



Final Report of the WWF Protected Areas for a Living Planet – Dinaric Arc Ecoregion Project Protected Area Gap Analysis



This document is a synthesis of the Final Report of the WWF Protected Areas for a Living Planet – Dinaric Arc Ecoregion Project Protected Area Gap Analysis carried out by the WWF Mediterranean Programme Office, June-December 2009. It provides a concise overview of the biodiversity of the Dinaric Arc Ecoregion and identifies areas with little or no protection so that more sound management decisions in planning a Protected Area network can be made.

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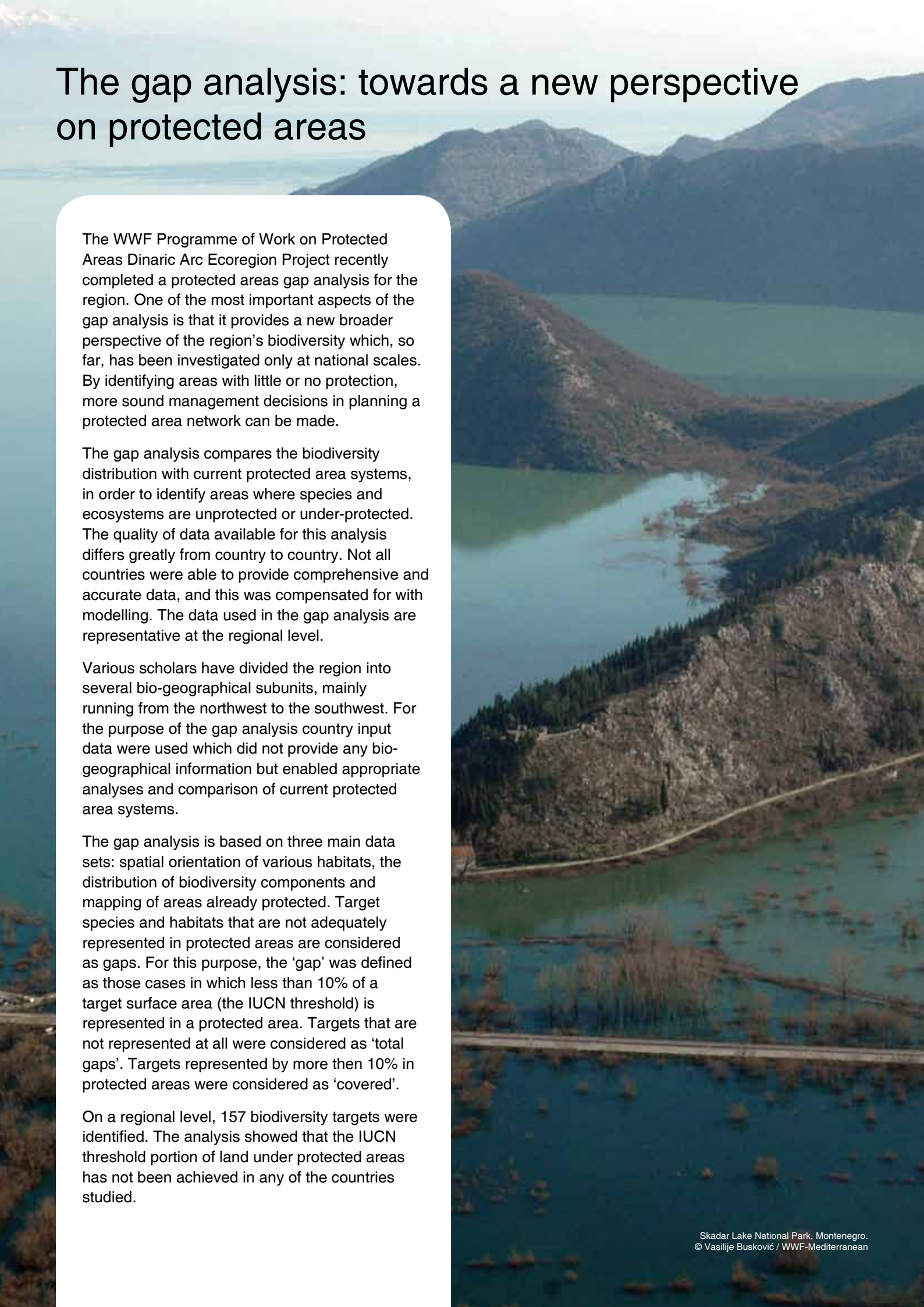
What is special about the Dinaric Arc Ecoregion?

The world is becoming increasingly aware of the importance of the Dinaric Arc region as one of Europe's biodiversity hotspots. An extraordinarily fragmented landscape, diverse geological composition, the impacts of different climate types and the invasion of neighbouring biogeographical territories have all contributed to the high biodiversity of the area. This has also been favoured by 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 including the brown bear, lynx and wolf.

