented within PAs as follows: in Slovenia 3.64 km^2 (1.62 %), in Croatia 1170.52 km^2 (9.09 %) and in Bosnia and Herzegovina 105.32 km^2 (5.48 %).

5.3.4.2.28. *Malpolon monspessulanus*

Range in DAE	**km²**		**%**	
	22,694.74		22.23	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	15,862.96	55.33	15.54
	Bosnia and Herzegovina	2,953.15	7.16	2.89
	Montenegro	2,445.27	17.61	2.40
	Albania	5,527.36	46.74	5.42

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	128.51	2.32
	IV	144.15	2.60
	V	224.63	4.06
	VI	6.35	0.11
	Total	503.64	9.11
Bosnia and Herzegovina	I/IV	17.36	0.59
	V	87.96	2.98
	Total	105.32	3.57
Croatia	I/IV	173.36	1.09
	II	204.14	1.25
	III	0.65	0.01
	V	177.14	1.12
	V/VI	686.01	4.32
	Total	1,241.31	7.83
Montenegro	II	209.33	8.56
	III	1.31	0.05
	III/V	4.36	0.18
	V	0.05	0.00
	Total	215.05	8.79
DAE	**Total**	2,065.64	9.10

Malpolon monspessulanus occurs on 28,456.75 km^2, which represents 27.76 % of the entire DAE. The great majority of occurrence is in Croatia (15,862.96 km^2). It does not occur in Slovenia. On a regional level it is not sufficiently represented in PAs (2065.64 km^2; 9.10 %). It is a gap in all DAE countries. In Croatia 1241.31 km^2 (7.83 %) are within PAs, in Montenegro 215.05 km^2 (8.79 %), in Bosnia and Herzegovina 105.32 km^2 (3.57 %) and in Albania 503.64 km^2 (9.09 %).

5.3.4.2.29. *Telescopus fallax*

Range in DAE	**km²**		**%**	
	2,0319.67		19.91	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	287.46	4.45	0.28
	Croatia	12,220.05	42.63	11.97
	Bosnia and Herzegovina	2,224.84	5.40	2.18
	Montenegro	1,967.10	14.17	1.93
	Albania	3,620.22	30.61	3.55

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	34.90	0.96
	IV	315.03	8.70
	V	218.05	6.02
	VI	0.06	0.00
	Total	568.04	15.69
Bosnia and Herzegovina	I/IV	17.36	0.78
	V	116.06	5.22
	Total	133.42	6.00
Croatia	I/IV	174.41	1.43
	II	202.27	1.66
	III	0.71	0.01
	V	231.19	1.89
	V/VI	515.86	4.22
	Total	1,124.43	9.20
Montenegro	II	423.32	21.52
	III	1.31	0.07
	III/V	4.36	0.22
	V	0.05	0.00
	Total	429.05	21.81
Slovenia	III	0.21	0.07
	IV	1.83	0.64
	V	3.32	1.15
	Total	5.36	1.86
DAE	**Total**	2,260.30	11.12

Telescopus fallax occurs on 20,319.67 km², which represents 19.91 % of total DAE surface area. The great majority of occurrence is in Croatia (12,220.05 km²). On a regional level it is adequately represented in PAs (2260.3 km²; 11.12 %). On country level it can be considered adequately covered in Montenegro (429.05 km²; 21.81 %) and Albania (568.04 km²; 15.69 %). Only in Montenegro it can be considered adequately covered with IUCN category II PAs. This target is a gap in Slovenia, with 5.36 km² (1.86 %), in Croatia, with 1124.43 km² (9.20 %) and in Bosnia and Herzegovina, with 133.42 km² (6.00 %) within PAs.

5.3.4.2.30. *Hierophis gemonensis*

Range in DAE	**km²**		**%**	
	27,951.05		27.38	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	18,649.71	65.05	18.27
	Bosnia and Herzegovina	6,691.08	16.23	6.56
	Montenegro	4,102.47	29.54	4.02
	Albania	4,889.69	41.35	4.79

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	314.35	6.43
	IV	316.69	6.48
	V	249.03	5.09
	Total	880.07	18.00
Bosnia and Herzegovina	I/IV	16.92	0.25
	V	316.86	4.74
	Total	333.79	4.99
Croatia	I/IV	156.44	0.84
	II	169.17	0.91
	III	0.46	0.00
	V	208.43	1.12
	V/VI	711.00	3.81
	Total	1,245.49	6.68
Montenegro	II	272.47	6.64
	III	1.31	0.03
	III/V	32.07	0.78
	V	0.05	0.00
	Total	305.9	7.45
DAE	**Total**	2,765.25	9.89

Hierophis gemonensis occurs on a range of 27,951.05 km^2, which is 27.38 % of the region. The great majority of the range is in Croatia (18,649.71 km^2). On a regional level it is not adequately covered with PAs, since 2765.25 km^2 (9.89 %) of the range occur in PAs. On country level is adequately covered only in Albania, with 880.07 km^2 (18.00 %) covered within PAs. It is a gap in Croatia, with 1245.49 km^2 (6.68 %), in Bosnia and Herzegovina, with 333.79 km^2 (4.99 %) and in Montenegro, with 305.9 km^2 (7.45 %) represented within PAs.

5.3.4.2.31. *Hierophis viridiflavus*

Range in DAE	**km²**		**%**	
	10,573.66		10.31	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	2,956.33	45.80	2.90
	Croatia	7,617.33	26.57	7.46
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I	22,12	0,29
	I/IV	32,02	0,42
	II	167,47	2,20
	III	0,79	0,01
	V	92,17	1,21
	V/VI	1,229,63	16,14
	Total	1,544,21	20,27
Slovenia	III	21,53	0,73
	IV	14,63	0,49
	V	118,85	4,02
	V/II	56,74	1,92
	Total	211,74	7,16
DAE	**Total**	1,755,95	16,60

Hierophis viridiflavus occurs only in Slovenia and Croatia on a range of 10,573.66 km^2 which represents 10.31 % of total DAE. The target is adequately represented in PAs on a regional level, with 1755.95 km^2 (16.60 %) covered. On country level it can be considered adequately covered only in Croatia, with 1544.21 km^2 (20.27 %) in PAs. With 211.74 km^2 within PAs, the target is a gap in Slovenia.

5.3.4.3. Amphibians

5.3.4.3.1. *Hyla arborea*

Range in DAE	**km²**		**%**	
	91,418.00		89.57	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	4398.00	68.14	4.31
	Croatia	20,084.00	70.06	19.68
	Bosnia and Herzegovina	41,224.00	100.00	40.39
	Montenegro	13,886.00	100.00	13.59
	Albania	11,826.00	100.00	11.58

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	590.69	5.00
	III	0.58	0.00
	IV	323.87	2.74
	V	249.07	2.11
	VI	106.11	0.90
	Total	1,270.32	10.75
Bosnia and Herzegovina	I/IV	17.26	0.04
	II	425.27	1.03
	III	61.06	0.15
	V	558.02	1.35
	Total	1,061.61	2.58
Croatia	I	11.27	0.06
	I/IV	84.53	0.42
	II	481.64	2.40
	III	2.23	0.01
	V	255.77	1.27
	V/VI	1,381.35	6.88
	Total	2,216.78	11.04
Montenegro	II	901.08	6.50
	III	2.57	0.02
	III/V	101.26	0.73
	IV	0.15	0.00
	V	0.05	0.00
	Total	1,005.11	7.25
Slovenia	III	10.47	0.24
	IV	9.64	0.22
	V	53.27	1.21
	V/II	227.30	5.17
	Total	300.68	6.84
DAE	**Total**	55,854.50	61.10

Hyla arborea is a widespread species that occurs on 91,418 km^2, which is 89.57 % of the total DAE surface area. On a regional level, this target was found to be a gap, since only 55,854.50 km^2 (6.40 %) of the range are represented within PAs. On a national level, it was found to be covered in Croatia, with 2216.78 km^2 (11.04 %) covered and in Albania, with 1270.32 km^2 (10.75 %) represented in PA. In Albania

the species seems well covered within IUCN category II PAs. It is a gap in the other countries. Respectively 300.68 km^2 (6.84 %) of the range are covered with PAs of Slovenia, 1061.61 km^2 (2.58 %) in Bosnia and Herzegovina, and 1005.11 km^2 (7.25 %) in Montenegro.

5.3.4.3.2. *Rana arvalis*

Range in DAE	**km²**		**%**	
	1,454.57		1.42	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	277.59	4.30	0.27
	Croatia	1,176.98	4.11	1.15
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	III	0.05	0.00
	V	2.60	0.22
	V/VI	338.64	28.77
	Total	341.29	29.00
Slovenia	III	2.19	0.79
	IV	0.39	0.14
	V	19.95	7.19
	Total	22.53	8.12
DAE	**Total**	363.82	25.01

Rana arvalis occurs only in Slovenia and Croatia on a range of 1454.57 km² which represents 1.42 % of DAE. The target can be considered covered on a regional level, with 363.82 km² (25.01 %) within PAs. It is a gap in Slovenia with 22.53 km² (8.12 %) within PAs. In Croatia, with 341.29 km² (29.00 %), mainly in IUCN category V/VI, the target is covered. The target is not represented in any PA of IUCN category I or II.

5.3.4.3.3. *Rana latastei*

Range in DAE	**km²**		**%**	
	184.36		0.18	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	33.76	0.52	0.03
	Croatia	150.60	0.53	0.15
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I/IV	2.63	1.75
	V	1.35	0.90
	Total	3.98	2.65
Slovenia	V	0.12	0.35
	Total	0.12	0.35
DAE	**Total**	4.10	2.22

Rana latastei occurs only in Slovenia and Croatia on a small range of 184.36 km^2, which represents only 0.18 % of total DAE. The target has to be considered a gap on a regional level, with 4.10 km^2 (2.22 %) within PAs. It is a gap in both countries. In Slovenia only 0.12 km^2 (0.35 %) are represented in PAs, while in Croatia only 3.98 km^2 (2.65 %).

5.3.4.3.4. *Rana graeca*

Range in DAE	**km²**		**%**	
	30,502.46		29.88	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	4,824.19	11.70	4.73
	Montenegro	13,863.24	100	13.58
	Albania	11,815.03	100	11.58

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	**Total**	1,270.32	10.75
Bosnia and Herzegovina	II	161.74	3.35
	Total	161.74	3.35
Montenegro	II	901.08	6.50
	III	2.57	0.02
	III/V	100.72	0.73
	IV	0.15	0.00
	V	0.05	0.00
	Total	1,004.58	7.25
DAE	**Total**	2,436.64	7.98

Rana graeca occurs on a range of 30,504.87 km^2, which is 29.89 % of the DAE. The target is a gap on the regional level, with 2436.64 km^2 (7.98 %) within PAs. Only in Albania, with 388.83 km^2 (6.45 %) in PAs, the target can be considered covered. In Bosnia and Herzegovina, 161.74 km^2 (3.35 %) are within PAs, while in Montenegro 1004.58 km^2 (7.25 %).