The region extends from its border with the Alps in Slovenia through Croatia and a large part of Bosnia and Herzegovina and Montenegro, ending in the north of Albania, and is characterised by a central mountain range that extends into Serbia, Kosovo and Macedonia. The whole Dinaric Arc region is characterised by karst phenomena. Water erosion transformed carbonate bedrock into surface and underground karst features, home to some unique species, including the endemic cave salamander *Proteus anguinus*. The cave system represents the largest underground river system in Europe and is therefore an extremely important source of water for the entire region.

The warm Mediterranean climate has had a significant impact on the diversity of flora and fauna in the Dinaric Arc. Habitats which differ dramatically can be found within short distances. Freshwater environments have been greatly affected by human activity, which has changed both the geomorphological and the biodiversity aspect of rivers. A large number of endemic species inhabit the rivers of the Adriatic basin, and there is a high concentration of endemic species in the region as a whole: the Dinaric vole, certain lizards, the cave salamander, many invertebrates and a number of plant species that have found refuge in the shelter of rocks, especially in river valleys and mountains.

The gap analysis: towards a new perspective on protected areas



The WWF Programme of Work on Protected Areas Dinaric Arc Ecoregion Project recently completed a protected areas gap analysis for the region. One of the most important aspects of the gap analysis is that it provides a new broader perspective of the region's biodiversity which, so far, has been investigated only at national scales. By identifying areas with little or no protection, more sound management decisions in planning a protected area network can be made.

The gap analysis compares the biodiversity distribution with current protected area systems, in order to identify areas where species and ecosystems are unprotected or under-protected. The quality of data available for this analysis differs greatly from country to country. Not all countries were able to provide comprehensive and accurate data, and this was compensated for with modelling. The data used in the gap analysis are representative at the regional level.

Various scholars have divided the region into several bio-geographical subunits, mainly running from the northwest to the southwest. For the purpose of the gap analysis country input data were used which did not provide any bio-geographical information but enabled appropriate analyses and comparison of current protected area systems.

The gap analysis is based on three main data sets: spatial orientation of various habitats, the distribution of biodiversity components and mapping of areas already protected. Target species and habitats that are not adequately represented in protected areas are considered as gaps. For this purpose, the 'gap' was defined as those cases in which less than 10% of a target surface area (the IUCN threshold) is represented in a protected area. Targets that are not represented at all were considered as 'total gaps'. Targets represented by more than 10% in protected areas were considered as 'covered'.

On a regional level, 157 biodiversity targets were identified. The analysis showed that the IUCN threshold portion of land under protected areas has not been achieved in any of the countries studied.

Analysis of each biodiversity target indicates that:

in Albania

97 targets were identified in Albania, of which 38 (41.2%) were identified as gaps and 5 (5.2%) as total gaps. 54 targets (53.6%) are adequately covered by protected areas, which amounts to almost 1,280km² (9.86%) of the Dinaric terrestrial part of Albania. The great majority of protected areas occur in the lowlands. At the time the gap analysis was completed, there were no marine protected areas in Albania.

in Bosnia and Herzegovina

The least protected area in the region is Bosnia and Herzegovina. Only 1,083km² (2.63%) of the area within the ecoregion is currently protected. Out of 111 targets identified in the country, 79 (71.2 %) of them indicated gaps and 21 (18.9%) total gaps. Only 11 targets (9.9%) can be considered as adequately covered by protected areas. Gaps occur evenly in all analysed groups of targets. There are no marine protected areas on the small portion of the Bosnia and Herzegovina coastline.

in Slovenia

Targets are not fully covered in Slovenian protected areas. Of a total of 85 targets identified in Slovenia, only 15 (17.6%) are adequately covered by protected areas, 68 (80%) result as a gap and 2 (2.4%) as a total gap. Gaps occur equally in all analysed groups of targets.

in Croatia

A total of 133 targets were identified in Croatia. 78 targets (58.6%) are adequately covered by protected areas, 52 (39.1%) result as a gap and 3 (2.3%) as a total gap. According to results, the system of terrestrial protected areas of Croatia should be considered effective for the protection of biodiversity. However, some important gaps were identified. The Croatian protected area system adequately covers land at higher altitudes, while lowlands and hilly areas (between 0 and 600m.a.s.l.) are not adequately covered. This is also true for the gaps which predominantly occur in lowland targets. Evergreen forests of the coastal areas and higher mountain areas are adequately covered. Forests of lower hilly areas are not. Karstic fields, which are widely distributed in the country and are of vital importance for biodiversity, are not adequately covered by protected areas. Gaps were identified among reptile species, especially those occurring in the warmest lowland areas. Significant gaps relating to freshwater fish, the great majority of which are endemic, were also identified.

in Montenegro

109 targets were identified in Montenegro, of which 60 (55%) indicate gaps, 15 (14%) total gaps, and 34 could be considered as adequately covered by protected areas. A little over 1,000km² (6.2%) of the land area in the Dinaric Arc part of the country is protected. Even though the majority of protected areas occur in the lowlands, a great number of lowland targets indicate gaps. This is because lakes and wetland surface areas have major shares in the protected area system. Gaps are equally distributed in all groups of targets. Only high mountain targets are relatively well covered by protected areas. There are no marine protected areas in Montenegro. It must be noted that the Montenegrin National Park of Prokletije was established after this analysis had started and is not included. This park will significantly improve the protected area system in Montenegro.