5.3.4.3.5. *Rana temporaria*

Range in DAE	**km²**		**%**	
	49,489.40		48.49	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	5,102.25	79.04	5.00
	Croatia	4,394.21	15.33	15.33
	Bosnia and Herzegovina	25,817.61	62.63	62.63
	Montenegro	7,311.22	52.65	52.65
	Albania	6,864.11	58.04	58.04

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	276.34	4.03
	III	0.58	0.01
	IV	0.47	0.01
	VI	106.11	1.55
	Total	383.49	5.59
Bosnia and Herzegovina	II	312.70	1.21
	III	61.06	0.24
	V	37.67	0.15
	Total	411.43	1.59
Croatia	I/IV	4.99	0.11
	II	45.13	1.03
	III	1.54	0.04
	V	48.27	1.10
	V/VI	338.64	7.71
	Total	438.57	9.98
Montenegro	II	400.15	5.47
	III/V	42.16	0.58
	Total	442.30	6.05
Slovenia	III	22.56	0.44
	IV	6.45	0.13
	V	158.65	3.11
	V/II	220.33	4.32
	Total	408.00	8.00
DAE	**Total**	2,083.79	4.21

Rana temporaria is a relatively widespread species that occurs on 49,489.4 km^2 (48.49 % of the region). With 2083.78 km^2 (4.21 %) represented in PAs, it has to be considered a gap on a regional level. This target is a gap in all five DAE countries. In Slovenia 408.00 km^2 (8.00 %) are represented in PAs. 438.57 km^2 (9.98 %) are covered with PAs of Croatia. Bosnia and Herzegovina, with the great majority of the range (25,817.61 km^2) has only 411.43 km^2 (1.59 %) within PAs. In Montenegro 442.30 km^2 (6.05 %) are in PAs. In Albanian PAs 383.49 km^2 (5.59 %) are represented.

5.3.4.3.6. *Pelophylax kurtmuelleri*

Range in DAE	**km²**		**%**	
	10,971.67		10.75	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	
	Croatia	0	0	
	Bosnia and Herzegovina	0	0	
	Montenegro	83.25	0.60	0.08
	Albania	10,888.42	92.07	10.67

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	589.00	5.41
	III	0.58	0.01
	IV	323.40	2.97
	V	249.07	2.29
	VI	106.11	0.97
	Total	1,268.16	11.65
Montenegro	II	21.46	25.78
	IV	0.15	0.18
	Total	21.61	25.96
DAE	**Total**	1,289.77	11.75

Pelophylax kurtmuelleri occurs on 10,971.67 km² (which is 10.75 % of the DAE), only in Albania and Montenegro. The great majority of the range is in Albania (10,888.42 km²). The target is covered on the regional level, with 1289.77 km² (11.75 %) represented within PAs. Also on country level it can be considered covered, with 21.61 km² (25.96 %) covered in Montenegro and 1268,16 km² (11.65 %) in Albania respectively. The target is relatively well represented in IUCN category II PAs of both countries.

5.3.4.3.7. *Pelophylax esculenta*

Range in DAE	**km²**		**%**	
	12,339.44		12.04	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,445.72	99.86	6.32
	Croatia	5,893.72	20.56	5.77
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I	9.32	0.16
	I/IV	8.44	0.14
	II	63.31	1.07
	III	1.64	0.03
	V	88.63	1.50
	V/VI	495.18	8.40
	Total	666.52	11.31
Slovenia	III	30.01	0.47
	IV	15.08	0.23
	V	169.43	2.63
	V/II	231.32	3.59
	Total	445.84	6.92
DAE	**Total**	1,112.36	9.01

Pelophylax esculenta occurs only in Slovenia and Croatia on a range of 12,339.44 km^2, which represents 12.04 % of DAE. The target is a gap on a regional level with 1112.36 km^2 (9.01 %) within PAs. In Croatia it is covered, with 666.52 km^2 (11.31 %) within PAs. The target is not adequately represented within IUCN category I and II PAs. It is a gap in Slovenia with 445.84 km^2 (6.92 %) covered with PAs.

5.3.4.3.8. *Pelophylax lessonae*

Range in DAE	**km²**		**%**	
	14,646.66		14.35	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,429.42	100.00	6.30
	Croatia	7,110.15	24.80	6.97
	Bosnia and Herzegovina	1,107.09	2.69	1.08
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0.00
Croatia	I	11.27	0.16
	I/IV	4.89	0.07
	II	168.04	2.36
	III	1.88	0.03
	V	60.87	0.86
	V/VI	345.24	4.86
	Total	592.19	8.33
Slovenia	III	30.01	0.47
	IV	15.08	0.23
	V	169.43	2.64
	V/II	231.32	3.60
	Total	445.84	6.93
DAE	**Total**	1,038.03	7.08

Pelophylax lessonae occurs on 14,646.66 km^2, which is 14.35 % of the surface area of the DAE. The majority of the range is in Croatia (7110.15 km^2). It is not adequately covered on a regional level (1038.03 km^2; 7.08 %). Not even on county level the target is adequately represented in PAs. In Slovenia it is a gap, with 445.84 km^2 (6.93 %) within PAs. In Croatia 592.19 km^2 (8.33 %) are represented in PAs. In Bosnia and Herzegovina it is a total gap, with no surface represented within PAs.

5.3.4.3.9. *Pelophylax ridibunda*

Range in DAE	**km²**		**%**	
	91,604.49		89.76	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,445.72	100.00	6.32
	Croatia	27,364.95	95.45	26.81
	Bosnia and Herzegovina	41,223.73	100.00	40.39
	Montenegro	13,869.30	100.00	13.59
	Albania	2,700.79	22.84	2.65

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	262.31	9.71
	IV	269.17	9.97
	V	204.22	7.56
	Total	735.70	27.24
Bosnia and Herzegovina	I/IV	17.26	0.04
	II	425.27	1.03
	III	61.06	0.15
	V	558.02	1.35
	Total	1,061.61	2.58
Croatia	I	24.25	0.09
	I/IV	181.79	0.66
	II	654.78	2.39
	III	2.68	0.01
	V	284.83	1.04
	V/VI	2,570.31	9.39
	Total	3,718.64	13.59
Montenegro	II	901.08	6.50
	III	2.57	0.02
	III/V	101.26	0.73
	IV	0.15	0.00
	V	0.05	0.00
	Total	1,005.11	7.25
Slovenia	III	30.01	0.47
	IV	15.08	0.23
	V	169.43	2.63
	V/II	231.32	3.59
	Total	445.84	6.92
DAE	**Total**	6,966.90	7.60

Pelophylax ridibunda is a widespread target that occurs on 91,604.49 km^2 (89.76 % of DAE). On the regional level the target is a gap, with 6966.90 km^2 (7.60 %) represented within PAs. The majority of the range is in Bosnia and Herzegovina (41,223.73 km^2) where the target is not adequately covered with PAs (1061.61 km^2; 2.58 %). It is a gap also in Slovenia, with 445.84 km^2 (6.92 %) and in Montenegro, with 1005.11 km^2 (7.25 %) within PAs. It can be considered covered in Croatia (3718.64 km^2; 13.59 %) and in Albania (735.70 km^2; 27.24 %). In both countries the target seems adequately covered within IUCN category II PAs.

5.3.4.3.10. *Pelophylax shqiperica*

Range in DAE	**km²**		**%**	
	2,143.15		2.10	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	613.22	4.42	0.60
	Albania	1,529.93	12.94	1.50

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	0.00	0.00
	IV	314.26	20.54
	V	146.43	9.57
	Total	460.68	30.11
Montenegro	II	396.97	64.73
	IV	0.15	0.02
	Total	397.11	64.76
DAE	**Total**	857.80	40.02

Pelophylax shqiperica occurs on 2143.15 km^2 (which is 2.10 % of the DAE), only in Albania and Montenegro. The majority of the range is in Albania (1529.93 km^2). The target is covered on the regional level, with 857.80 km^2 (40.02 %) represented in PAs. Also on country level it can be considered covered, with 397.11 km^2 (64.76 %) covered in Montenegro and 460.68 km^2 (30.11 %) in Albania respectively. The target is relatively well represented in IUCN category II PAs of both countries.

5.3.4.3.11. *Salamandra atra*

Range in DAE	**km²**		**%**	
	7,214.39		7.07	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	1,955.75	30.30	1.92
	Croatia	2,007.48	7.00	1.97
	Bosnia and Herzegovina	718.67	1.74	0.70
	Montenegro	1,177.36	8.48	1.15
	Albania	1,355.13	11.46	1.33

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	262.31	19.36
	Total	262.31	19.36
Bosnia and Herzegovina	II	147.36	20.50
	Total	147.36	20.50
Croatia	I	11.27	0.56
	I/IV	4.89	0.24
	II	63.31	3.15
	III	0.21	0.01
	V	24.82	1.24
	V/VI	165.37	8.24
	Total	269.88	13.44
Montenegro	II	46.43	3.94
	Total	46.43	3.94
Slovenia	III	12.37	0.62
	IV	13.57	0.68
	V	76.43	3.91
	V/II	95.79	4.90
	Total	198.16	10.13
DAE	**Total**	924.14	12.80

Salamandra atra occurs on 7214.39 km^2, which is 7.07 % of DAE. On the regional level this target is adequately covered with PAs (924.14 km^2; 12.80 %). The majority of the range is in Slovenia (1955.75 km^2) and Croatia (2007.48 km^2). The target is adequately covered in Slovenia, with 197.77 km^2 (10.13 %), in Bosnia and Herzegovina, with 147.36 km^2 (20.50 %), in Croatia, 269.88 km^2 (13.44 %) and in Albania with 262.31 km^2 (19.36 %) within PAs. In Bosnia and Herzegovina and in Albania the target seems adequately represented within IUCN category II PAs. It is a gap in Montenegro, where only 46.43 km^2 (3.94 %) are within PAs.

5.3.4.3.12. *Triturus alpestris*

Range in DAE	**km^2**		**%**	
	85,971.10		84.24	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	5,749.30	89.07	5.63
	Croatia	19,769.31	68.96	19.37
	Bosnia and Herzegovina	40,122.48	97.33	39.31
	Montenegro	12,726.99	91.65	12.47
	Albania	7,603.02	64.29	7.45

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Albania	II	276.34	3.63
	III	0.58	0.01
	IV	0.47	0.01
	V	20.95	0.28
	VI	106.11	1.40
	Total	404.44	5.32
Bosnia and Herzegovina	I/IV	0.00	0.00
	II	425.27	1.06
	III	61.06	0.15
	V	558.02	1.39
	Total	1,044.35	2.60
Croatia	I	24.25	0.12
	I/IV	47.73	0.24
	II	627.67	3.17
	III	2.10	0.01
	V	119.40	0.60
	V/VI	2,131.58	10.78
	Total	2,952.74	14.94
Montenegro	II	672.76	5.29
	III	1.26	0.01
	III/V	90.47	0.71
	Total	764.49	6.01
Slovenia	III	23.84	0.41
	IV	14.60	0.25
	V	159.53	2.77
	V/II	231.32	4.02
	Total	429.29	7.47
DAE	**Total**	5,595.31	6.50

Triturus alpestris is a widespread target that occurs on 85,971.1 km^2, which represents 84.24 % of the entire DAE. On a regional level is not sufficiently represented in PAs (5595.31 km^2; 6.50 %). On country level it can be considered covered only in Croatia, with 2952.74 km^2 (14.94 %) within PAs. In Croatia it can be partially considered covered also within IUCN category II PAs. This target is a gap in Slovenia, with 429.29 km^2 (7.47 %), in Bosnia and Herzegovina, with 1044.35 km^2 (2.60 %) in Montenegro, with 764.49 km^2 (6.01 %) and in Albania, with 404.44 km^2 (5.32 %) in PAs respectively.

5.3.4.3.13. *Triturus carnifex*

Range in DAE	**km²**		**%**	
	85,971.10		84.24	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	6,514.01	100.00	6.38
	Croatia	14,464.78	50.46	14.17
	Bosnia and Herzegovina	14,221.76	34.50	13.93
	Montenegro	13,869.30	100.00	13.59
	Albania	11,815.03	100.00	11.58

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	590.69	5.00
	III	0.58	0.00
	IV	323.87	2.74
	V	249.07	2.11
	VI	106.11	0.90
	Total	1270.32	10.75
Bosnia and Herzegovina	II	271.22	1.91
	Total	271.22	1.91
Croatia	I	24.25	0.17
	I/IV	18.26	0.13
	II	478.78	3.31
	III	2.49	0.02
	V	151.70	1.05
	V/VI	1596.10	11.03
	Total	2271.58	15.70
Montenegro	II	901.08	6.50
	III	2.57	0.02
	III/V	101.26	0.73
	IV	0.15	0.00
	V	0.05	0.00
	Total	1005.11	7.25
Slovenia	III	30.03	0.47
	IV	16.62	0.26
	V	170.57	2.62
	V/II	231.32	3.55
	Total	448.54	6.89
DAE	**Total**	5266.77	6.12

Triturus carnifex is a widespread target that occurs on 85,971.10 km^2 (84.24 % of DAE). On a regional level this target is a gap, since 5266.77 km^2 (6.12 %) are within PAs.

In Bosnia and Herzegovina the target is not adequately represented in PAs (271.22 km^2; 1.91 %). This target is a gap also in Slovenia, with 16.78 km^2 (6.89 %) and Montenegro, with 1005.11 km^2 (7.25 %) within PAs respectively. It can be considered covered in Croatia (1912.13 km^2; 13.22 %) and in Albania (1270.32 km^2; 10.75 %). In both countries the target is partially covered within IUCN category II PAs.

5.3.4.4. Freshwater fish of the Adriatic basin

5.3.4.4.1. *Salaria fluviatilis*

Range in DAE	**km²**		**%**	
		24,052.25		23.46 %
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	3,521.19	12.28	3.45
	Bosnia and Herzegovina	13,217.40	32.06	12.95
	Montenegro	2,556.31	18.41	2.50
	Albania	4,757.35	40.23	4.66

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	314.40	6.61
	IV	36.91	0.78
	V	185.01	3.89
	VI	22.68	0.48
	Total	559.01	11.75
Bosnia and Herzegovina	I/IV	17.65	0.13
	V	558.02	4.22
	Total	575.67	4.36
Croatia	I/IV	51.03	1.45
	II	109.44	3.11
	III	0.19	0.01
	V	81.65	2.32
	V/VI	230.13	6.54
	Total	472.44	13.42
Montenegro	II	17.82	0.70
	III	1.31	0.05
	III/V	28.33	1.11
	V	0.05	0.00
	Total	47.52	1.86
DAE	**Total**	1,654.64	6.88

Salaria fluviatilis occurs on 24,052.25 km^2 (23.46 % of DAE). The majority of the range is in Bosnia and Herzegovina (13,217.40 km^2). The species is a gap on a regional level since it covers an area in PAs of 1654.64 km^2 (6.88 %). On a national level, it can be considered covered only in Croatia and Albania, with 472.44 km^2 (13.42 %) and 559.01 km^2 (11.75 %) of the area occurring in PAs, respectively. The species is a gap in Bosnia and Herzegovina and Montenegro, with 575.67 km^2 (4.36 %) and 47.52 km^2 (1.86 %) within PAs respectively.

5.3.4.4.2. *Cobitis bileneata*

Range in DAE	**km²**	**%**		
	8,256.40			8.05
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	2,887.29	44.73	2.83
	Croatia	5,369.01	18.73	5.26
	Bosnia and Herzegovina	0.10	0.00	0.00
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0.00
Croatia	I	12.98	0.24
	I/IV	10.04	0.19
	II	206.05	3.84
	III	0.46	0.01
	V	15.59	0.29
	V/VI	1,605.52	29.90
	Total	1,850.65	34.47
Slovenia	III	25.37	0.88
	IV	6.59	0.23
	V	112.42	3.89
	V/II	4.02	0.14
	Total	148.40	5.14
DAE	**Total**	1,999.05	24.21

Cobitis bileneata occurs on 8256.40 km^2 (8.05 % of DAE). The majority of the range is in Croatia (5369.01 km^2). The species is well represented in PAs, since its coveres an area of 1999.05 km^2 (24.21 %) in PAs. On country level it can be considered covered only in Croatia with 1850.65 km^2 (34.47 %) within PAs. The species is a gap in Slovenia, with 148.40 km^2 (5.14 %) of the range represented in PAs. In Bosnia and Herzegovina it is distributed on a surface of only 0.1 km^2 and it is not represented in any PA, therefore it has to be considered as total gap.

5.3.4.4.3. *Cobitis dalmatina*

Range in DAE	**km^2**		**%**	
	978.75		0.95	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	978.75	3.41	0.96
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Croatia	V	42.45	4.34
	V/VI	1.85	0.19
	Total	44.30	4.53
DAE	**Total**	44.30	4.53

Cobitis dalmatina occurs on 978.75 km^2 (0.95 % of DAE). It is an endemic species of the DAE. In the IUCN red list is treated as Vulnerable. It occurs only in Croatia on 978.75 km^2. The species represents a gap, since it is covered only on 44.30 km^2 (4.53 %) within PAs.

5.3.4.4.4. *Cobitis narentana*

Range in DAE	**km²**		**%**	
	1,639.74		1.60	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	432.06	1.51	0.42
	Bosnia and Herzegovina	1,207.68	2.93	1.18
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	V	83.28	6.90
	Total	83.28	6.90
Croatia	I/IV	5.52	1.28
	V	3.07	0.71
	Total	8.59	1.99
DAE	**Total**	91.87	5.60

Cobitis narentana occurs on 1639.74 km^2 (1.60 % of DAE). The majority of the range is in Bosnia and Herzegovina (1207.68 km^2). This species is endemic for the DAE and treated as Vulnerable in the IUCN red list. The species is not sufficiently represented in PAs, represented on an area of 91.87 km^2 (5.60 %) within PAs, meaning that it represents a gap. On country level it represents a gap in both countries, covering 83.28 km^2 (6.90 %) of Bosnia and Herzegovina's PAs and 8.59 km^2 (1.99 %) within Croatia's PAs.

5.3.4.4.5. *Cobitis ohridana*

Range in DAE	**km²**		**%**	
	11,226.20		10.95	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	4,357.38	31.38	4.27
	Albania	6,868.82	58.08	6.73

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	274.86	4.00
	III	0.58	0.01
	IV	269.79	3.93
	V	42.04	0.61
	VI	83.42	1.21
	Total	670.69	9.76
Montenegro	II	468.89	10.76
	III	1.26	0.03
	III/V	4.14	0.10
	Total	474.29	10.88
DAE	**Total**	1,144.98	10.20

Cobitis ohridana occurs on 11,226.20 km^2 (10.95 % of DAE). The species is well represented in PAs, since it is represented on an area of 1144.98 km^2 (10.20 %). It is an endemic species of the DAE. On country level it can be considered covered in Montenegro, with 474.29 km^2 (10.88 %) of the area occurring in PAs. With the surface area of 670.69 km^2 (9.76 %) of the area occurring in Albania's PAs, the species represents there a gap.

5.3.4.4.6. *Aulopyge huegeli*

Range in DAE	**km²**		**%**	
	2,812.54		2.76	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	2,812.54	9.81	2.76
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I/IV	6.41	0.23
	II	109.44	3.89
	V	78.57	2.79
	V/VI	329.32	11.71
	Total	523.75	18.62
DAE	**Total**	523.75	18.62

Aulopyge huegeli occurs on 2812.54 km^2 (2.76 % of DAE) and it is present only in Croatia. It is an endemic species of the DAE. In the IUCN red list is treated as Endangered. The species is well represented in Croatia's PAs, since it is covered within an area of 523.75 km^2 (18.62 %).

5.3.4.4.7. *Barbus plebejus*

Range in DAE	**km²**		**%**	
	5,458.60		5.32	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	2,923.08	45.28	2.86
	Croatia	2,535.52	8.84	2.48
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I/IV	9.96	0.39
	II	102.72	4.05
	V	64.49	2.54
	V/VI	408.16	16.10
	Total	585.33	23.09
Slovenia	III	25.54	0.87
	IV	6.65	0.23
	V	118.98	4.07
	V/II	4.02	0.14
	Total	155.19	5.31
DAE	**Total**	740.52	13.56

Barbus plebejus occurs on 5458.6 km² (5.32 % of DAE) only in Croatia and Slovenia. The species is sufficiently represented in PAs, since it is covered within an area of 740.52 km² (13.56 %). On country level it is sufficiently represented in Croatia's PAs, with 585.33 km² (23.09 %) covered with PAs, while in Slovenia it should be considered as gap, with 155.19 or 5.31 % represented in country's PAs.