In the future

The analysis showed that the level of protected area designations in the Dinaric Arc is not sufficient to ensure adequate biodiversity protection for the region. Only in the terrestrial areas of Croatia has the IUCN 10% threshold portion of protected land surface been achieved. Marine protected areas in the whole region fall far below the threshold.

Bosnia and Herzegovina, with its central role in connecting biodiversity between the north and south Dinaric Arc, almost completely lacks a system of protected areas with respective corridors. The lack of adequate data indicates a future investment in compiling field inventories for a full understanding of the biodiversity of the area. This is particularly true for biodiversity hotspots.

The geographic characteristics of the Dinaric Arc indicate that the region will be seriously influenced by anticipated climate change. Higher temperatures with longer periods of drought will cause disruption to natural communities, with the extinction of populations and species. Since the region is characterised by high geomorphological diversity it is also expected that changes in the altitudinal distribution of species and habitats will occur. Changes in climate, together with the developing infrastructure, will create (and are already creating) favourable conditions for the arrival and acclimatisation of new alien and invasive animal and plant species. Climatic changes will also affect marine ecology. The impacts of temperature changes on phytoplankton populations – as primary biomass producers – will trigger subsequent changes at all food chain levels.

Conclusions

With less than 3% of its surface area adequately covered by protected areas, Bosnia and Herzegovina – with its central role in connecting biodiversity – is in urgent need of a protected area system. Biodiversity at lower altitudes in Montenegro and Albania is inadequately protected, mainly due to the large portion of one ecosystem type in the protected area system (Skadar/Schkoder Lake and the coastal lagoons in Albania). In Slovenia, Croatia and Bosnia and Herzegovina lowlands are not adequately represented in the protected area systems, while habitats at higher altitudes throughout the region can be considered as adequately represented. The highest gap relates to habitats between 200 and 1400m.a.s.l. which, together with the lowlands, are subject to the highest human pressures.

At a regional level the majority of forest types are not adequately represented. Only evergreen forests and scrub, thermophilous beech forests, coastal flooded forests of ash and common oak and shrubs of mountain pine are adequately represented. High mountain grasslands ('rudine'), thermophilous grasslands and karstic fields with surface hydrology were identified as gaps. Other terrestrial habitats are adequately represented within protected areas. Cave biodiversity is under-represented in the protected area systems. More comprehensive and focused research is required to define the full value of this biodiversity component which is extremely important for the entire region.

Inland mountains are areas particularly rich in small terrestrial mammals. Gaps were identified for these equally throughout the entire region. The most significant reptile hotspots are along the Adriatic coast, most influenced by the warm and dry Mediterranean climate. Gaps were identified for most of the islands. Areas with the highest diversity of amphibian species were identified in the central Dinaric part of Slovenia, in northern Croatia and in the mountains of eastern Bosnia and Herzegovina, Montenegro, and Albania. Gaps are equally distributed throughout the region.

No detailed maps of nesting birds were available. The importance of karst poljes for nesting and migrating bird populations were analysed. Only in Slovenia were these extremely important habitats and characteristic landscape features found to be adequately protected. Again, the greatest gap was identified in Bosnia and Herzegovina where only three important bird sites were adequately protected. On a regional level, important bird sites are protected.

Areas rich in freshwater fish were identified in the river systems of Dalmatia and south Bosnia and Herzegovina, particularly the rivers Krka, Cetina and Neretva. All identified areas are under high pressure from human activities. On a regional level all of the most important areas for freshwater fish are under-represented within current protected area systems.

Major gaps in the protection of large mammals were identified in Slovenia and in Bosnia and Herzegovina, where no species is adequately covered. Planned infrastructure will further fragment the ranges of populations of large carnivores

Concerning marine biodiversity, insufficient data related to marine ecosystems in the entire project area indicate that significant research is needed to address the information gap. In Croatia, marine protected areas cover a little more than 3% of the surface area. There are no marine protected areas in Montenegro and Albania. Although marine protected areas in Croatia are insufficient, it was found that some identified targets were adequately represented within them. Coastal habitats are adequately covered within terrestrial protected areas.



Why we are here.
WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