5.3.4.4.8. *Chondrostoma genei*

Range in DAE	**km^2**		**%**	
	1,540.59		1.51	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	1,540.59	23.87	1.51
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Slovenia	III	15.22	0.99
	IV	4.97	0.32
	V	108.91	7.07
	Total	129.10	8.38
DAE	**Total**	129.10	8.38

Chondrostoma genei occurs only in Slovenia on 1540.59 km^2 (1.51 % of DAE). In the IUCN red list is treated as Endangered. The species is not sufficiently represented in Slovenia, occurring on 129.10 km^2 (8.38 %) within PAs, meaning that it represents a gap on country and also on a regional level.

5.3.4.4.9. *Chondrostoma knerii*

Range in DAE	**km^2**		**%**	
	8,073.78		7.88	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	432.06	1.51	0,42
	Bosnia and Herzegovina	7,641.72	18.54	7,49
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Bosnia and Herzegovina	V	558.02	7.30
	Total	558.02	7.30
Croatia	I/IV	5.52	1.28
	V	3.07	0.71
	Total	8.59	1.99
DAE	**Total**	566.61	7.01

Chondrostoma knerii occurs in Croatia and Bosnia and Herzegovina on 8073.78 km^2 (7.88 % of DAE). This species is endemic for the DAE and treated as Vulnerable in the IUCN red list. The great majority of the range is in Bosnia and Herzegovina (7641.72 km^2). The species is not sufficiently covered with PAs (566.61 km^2; 7.01 %), meaning that it represents a gap. The species represents a gap also in both countries, Bosnia and Herzegovina and Croatia, covering 558.02 km^2 (7.30 %) and 8.59 km^2 (1.99 %) of countries' PAs, respectively.

5.3.4.4.10. *Chondrostoma phoxinus*

Range in DAE	**km²**		**%**	
	2,425.68		2.3	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	978.75	3.41	0.96
	Bosnia and Herzegovina	1,446.93	3.51	1.42
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	V	42.45	4.34
	V/VI	1.85	0.19
	Total	44.30	4.53
DAE	**Total**	44.30	1.82

Chondrostoma phoxinus occurs on 2425.68 km^2 (2.37 % of DAE) in Croatia and Bosnia and Herzegovina. This species is endemic for the DAE and treated as Endangered in the IUCN red list. The majority of the range is in Bosnia and Herzegovina (1446.93 km^2). The species is not sufficiently covered with PAs, since only 44.30 km^2 (1.82 %) of the range are within PAs. On country level it represents a gap in Croatia, covering 44.30 km^2 (4.53 %) of its PAs, while in Bosnia and Herzegovina it is not present at all in PAs and is therefore consider as total gap.

5.3.4.4.11. *Gobio benacensis*

Range in DAE	**km^2**		**%**	
	1,617.67		1.59	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	1,617.67	25.06	1.59
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Slovenia	III	14.67	0.91
	IV	4.97	0.31
	V	108.91	6.73
	Total	128.55	7.95
DAE	**Total**	128.55	7.95

Gobio benacensis occurs only in Slovenia on a surface of 1617.67 km^2 (1.59 % of DAE). In the IUCN red list is treated as Endangered. The species is not sufficiently covered within PAs, since it occurs within PAs on an area of 128.55 km^2 (7.95 %), meaning that it represents a gap.

5.3.4.4.12. *Leuciscus svallize*

Range in DAE	**km²**		**%**	
	2,813.88		2.7	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	495.56	1.73	0.49
	Bosnia and Herzegovina	2,318.32	5.62	2.27
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	I/IV	16.32	0.70
	V	87.96	3.79
	Total	104.28	4.50
Croatia	I/IV	59.29	11.96
	V	3.07	0.62
	Total	62.36	12.58
DAE	**Total**	166.64	5.92

Leuciscus svallize occurs on 2813.88 km^2, which is 2.74 % of DAE. This species is endemic for the DAE and treated as Vulnerable in the IUCN red list. The species is not sufficiently in represented in PAs, since it is represented only on 166.64 km^2 (5.92 %). The majority of the range is in Bosnia and Herzegovina (2318.32 km^2), where the target is gap, with 104.28 km^2 (4.50 %) within PAs. In Croatia the target can be considered covered, with 62.36 km^2 (12.58 %) within PAs.

5.3.4.4.13. *Pachychilon pictum*

Range in DAE	**km²**		**%**	
	15,952.01		15.56	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	4,365.47	31.44	4.28
	Albania	11,586.54	97.98	11.35

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	589.25	5.09
	III	0.58	0.01
	IV	306.70	2.65
	V	212.84	1.84
	VI	106.11	0.92
	Total	1,215.48	10.49
Montenegro	II	468.89	10.74
	III	1.26	0.03
	III/V	4.14	0.09
	Total	474.29	10.86
DAE	**Total**	1,689.77	10.59

Pachychilon pictum occurs on 15,952.01 km^2 (15.56 % of DAE). The species is adequately represented in PAs, since it is covered on an area of 1689.77 km^2 (10.59 %). It is an endemic species of the DAE. On country level it can be considered covered in Montenegro, with 474.29 km^2 (10.86 %) of the area occurring within PAs. With 1215.48 km^2 (10.49 %) represented in PAs, the target can be considered covered also in Albania.

5.3.4.4.14. *Phoxinellus adspersus*

Range in DAE	**km²**		**%**	
	1,785.54		1.75	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	826.82	2.88	0.81
	Bosnia and Herzegovina	958.72	2.33	0.94
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	6.84	0.83
	V	13.73	1.66
	V/VI	106.36	12.86
	Total	126.93	15.35
DAE	**Total**	126.93	7.11

Phoxinellus adspersus occurs on 1785.54 km^2, which is 1.75 % % of the region. This species is endemic for the DAE and treated as Vulnerable in the IUCN red list. The species is not sufficiently represented in PAs on regional level, since it is represented only on 126.93 km^2 (7.11 %). In Bosnia and Herzegovina it has to be considered as total gap, since no range is represented within PAs. In Croatia the target is covered, with 126.93 km^2 (15.35 %) within PAs. The target is not represented in any IUCN category I or II PA.

5.3.4.4.15. *Phoxinellus alepidotus*

Range in DAE	**km^2**		**%**	
	556.41		0.54	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	532.04	1.86	0.52
	Bosnia and Herzegovina	24.37	0.06	0.02
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	5.52	1.04
	V	3.07	0.58
	Total	8.59	1.62
DAE	**Total**	8.59	1.54

Phoxinellus alepidotus occurs on 556.41 km^2, which is only 0.54 % of the region. The great majority of the range is in Croatia (532.04 km^2). This species is endemic for the DAE and treated as Endangered in the IUCN red list. The species is not sufficiently represented in PAs on a regional level, since it is represented only on 8.59 km^2 (1.54 %). In Bosnia and Herzegovina it has to be considered as total gap, since no range is represented within PAs. In Croatia the target is a gap, with 8.59 km^2 (1.62 %) within PAs.

5.3.4.4.16. *Phoxinellus croaticus*

Range in DAE	**km²**		**%**	
	2,202.03		2.15	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	2,197.09	7.66	2.15
	Bosnia and Herzegovina	4.94	0.01	0.00
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	0.47	0.02
	II	113.48	5.16
	III	0.16	0.01
	V/VI	289.92	13.20
	Total	404.02	18.39
DAE	**Total**	404.02	18.34

Phoxinellus croaticus occurs on 2202.03 km^2, which is 2.15 % of the region. The great majority of the range is in Croatia (2197.09 km^2). This species is endemic for the DAE. In the IUCN red list is treated as Endangered. On a regional level the species can be considered sufficiently covered with PAs, with a range of 404.02 km^2 (18.34 %) within PAs. On country level the target is covered only in Croatia (404.02 km^2; 18.39 %), where it is adequately covered even within IUCN category II PAs. In Bosnia and Herzegovina it is as total gap, since no range is represented within PAs.

5.3.4.4.17. *Phoxinellus dalmaticus*

Range in DAE	**km^2**		**%**	
	1,261.65		1.40	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	1,261.65	4.40	1.40
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Croatia	I/IV	0.52	0.04
	II	109.44	8.67
	V	36.13	2.86
	Total	146.09	11.58
DAE	**Total**	146.09	11.58

Phoxinellus dalmaticus occurs on 1261.65 km^2 (1.40 % of DAE) and it is present only in Croatia. It is an endemic species of the DAE. In the IUCN red list is treated as Critically Endangered. The species is adequately represented in Croatia's PAs, since it is covered within an area of 146.09 km^2 (11.58 %).

5.3.4.4.18. *Phoxinellus fontinalis*

Range in DAE	**km^2**		**%**	
	300.21		0.29	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	300.21	1.05	0.29
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Croatia	I/IV	0.47	0.16
	Total	0.47	0.16
DAE	**Total**	0.47	0.16

Phoxinellus fontinalis occurs on 300.21 km^2 (0.29 % of DAE) and it is present only in Croatia. It is an endemic species of the DAE. In the IUCN red list is treated as Critically Endangered. The species is insufficiently represented in Croatia's PAs, since it is covered only within an area of 0.47 km^2 (0.16 %).

5.3.4.4.19. *Phoxinellus ghetaldii*

Range in DAE	**km^2**		**%**	
	2,550.81		2.49	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	866.91	3.02	0.85
	Bosnia and Herzegovina	1,627.51	3.95	1.59
	Montenegro	56.39	0.41 %	0.06 %
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	5.53	0.64
	V	11.65	1.34
	Total	17.18	1.98
Montenegro	III/V	0.41	0.73
	Total	0.41	0.73
DAE	**Total**	17.59	0.69

Phoxinellus ghetaldii occurs on 2550.81 km^2 (2.49 % of DAE). This species is endemic for the DAE. In the IUCN red list is treated as Vulnerable. The majority of the range is in Bosnia and Herzegovina (1627,51 km^2). The species is not sufficiently represented in PAs, since it is covered only within an area of 17.59 km^2 (0.69 %). On country level it represents a gap in all three countries. In Croatia only 17.18 km^2 (1.98 %), while in Montenegro only 0.41 km^2 (0.73 %) are represented within PAs. In Bosnia and Herzegovina the target is not represented in any PA, therefore it can be considered a total gap.

5.3.4.4.20. *Phoxinellus jadovensis*

Range in DAE	**km^2**		**%**	
	67.05		0.07	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	67.05	0.23	0.07
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Croatia	**Total**	0	0
DAE	**Total**	0	0

Phoxinellus jadovensis occurs on an area of 67.05km^2 (0.29 % of DAE) and it is present only in Croatia. It is an endemic species of the DAE. In the IUCN red list is treated as Critically Endangered. The species is not represented in any Croatia's PAs, therefore it can be considered a total gap.

5.3.4.4.21. *Phoxinellus krbavensis*

Range in DAE	**km^2**		**%**	
	627.87		0.62	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	627.77	2.19	0.62
	Bosnia and Herzegovina	0.10	0.00	0.00
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	0.47	0.08
	II	23.98	3.82
	V	1.08	0.17
	Total	25.53	4.07
DAE	**Total**	25.53	4.07

Phoxinellus krbavensis occurs on 2202.03 km^2, which is 2.15 % of the region. The great majority of the range is in Croatia (2197.09 km^2). This species is endemic for the DAE. In the IUCN red list is treated as Endangered. The target has to be considered a gap, both on a regional and country level. In Bosnia and Herzegovina it is a total gap, since not represented in any PA. In Croatia only 25.53 km^2 (4.07 %) are represented within PAs.

5.3.4.4.22. *Phoxinellus metohiensis*

Range in DAE	**km^2**		**%**	
	2,887.95		2.82	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	90.64	0.32	0.09
	Bosnia and Herzegovina	1,967.78	4.77	1.93
	Montenegro	829.53	5.97	0.81
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	V	5.26	5.80
	Total	5.26	5.80
Montenegro	**Total**	0	0
DAE	**Total**	5.26	0.18

Phoxinellus metohiensis occurs on 2887.95 km^2 (2.82 % of DAE). The majority of the range is in Bosnia and Herzegovina (1967.78 km^2). This species is endemic for the DAE. In the IUCN red list is treated as Vulnerable. The species is not sufficiently in PAs, since it covers an area of 5.26 km^2 (0.18 %), meaning that it represents a gap on a regional level. It represents a gap also on country level. In Croatia only 5.26 km^2 (5.80 %) are within PAs. In Bosnia and Herzegovina and in Montenegro, not resulting in any PA, the target can be considered as total gap.

5.3.4.4.23. *Phoxinellus pseudalepidotus*

Range in DAE	**km^2**		**%**	
	88.55		0.09	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	88.55	0.21	0.09
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
DAE	**Total**	0	0

Phoxinellus pseudalepidotus occurs on 88.55 km^2 (0.09 % of DAE) and it is present only in Bosnia and Herzegovina. It is an endemic species of the DAE. In the IUCN red list is treated as Vulnerable. The species is not covered within any PA, therefore it can be considered a total gap.

5.3.4.4.24. *Rutilus aula*

Range in DAE	**km²**		**%**	
	6,731.41		6.58	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	2,923.08	45.28	2.86
	Croatia	3,808.33	13.28	3.73
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I/IV	6.67	0.18
	II	0.02	0.00
	III	0.12	0.00
	V	88.07	2.31
	V/VI	159.75	4.19
	Total	254.64	6.69
Slovenia	III	25.66	0.88
	IV	6.65	0.23
	V	119.41	4.09
	V/II	4.02	0.14
	Total	155.74	5.33
DAE	**Total**	410.38	6.09

Rutilus aula occurs on 6731.41 km² (6.58 % of DAE) only in Croatia and Slovenia. The species is insufficiently represented in PAs, since it is covered within an area of 410.38 km² (6.09 %). On country level it is a gap in both countries. In Croatia 254.64 km² (6.69 %) are represented in PAs, while in Slovenia 155.19 km² (5.33 %) are within PAs.

5.3.4.4.25. *Rutilus basak*

Range in DAE	**km²**		**%**	
	10,629.26		10.37	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	526.62	1.84	0.52
	Bosnia and Herzegovina	9,797.77	23.77	9.60
	Montenegro	304.87	2.20	0.30
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	V	558.02	5.70
	Total	558.02	5.70
Croatia	I/IV	6.84	1.30
	V	13.73	2.61
	Total	20.57	3.91
Montenegro	**Total**	0	0
DAE	**Total**	578.59	5.44

Rutilus basak occurs on 10,629.26 km^2 (10.37 % of DAE). The majority of the range is in Bosnia and Herzegovina (9797.77 km^2). This species is endemic for the DAE. The species is not sufficiently represented in PAs, since it is covered only within an area of 578.59 km^2 (5.44 %). Even on country level the target is a gap. In Croatia 20.57 km^2 (3.91 %) are covered within PAs, while in Bosnia and Herzegovina it is covered with 558.02 km^2 (5.70 %). In Montenegro, not resulting in any PA, the target can be considered a total gap.

5.3.4.4.26. *Rutilus karamani*

Range in DAE	**km^2**		**%**	
	11,226.20		10.95	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	4,357.38	31.38	4.27
	Albania	6,868.82	58.08	6.73

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Albania	II	274.86	4.00
	III	0.58	0.01
	IV	269.79	3.93
	V	42.04	0.61
	VI	83.42	1.21
	Total	670.69	9.76
Montenegro	II	468.89	10.76
	III	1.26	0.03
	III/V	4.14	0.10
	Total	474.29	10.88
DAE	**Total**	1,144.98	10.20

Rutilus karamani occurs on 11,226.2 km^2 (10.95 % of DAE) only in Montenegro and Albania. This species is endemic for the DAE. The target is adequately represented in PAs, covering an area of 1144.98 km^2 (10.20 %). On country level it can be considered covered only in Montenegro, with 474.29 km^2 (10.88 %) within PAs. With 670.69 km^2 (9.76 %) represented by PAs, the target is a gap in Albania.

5.3.4.4.27. *Rutilus ohridanus*

Range in DAE	**km²**		**%**	
	374.91		0.37	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	215.25	1.55	0.21
	Albania	159.66	1.35	0.16

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	IV	159.55	99.93
	Total	159.55	99.93
Montenegro	II	215.25	100
	Total	215.25	100
DAE	**Total**	374.57	99.90

Rutilus ohridanus occurs on 374.91 km² (0.37 % of DAE). The species is very well represented in PAs, since it is covered within an area of 374.57 km² (99.90 %). It is an endemic species of the DAE. On country level it can be considered covered in both countries, in Montenegro, with 215.25 km² (100 %), all within IUCN category II PAs and in Albania with 159.55 km² (99.93 %) in PAs. In Albania it does not occur in any IUCN category I or II PA.

5.3.4.4.28. *Scardinius dergle*

Range in DAE	**km²**		**%**	
	1,033.50		1.01	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	1,033.50	3.61	1.01
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I/IV	5.89	0.57
	II	77.95	7.54
	V	29.93	2.90
	V/VI	228.28	22.09
	Total	342.05	33.10
DAE	**Total**	342.05	33.10

Scardinius dergle occurs on 1033.50 km² (1.01 % of DAE) and it is present only in Croatia. It is an endemic species of the DAE. The species is adequately represented in Croatia's PAs, since it is represented on an area of 342.05 km² (33.10 %).

5.3.4.4.29. *Squalius illyricus*

Range in DAE	**km²**		**%**	
	2,732.84		2.67	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	2,079.20	7.25	2.04
	Bosnia and Herzegovina	653.64	1.59	0.64
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	0.52	0.03
	II	109.44	5.26
	V	71.25	3.43
	V/VI	1.85	0.09
	Total	183.06	8.80
DAE	**Total**	183.06	6.69

Squalius illyricus occurs on 2732.84 km^2, which is 2.67 % of the region. The majority of the range is in Croatia (2079.20 km^2). This species is endemic for the DAE. The target is a gap both, on regional and country level. In Bosnia and Herzegovina it is a total gap, since not represented in any PA. In Croatia 183.06 km^2 (6.69 %) are covered with PAs.

5.3.4.4.30. *Squalius microlepis*

Range in DAE	**km²**		**%**	
	10,629.26		10.37	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	526.62	1.84	0.52
	Bosnia and Herzegovina	9,797.77	23.77	9.60
	Montenegro	304.87	2.20	0.30
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	V	558.02	5.70
	Total	558.02	5.70
Croatia	I/IV	6.84	1.30
	V	13.73	2.61
	Total	20.57	3.91
Montenegro	**Total**	0	0
DAE	**Total**	578.59	5.44

Squalius microlepis occurs on 10,629.29 km^2 (10.37 % of DAE). The majority of the range is in Bosnia and Herzegovina (9797.77 km^2). This species is endemic for the DAE. In the IUCN red list is treated as Endangered. The species is not sufficiently represented in PAs, since it is covered within an area of 578.59 km^2 (5.44 %). Even on country level the target is a gap. In Croatia 20.57 km^2 (3.91 %) are covered within PAs, while in Bosnia and Herzegovina it is represented on 558.02 km^2 (5.70 %). In Montenegro, no resulting in any PA, the target can be considered a total gap.

5.3.4.4.31. *Squalius zrmanjae*

Range in DAE	**km²**		**%**	
	1,613.10		1.58	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	1,613.10	5.63	1.58
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I/IV	5.89	0.37
	II	103.50	6.42
	V	45.12	2.80
	V/VI	323.66	20.06
	Total	478.16	29.64
DAE	**Total**	478.16	29.64

Squalius zrmanjae occurs on 1613.10 km^2 (1.58 % of DAE) and it is present only in Croatia. It is an endemic species of the DAE. The species is adequately represented in Croatia's PAs, since it is covered within an area of 478.16 km^2 (29.64 %).

5.3.4.4.32. *Telestes montenegrinus*

Range in DAE	**km²**		**%**	
	7,047.85		6.87	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	0	0	0
	Bosnia and Herzegovina	0	0	0
	Montenegro	4,235.82	30.50	4.15
	Albania	2,812.03	23.78	2.76

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	60.49	2.15
	IV	269.32	9.58
	V	42.04	1.50
	Total	371.85	13.22
Montenegro	II	468.89	11.07
	III	1.26	0.03
	III/V	4.14	0.10
	Total	474.29	11.20
DAE	**Total**	846.14	12.00

Telestes montenegrinus occurs on 7047.85 km² (6.87 % of DAE). The species is adequately represented in PAs, since it is covered within an area of 846.14 km² (12.00 %). It is an endemic species of the DAE. On country level it can be considered covered in both countries, in Montenegro, with 474.29 km² (11.20 %), the great majority within IUCN category II PAs and in Albania with 371.85 km² (13.22 %) in PAs.

5.3.4.4.33. *Telestes polylepis*

Range in DAE	**km^2**		**%**	
	600.64		0.59	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	600.64	2.10	0.59
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Croatia	V	9.28	1.55
	Total	9.28	1.55
DAE	**Total**	9.28	1.55

Telestes polylepis occurs on 600.64 km^2 (0.59 % of DAE) and it is present only in Croatia. It is an endemic species of the DAE. In the IUCN red list is treated as Critically Endangered. The species is insufficiently represented in Croatia's PAs, since it is covered only within an area of 9.28 km^2 (1.55 %).

5.3.4.4.34. *Telestes turskyi*

Range in DAE	**km²**		**%**	
	768.43		0.75	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	768.43	2.68	0.75
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	II	20.09	2.61
	V	4.41	0.57
	Total	24.50	3.19
DAE	**Total**	24.50	3.19

Telestes turskyi occurs on 768.43 km² (0.75 % of DAE) and it is present only in Croatia. It is an endemic species of the DAE. In the IUCN red list is treated as Critically Endangered. The species is insufficiently represented in Croatia's PAs, since it is covered only within an area of 24.50 km² (3.19 %).

5.3.4.4.35. *Telestes ukliva*

Range in DAE	**km²**		**%**	
	1,901.13		1.85	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	1,757.51	6.13	1.72
	Bosnia and Herzegovina	143.62	0.35	0.14
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	III	0.19	0.01
	V	47.98	2.73
	V/VI	26.24	1.49
	Total	74.40	4.23
DAE	**Total**	74.40	3.91

Telestes ukliva occurs on 1901.13 km^2, which is 1.85 % of the region. The majority of the range is in Croatia (1757.51 km^2). This species is endemic for the DAE. In the IUCN red list is treated as Extinct. Croatian Red Book regards it as Criticaly Endangered, since according to recent studies viable populations still survive in Cetina river. The target is as gap both, on a regional and country level. In Bosnia and Herzegovina it has to be considered a total gap, since not represented in any PA. In Croatia 74.40 km^2 (4.23 %) are within PAs.

5.3.4.4.36. *Aphanius fasciatus*

Range in DAE	**km²**		**%**	
	384.27		0.37	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	34.84	0.54	0.03
	Croatia	61.22	0.21	0.04
	Bosnia and Herzegovina	0	0	0
	Montenegro	51.37	0.37	0.05
	Albania	236.84	2.00	0.23

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	V	28.09	11.86
	VI	88.99	37.57
	Total	117.08	49.43
Croatia	I/IV	0.36	0.59
	III	0.08	0.12
	V	0.43	0.70
	Total	0.86	1.40
Montenegro	III/V	3.90	7.59
	V	0.14	0.28
	Total	4.04	7.86
Slovenia	III	0.10	0.28
	IV	1.05	3.03
	V	7.27	20.85
	Total	8.42	24.16
DAE	**Total**	130.4	33.93

Aphanius fasciatus occurs on 384.27 km^2 (0.37 % of DAE). The species is covered on the regional level, with 130.4 km^2 (33.93 %) within PAs. It can be considered covered only in Slovenia and Albania, with 8.42 km^2 (24.16 %) and 117.08 km^2 (49.43 %) of the area occurring on PAs. The target is only partially covered within IUCN category II. The species is a gap in Croatia and in Montenegro, with 0.86 km^2 (1.40 %) and 4.04 km^2 (7.86 %) of the range represented in PAs.

5.3.4.4.37. *Knipowitschia croatica*

Range in DAE	**km²**		**%**	
	1,733.14		1.70	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	517.76	1.81	0.51
	Bosnia and Herzegovina	1,215.38	2.95	1.19
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	V	87.96	7.24
	Total	87.96	7.24
Croatia	I/IV	14.43	2.79
	V	3.07	0.59
	Total	17.51	3.38
DAE	**Total**	105.47	6.08

Knipowitschia croatica occurs on 10,629.26 km^2 (10.37 % of DAE). The majority of the range is in Bosnia and Herzegovina (9797.77 km^2). This species is endemic in the DAE. In the IUCN red list is assessed as Vulnerable. The species is not sufficiently represented within PAs, since it is covered within an area of 105.47 km^2 (6.08 %). The target is a gap even on country level. In Croatia 17.51 km^2 (3.38 %) are within PAs, while in Bosnia and Herzegovina 87.96 km^2 (7.24 %) are covered with PAs.

5.3.4.4.38. *Knipowitschia mrakovcici*

Range in DAE	**km²**		**%**	
	200.11		0.20	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	200.11	0.70	0.20
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	II	51.98	25.98
	V	13.75	6.87
	Total	65.73	32.85
DAE	**Total**	65.73	32.85

Knipowitschia mrakovcici occurs on 200.11 km² (0.20 % of DAE) and it is found only in Croatia. It is an endemic species of the DAE. In the IUCN red list is assessed as Endangered. The species is adequately represented in Croatia's PAs, since it is covered with an area of 65.73 km² (32.85 %).

5.3.4.4.39. *Knipowitschia radovici*

Range in DAE	**km²**		**%**	
	27.55		0.02	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	0	0	
	Croatia	22.96	0.08	0.02
	Bosnia and Herzegovina	4.59	0.01	0.00
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	6.61	23.99
	Total	6.61	23.99
DAE	**Total**	6.61	23.99

Knipowitschia radovici occurs on a very small range of 27.55 km^2, which is 0.02 % of the region. The majority of the range is in Croatia (22.96 km^2). This species is endemic for the DAE. The target is covered on the regional level, with 6.61 km^2 (23.99 %) represented in PA. In Bosnia and Herzegovina it is a total gap, since it is not found on any PA. In Croatia 6.61 km^2 (23.99 %) are covered within PAs. No range is covered within IUCN category I or II.

5.3.4.4.40. *Padogobius bonelli*

Range in DAE	**km²**		**%**	
	2,811.14		2.74	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	1,637.79	25.37	1.60
	Croatia	1,173.35	4.09	1.15
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Croatia	I/IV	8.52	0.73
	V	9.46	0.81
	V/VI	327.48	27.91
	Total	345.45	29.44
Slovenia	III	15.68	0.96
	IV	4.97	0.30
	V	108.91	6.65
	Total	129.56	7.91
DAE	**Total**	475.01	16.89

Padogobius bonelli occurs on 2811.14 km² (2.74 % of DAE) only in Croatia and Slovenia. The species is adequately represented within PAs, since it is covered within an area of 475.01 km² (16.89 %). On country level it is a gap in Slovenia, with 129.56 km² (7.91 %) within PAs. In Croatia 345.45 km² (29.44 %) are represented in PAs. The target is not represented in any IUCN category I or II.

5.3.4.4.41. *Lethenteron zanandreai*

Range in DAE	**km²**		**%**	
	15,378.97		15.00	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	2,923.08	45.28	2.86
	Croatia	432.06	1.51	0.42
	Bosnia and Herzegovina	11,718.96	28.43	11.48
	Montenegro	304.87	2.20	0.30
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	V	558.02	4.76
	Total	558.02	4.76
Croatia	I/IV	5.52	1.28
	V	3.07	0.71
	Total	8.59	1.99
Slovenia	III	25.54	0.87
	IV	6.65	0.23
	V	118.98	4.07
	V/II	4.02	0.14
	Total	155.19	5.31
Montenegro	**Total**	0	0
DAE	**Total**	721.80	4.69

Lethenteron zanandreai occurs on 15,378.97 km^2 (15.00 % of DAE). This target does not occur in Albania. It is a gap on the regional level, with 721.80 km^2 (4.69 %) within PAs. On country level it has to be considered as a gap in the other four countries, with respectively 155.19 km^2 (5.31 %) in Slovenia, 8.59 km^2 (1.99 %) in Croatia and 558.02 km^2 (4.76 %) in Bosnia and Herzegovina within PAs. In Montenegro it is a total gap, since not represented in any PA.

5.3.4.4.42. *Salmo marmoratus*

Range in DAE	**km²**		**%**	
	3,546.51		3.46	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	1,630.55	25.26	1.60
	Croatia	1,796.54	6.27	1.76
	Bosnia and Herzegovina	119.42	0.29	0.12
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Bosnia and Herzegovina	I/IV	17.37	14.54
	Total	17.37	14.54
Croatia	I/IV	45.15	2.51
	II	109.44	6.09
	V	39.20	2.18
	Total	193.79	10.79
Slovenia	III	15.93	0.98
	IV	4.97	0.30
	V	108.91	6.68
	Total	129.81	7.96
DAE	**Total**	340.97	9.61

Salmo marmoratus occurs on 35,46.51 km² (3.46 % of DAE). The species is not adequately represented, covering 340.97 km² (9.61 %) within PAs. On country level it is a gap only in Slovenia, where 129.81 km² (7.96 %) are covered within PAs. In Croatia 193.79 km² (10.79 %) are within PAs. The target is covered also in Bosnia and Herzegovina with 17.37 km² (14.54 %) within PAs. Only in Croatia the target is adequately represented in IUCN category II.

5.3.4.4.43. *Salmo visovacensis*

Range in DAE	**km^2**		**%**	
	100.06		0.10	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	100.06	0.35	0.10
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Croatia	II	20.58	20.57
	Total	20.58	20.57
DAE	**Total**	20.58	20.57

Salmo visovacensis occurs on 100.06 km^2 (0.10 % of DAE) and it is found only in Croatia. It is an endemic species of the DAE. In the IUCN red list is indicated as Endangered. The species is adequately represented in Croatia, since it is covered with PA of 20.58 km^2 (20.57 %).

5.3.4.4.44. *Salmo zrmanjensis*

Range in DAE	**km^2**		**%**	
	672.15		0.66	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	672.15	2.34	0.66
	Bosnia and Herzegovina	0	0	0
	Montenegro	0	0	0
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Croatia	I/IV	5.89	0.88
	V/VI	327.48	48.72
	Total	333.37	49.60
DAE	**Total**	333.37	49.60

Salmo zrmanjensis occurs on 672.15 km^2 (0.66 % of DAE) and it is found only in Croatia. It is an endemic species of the DAE. The species is adequately represented within Croatia's PAs, since it is covered with PA of 333.37 km^2 (49.60 %).

5.3.4.4.45. *Salmothymnus obtusirostris*

Range in DAE	**km^2**		**%**	
	14,571.30		14.21	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	832.20	2.90	0.82
	Bosnia and Herzegovina	11,748.51	28.50	11.51
	Montenegro	1,990.59	14.34	1.95
	Albania	0	0	0

Country	**PA category**	**Range in PA (km^2)**	**Range in PA (%)**
Bosnia and Herzegovina	I/IV	16.32	0.14
	V	558.02	4.75
	Total	574.34	4.89
Croatia	I/IV	6.12	0.73
	II	31.98	3.84
	V	4.86	0.58
	Total	42.95	5.16
Montenegro	II	10.70	0.54
	III/V	23.21	1.17
	V	0.05	0.00
	Total	33.97	1.71
DAE	**Total**	651.26	4.47

Salmothymnus obtusirostris occurs on 14,571.30 km^2 (14.21 % of DAE). It is an endemic species of the DAE. In the IUCN red list is inidcated as Endangered. The species is not sufficiently represented in PAs, since it is covered only with 651.26 km^2 (4.47 %) of PA. It is a gap also on country level. In Croatia 42.95 km^2 (5.16 %) are represented within PAs, in Bosnia and Herzegovina 574.34 km^2 (4.89 %) and 33.97 km^2 (1.71 %) in Montenegro.

5.3.4.5. Large charismatic mammals

5.3.4.5.1. *Ursus arctos*

Range in DAE	**km²**		**%**	
	42,886.79		42.02	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	3,597.12	55.73	3.52
	Croatia	10,918.79	38.09	10.70
	Bosnia and Herzegovina	17,919.61	43.47	17.56
	Montenegro	6,854.15	49.36	6.72
	Albania	3,597.12	56.68	6.57

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	468.19	13.02
	III	0.58	0.02
	IV	0.47	0.01
	V	20.95	0.58
	VI	106.11	2.95
	Total	596.29	16.58
Bosnia and Herzegovina	II	359.74	2.01
	III	23.42	0.13
	V	418.26	2.33
	Total	801.42	4.47
Croatia	V/VI	1,817.13	16.64
	I	24.25	0.22
	I/IV	14.39	0.13
	II	557.17	5.10
	III	2.31	0.02
	V	25.98	0.24
	Total	2,441.23	22.36
Montenegro	II	414.37	6.05
	III/V	80.14	1.17
	Total	494.51	7.21
Slovenia	III	14.92	0.41
	IV	14.16	0.39
	V	82.31	2.29
	V/II	227.30	6.32
	Total	338.70	9.42
DAE	**Total**	4,672.15	10.89

Ursus arctos occurs on 42,886.79 km^2, which covers 42.02 % of the entire DAE. On the regional level it is sufficiently represented with PAs (4672.15 km^2; 10.89 %). On country level it can be considered covered only in Croatia, with 2441.23 km^2 (22.36 %) represented in PAs. At the IUCN cagtegory II level, it is partially covered in Croatia. The target is adequately covered also in Albania, with 596.29 km^2 (16.58 %) within PAs. This target has to be considered a gap in Slovenia, with 338.70 km^2 (9.14 %), in Bosnia and Herzegovina, with 801.42 km^2 (4.47 %) and in Montenegro, with 494.51 km^2 (7.21 %).

5.3.4.5.2. *Lynx lynx*

Range in DAE	**km²**		**%**	
	29,520.52		28.92	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	2,476.45	38.36	2.43
	Croatia	11,325.67	39.51	11.10
	Bosnia and Herzegovina	12,002.27	29.11	11.76
	Montenegro	670.50	4.83	0.66
	Albania	3,045.63	25.75	2.98

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	197.97	6.50
	III	0.58	0.02
	V	20.95	0.69
	VI	85.11	2.79
	Total	304.60	10.00
Bosnia and Herzegovina	II	164.53	1.37
	III	23.42	0.20
	V	403.66	3.36
	Total	591.61	4.93
Croatia	V/VI	1,745.29	15.41
	I	24.25	0.21
	I/IV	12.53	0.11
	II	555.59	4.91
	III	2.27	0.02
	V	48.33	0.43
	Total	2,388.25	21.09
Montenegro	II	118.82	17.72
	Total	118.82	17.72
Slovenia	III	13.38	0.54
	IV	14.16	0.57
	V	77.57	3.13
	V/II	92.84	3.75
	Total	197.95	7.99
DAE	**Total**	3,601.23	12.19

Lynx lynx occurs within a range of 29,520.52 km^2, which is 28.92 % of the region. On the regional level it is adequately covered with PAs (3601.23 km^2 or 12.19 %). On country level it is adequately covered in Croatia, with 2388.25 km^2 (21.09 %), in Montenegro, with 118.82 km^2 (17.72 %) and in Albania, with 304.60 km^2 (10.00 %) within PAs. In Montenegro the whole protected range is within IUCN category II. In Croatia and Albania the range is partially covered with IUCN categories I and II. It is a gap in Slovenia, with 197.95 km^2 (7.99 %) and Bosnia and Herzegovina, with 591.61 km^2 (4.93 %) represented within PAs.

5.3.4.5.3. *Canis lupus*

Range in DAE	**km²**		**%**	
	65,731.65		64.40	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	2,372.71	36.76	2.32
	Croatia	20,321.73	70.89	19.91
	Bosnia and Herzegovina	27,021.86	65.55	26.48
	Montenegro	6,827.66	49.17	6.69
	Albania	9,187.69	77.69	9.00

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	590.69	6.43
	III	0.58	0.01
	IV	24.03	0.26
	V	20.95	0.23
	VI	106.11	1.15
	Total	151.08	1.64
Bosnia and Herzegovina	I/IV	0.18	0.00
	II	425.70	1.58
	III	61.06	0.23
	V	419.39	1.55
	Total	906.33	3.35
Croatia	I/IV	50.81	0.25
	II	660.62	3.25
	III	2.09	0.01
	V	193.28	0.95
	V/VI	2,344.02	11.53
	I	24.25	0.12
	Total	3,275.05	16.12
Montenegro	II	414.76	6.07
	III/V	80.16	1.17
	Total	494.92	7.25
Slovenia	III	13.70	0.58
	IV	13.83	0.58
	V	77.93	3.28
	V/II	91.94	3.87
	Total	197.40	8.32
DAE	**Total**	5,024.78	7.64

Canis lupus occurs on 65,731.65 km^2, which is 64.40 % of the entire DAE. On the regional level it is insufficiently represented within PAs (5024.78 km^2; 7.64 %). On country level it can be considered covered only in Croatia, with 3275.05 km^2 (16.12 %) represented in PAs. In Croatia it can be partially considered covered also within IUCN category II. This target is a gap in Slovenia, with 197.40 km^2 (8.32 %), in Bosnia and Herzegovina, with 906.33 km^2 (3.35 %) in Montenegro, with 494.92 km^2 (7.25 %) and in Albania, with 151.08 km^2 (1.64 %) within PAs.

5.3.4.5.4. *Rupicapra rupicapra*

Range in DAE	**km²**		**%**	
	16,448.55		16.04	
Range in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	2,509.84	38.88	2.46
	Croatia	3,110.00	10.85	3.05
	Croatia (Rupicapra r. balcanica)	407.28	1.42	3.05
	Bosnia and Herzegovina	3,112.86	7.55	0.40
	Montenegro	3,018.68	21.74	2.96
	Albania	4,289.89	36.28	4.20

Country	**PA category**	**Range in PA (km²)**	**Range in PA (%)**
Albania	II	531.23	12.38
	III	0.58	0.01
	V	20.95	0.49
	VI	68.87	1.61
	Total	621.63	14.49
Bosnia and Herzegovina	II	111.24	3.57
	V	0.08	0.00
	Total	111.33	3.58
Croatia	I	12.98	0.42
	I/IV	8.30	0.27
	II	255.14	8.20
	III	0.66	0.02
	V	0.91	0.03
	V/VI	1,994.96	56.71
	Total	2,272.96	65.65
Montenegro	II	352.99	11.69
	III/V	58.18	1.93
	Total	411.18	13.62
Slovenia	III	16.61	0.66
	IV	13.57	0.54
	V	81.71	3.26
	V/II	227.30	9.06
	Total	339.19	13.51
DAE	**Total**	3,756.29	22.83

Rupicapra rupicapra occurs on 16,448.55 km^2 which is 16.04 % of DAE. On the regional level this target is adequately covered within PAs (3756.29 km^2; 22.83 %). On country level only in Bosnia and Herzegovina the target is not adequately covered within PAs (111.33 km^2; 3.58 %). It is covered in the other DAE countries, with 339.19 km^2 (13.51 %) in Slovenia, 2272.96 km^2 (65.65 %) in Croatia, 411.18 km^2 (13.62 %) in Montenegro and 621.63 km^2 (14.49 %) in Albania. In Croatia, Montenegro and Albania the target is adequately represented in IUCN category II.

5.3.4.6. Birds - Important Bird Areas (IBA), Specially Protected Areas (SPA) and Ramsar Sites

Range in DAE	**km^2**		**%**	
	29,491.04		21.42	
Range in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	2,051.33	30.92	1.49
	Croatia	25,324.20	41.85	18.40
	Bosnia and Herzegovina	117.60	0.29	0.09
	Montenegro	1,516.24	9.31	1.10
	Albania	481.66	3.71	0.35

Country	**PA category**	**Surface area in PAs (km^2)**	**Surface area in PAs (%)**
Albania	II	63.43	13.17
	IV	319.77	66.39
	V	37.21	7.72
	Total	420.40	87.28
Bosnia and Herzegovina	I/IV	0.00	0.00
	II	0.15	0.13
	III/V	3.97	3.38
	V	87.96	74.79
	Total	92.08	78.30
Croatia	I	24.25	0.10
	I/IV	659.94	2.61
	II	964.88	3.81
	III	1.14	0.00
	V	110.27	0.44
	V/VI	2,496.76	9.86
	Total	4,257.24	16.81
Montenegro	II	837.91	55.26
	III/V	26.59	1.75
	V	1.08	0.07
	Total	865.58	57.09
Slovenia	III	7.43	0.36
	IV	14.86	0.72
	V	95.83	4.67
	V/II	69.59	3.39
	Total	187.71	9.15
DAE	**Total**	5,823.01	19.74

Important Bird Areas (IBA), Specially Protected Areas (SPA) and Ramsar Sites are sites recognized as significant for bird populations. On the regional level, the total area of these sites covers 29,491.04 km^2, which is 21.24 % of the total DAE. The great majority of IBAs were recognized as SPA in Croatia (25,324.20 km^2, which is 41.85 % of the total country), where they were found to be adequately represented within PAs (4257.24 km^2; 16.81 %). In Bosnia and Herzegovina only 117.60 km^2, which is 0.29 % of the country, were recognised as IBA. Only two areas are identified, of which one is entirely covered with a PA. There is also a big Ramsar site covering Lonjsko polje. In Montenegro and Albania, 1516.24 km^2 (9.31 %) and

481.66 km^2 (3.71 %) are recognized as IBAs. In all the DAE countries, sites of importance for birds were mainly recognized within existing PAs, therefore they are considered as covered. Slovenia recognized 2051.33 km^2 (30.92 %) as SPA, and this area is not sufficiently covered with PAs (187.71 km^2; 9.15 %).

5.3.5. Marine

5.3.5.1. Sea caves

In the coastal area of the DAE, data on 207 identified sea caves were available. 206 of them are in Croatia and only 1 in Montenegro. Data regarding sea caves in other countries were not available. The only sea cave recorded in Montenegro is not within any PA, while in Croatia, 73 sea caves are within PAs (see 'Lessons Learned – a contribution from NSCs', first paragraph, page 18/19).

5.3.5.2. Sea grass meadows

Surface of target in DAE	**km^2**		**%**	
	927.51		2.61	
Surface of target in countries		**km^2**	**% of country**	**% of marine DAE**
	Slovenia	0.07	0.04	0.00
	Croatia	829.80	2.61	2.33
	Bosnia and Herzegovina	0	0	0
	Montenegro	87.16	3.62	0.24
	Albania	10.48	0.92	0.03

Country	**PA category**	**Surface in PA (km^2)**	**Surface in PA (%)**
Albania	**Total**	0	0
Croatia	I/IV	86.57	10.43
	II	249.97	30.12
	V	8.58	1.03
	V/VI	70.09	8.45
	Total	415.21	50.04
Montenegro	**Total**	0	0
Slovenia	**Total**	0	0
DAE	**Total**	415.21	44.76

Sea grass meadows occur on an area of 927.51 km2, which is 2.61 % of total marine area. On a regional level this target is adequately covered within PAs (415.21 km^2; 44.76 %). On country level, only in Croatia this target is adequately covered, with 415 km^2 (50.04 %) represented within PAs. In Slovenia, Montenegro and Albania this target is not represented in any PA.

5.3.5.3. Coastal lagoons

Surface of target in DAE	**km²**		**%**	
	61.07		0.17	
Surface of target in countries		**km²**	**% of country**	**% of marine DAE**
	Slovenia	0.35	0.20	0.00
	Croatia	41.05	0.13	0.12
	Bosnia and Herzegovina	0	0	0
	Montenegro	1.24	0.05	0.00
	Albania	18.43	1.61	0.05

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	IV	14.41	78.19
	V	4.00	21.71
	Total	18.41	99.90
Croatia	I/IV	0.01	0.02
	V	0.07	0.18
	Total	0.08	0.20
Montenegro	**Total**	0	0
Slovenia	IV	0.33	94.51
	V	0.02	5.47
	Total	0.35	99.98
DAE	**Total**	18.85	30.87

Coastal lagoons occur on a surface area of 61.07 km^2, which is only 0.17 % of the marine surface of the DAE. There are no lagoons in Bosnia and Herzegovina. On a regional level the target is adequately covered, with 18.85 km^2 (30.87 %) represented in PAs. On country level the target is covered only in Slovenia and Albania, where the total surface is covered with PAs, respectively 0.35 km^2 (99.98 %) in Slovenia and 18.41 km^2 (99.90 %) in Albania. In Croatia this target is gap, with only 0.08 km^2 (0.20 %) represented within PAs. In Montenegro no surface in covered with PAs, hence the target is as total gap.

5.3.5.4. Bays

Surface of target in DAE	**km²**		**%**	
	338.76		0.95	
Surface of target in countries		**km²**	**% of country**	**% of marine DAE**
	Slovenia	0	0	0
	Croatia	252.11	0.79	0.71
	Bosnia and Herzegovina	2.73	19.49	0.01
	Montenegro	83.92	3.49	0.24
	Albania	0	0	0

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	156.32	62.00
	III	0.01	0.00
	V	0.15	0.06
	V/VI	0.00	0.00
	Total	156.48	62.07
Montenegro	**Total**	0	0
DAE	**Total**	157.70	46.55

Bays occur on a surface of 338.76 km² (0.95 % of the marine surface). Only in Croatia the target is adequately covered, with 156 km² (62.07 %) within PAs. In Bosnia and Herzegovina and Montenegro the target is a total gap.

5.3.5.5. Salt marshes, standing brackish and saltwater

Surface of target in DAE	**km²**		**%**	
	97.34		0.09	
Surface of target in countries		**km²**	**% of country**	**% of DAE**
	Slovenia	7.72	0.12	0.00
	Croatia	10.59	0.03	0.01
	Bosnia and Herzegovina	0	0	0
	Montenegro	16.74	0.12	0.01
	Albania	62.29	0.53	0.06

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	IV	23.27	37.36
	V	15.85	25.45
	Total	39.12	62.81
Croatia	III	0.03	0.28
	IV	1.43	13.50
	V	6.11	57.70
	Total	7.57	71.48
Montenegro	V	1.03	6.15
	Total	1.03	6.15
Slovenia	III	0.04	0.52
	IV	1.43	18.52
	V	6.22	80.57
	Total	7.69	99.61
DAE	**Total**	55.41	56.92

Salt marshes, standing brackish and saltwater occurs on a surface area of 97.34 km^2 which is only 0.09 % % of the DAE surface area. This target is missing in Bosnia and Herzegovina. On a regional level the target is adequately covered, with 55.41 km^2 (56.92 %) represented in PAs. On country level the target is covered in Slovenia, Croatia and Albania, with respectively 7.69 km^2 (99.61 %) in Slovenia, 7.57 km^2 (71.48 %) in Croatia and 39.12 km^2 (62.81 %) in Albania. In Montenegro 1.03 km^2 (6.15 %) are covered with PAs, and the target is a gap.

5.3.5.6. Dunes, salt steppes and salt scrubs

Surface of target in DAE	**km^2**		**%**	
	92.97		0.09	
Surface of target in countries		**km^2**	**% of country**	**% of DAE**
	Slovenia	0	0	0
	Croatia	18.43	0.06	0.01
	Bosnia and Herzegovina	0	0	0
	Montenegro	11.43	0.08	0.01
	Albania	63.11	0.53	0.06

Country	**PA category**	**Surface in PA (km^2)**	**Surface in PA (%)**
Albania	IV	29.22	46.30
	V	15.92	25.23
	Total	45.14	71.53
Croatia	V	1.93	10.47
	Total	1.93	10.47
Montenegro	III/V	5.51	48.20
	Total	5.51	48.20
DAE	**Total**	52.58	56.55

Dunes, salt steppes and salt scrubs occurs on a surface area of 92.97 km^2 which is only 0.09 % of the DAE surface area. This target is missing in Slovenia and Bosnia and Herzegovina. On the regional level the target is adequately covered, with 52.58 km^2 (56.55 %) represented in PAs. On country level the target is covered in all three countries, whit respectively 1.93 km^2 (10.47 %) in Croatia, 5.51 km^2 (48.20 %) in Montenegro and 45.14 km^2 (71.53 %) in Albania. In none of the countries the target is represented in any IUCN category I or II PA.

5.3.5.7. Fish spawning and feeding sites

Surface of target in DAE	**km²**		**%**	
	2,777.82		2.01	
Surface of target in countries		**km²**	**% of country**	**% of marine DAE**
	Slovenia	9.45	5.28	0.03
	Croatia	2,097.30	-	-
	Bosnia and Herzegovina	0	0	0
	Montenegro	388.79	-	-
	Albania	282.28	-	-

Country	**PA category**	**Surface in PA (km²)**	**Surface in PA (%)**
Albania	II	1.05	0.37
	IV	155.25	55.00
	V	4.92	1.74
	Total	161.23	57.11
Croatia	I/IV	94.27	4.49
	II	249.97	11.92
	III	0.01	0.00
	V	21.94	1.05
	V/VI	97.41	4.64
	Total	463.60	22.10
Montenegro	II	308.18	79.27
	III/V	0.00	0.00
	V	1.22	0.31
	Total	309.39	79.58
Slovenia	III	0.02	0.21
	V	0.14	1.48
	Total	0.16	1.69
DAE	**Total**	934.39	33.63

Fish spawning and feeding sites were identified on an area of 2777.82 km^2. This target partially matches targets Mediterranean lakes and coastal lagoons. On a regional level the target has to be considered covered within PA on an area of 934.39 km^2 (33.63 %). On country level this target can not be considered covered only in Slovenia, where 0.17 km^2 (1.69 %) are represented in PAs. In other countries the target is covered as follows: Croatia 463.60 km^2 (22.10 %), Montenegro 309.39 km^2 (79.58 %) and Albania 161.23 km^2 (57.11 %).

5.3.5.8. Corridors for the Loggerheaded turtle

Surface of target in DAE	**km^2**		**%**	
	12,405.61		34.85	
Surface of target in countries		**km^2**	**% of country**	**% of marine DAE**
	Slovenia	0	0	0
	Croatia	12,255.41	38.49	34.45
	Bosnia and Herzegovina	13.66	97.57	0.03
	Montenegro	39.94	1.66	0.11
	Albania	96.60	8.45	0.27

Country	**PA category**	**Surface in PA (km^2)**	**Surface in PA (%)**
Albania	**Total**	0	0
Bosnia and Herzegovina	**Total**	0	0
Croatia	I/IV	594.40	4.85
	II	143.73	1.17
	III	0.01	0.00
	V	7.43	0.06
	V/VI	21.63	0.18
	Total	767.20	6.26
Montenegro	**Total**	0	0
DAE	**Total**	767.20	6.18

Corridors for the Loggerheaded turtle were identified on an area of 12,405.61 km^2. On a regional level the target is not covered within PA, since only an area of 767.20 km^2 (6.20 %) is represented. On country level this target can not be considered covered in any of the countries. In Bosnia and Herzegovina, Montenegro and Albania it is a total gap. In Croatia the target is a gap, with 767.20 km^2 (6.26 %) within PAs.

5.3.5.9. Important areas for bottlenose dolphin

Surface of target in DAE	**km^2**		**%**	
	4,130.31		11.61	
Surface of target in countries		**km^2**	**% of country**	**% of marine DAE**
	Slovenia	30.79	17.20	0.09
	Croatia	3,462.04	10.87	9.73
	Bosnia and Herzegovina	0	0	0
	Montenegro	5.69	0.24	0.02
	Albania	631.79	55.28	1.78

Country	**PA category**	**Surface in PA (km^2)**	**Surface in PA (%)**
Albania	**Total**	0	0
Croatia	I/IV	535.38	15.46
	II	302.67	8.74
	III	0.00	0.00
	V	29.84	0.86
	V/VI	70.09	2.02
	Total	937.99	27.09
Montenegro	**Total**	0	0
Slovenia	III	0.12	0.38
	V	0.77	2.50
	Total	0.89	2.88
DAE	**Total**	938.88	22.73

Important areas for bottlenose dolphin were identified on an area of 4130.31 km^2. On a regional level the target is adequately covered within PA, on an area of 938.88 km^2 (22.73 %). In Montenegro and Albania it is a total gap. In Croatia the target can be considered covered, with 937.99 km^2 (27.09 %) within PAs. In Slovenia this target was identified on an area of 30.79 km^2. Only 0.89 km^2 (2.88 %) are within PAs.

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